

EXAMINERS' REPORTS 2010

[Abridged version for Ox-only website]

MATERIALS SCIENCE (MS)

MATERIALS, ECONOMICS & MANAGEMENT (MEM)

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REPORT ON PRELIMINARY EXAMINATION IN MATERIAL SCIENCE

Part I

A. STATISTICS

Category	Number			Percentage		
	2009/10	2008/09	2007/08	2009/10	2008/09	2007/08
Distinction	8	9	7	27	32	25
Pass	20	16	20	67	57	71
Fail	2**	3*	1	6	11	4

(** Both passed the resit in September; * One candidate passed the resit)
One further candidate passed the entire 2009/10 examination in September.

Marking of scripts

Scripts are single marked except for borderline cases which are double-marked.

B. NEW EXAMINING METHODS AND PROCEDURES

None in this year

C. Please list any changes in examining methods, procedures and conventions which the examiners would wish the faculty/department and the divisional board to consider.

None

D. Please describe how candidates are made aware of the examination conventions to be followed by the examiners

Circulation by Deputy Administrator (Academic) to all students and tutors by e-mail, hard copy, and onto the Departmental website.

A copy of the conventions for this examination is attached below.

Part II

A. GENERAL COMMENTS ON THE EXAMINATION

31 students were registered for the examination, but one had to withdraw through illness.

27 candidates passed all papers, without the necessity for compensation. One candidate was awarded a compensated pass (in MS2). Of the total of 28 successful candidates in June, 8 were awarded Distinctions, all with marks above 72%.

All but one candidate passed the MS1 and MS2 paper in June. Two candidates failed MS3 and Mathematics. In the Long Vacation examination one candidate successfully passed all 4 papers and

another passed the 2 that he had failed. The candidate who missed the June examination completed all 4 successfully.

The prize for the best overall performance in Prelims was awarded to Shengde Tham of St Catherine's College. The prize for the best performance in 1st year Practicals was awarded to Michelle Lim, also of St Catherine's College. Additional prizes for outstanding performance were awarded to Ian Faulkner of St Anne's College, and Anna Ploszajski, of Mansfield College.

B. EQUAL OPPORTUNITIES ISSUES AND BREAKDOWN OF THE RESULTS BY GENDER

3 candidate were notified to the Examiners as requiring extra time.

Gender Issues:

Of the 30 candidates 13 were women and 17 men.

2 of the 8 distinctions were awarded to women.

In view of the small overall number of candidates, it is not sensible to draw conclusions from these data. The mean score for males was 62.5 and for females 65.9.

C. DETAILED NUMBERS ON CANDIDATES' PERFORMANCE IN EACH PART OF THE EXAMINATION

All candidates took the same papers for the whole examination.

D. COMMENTS ON PAPERS AND INDIVIDUAL QUESTIONS

Attached.

E. COMMENTS ON THE PERFORMANCE OF IDENTIFIABLE INDIVIDUALS AND OTHER MATERIAL WHICH WOULD USUALLY BE TREATED AS RESERVED BUSINESS

F. NAMES OF MEMBERS OF THE BOARD OF EXAMINERS

Prof J.M. Sykes (Chairman)

Dr S.C. Benjamin

Dr J.D. Murphy

Dr J.M. Smith

Attachments: Examination Conventions 2010

Comments on Materials Science 1: Structure of Materials

Comments on Materials Science 2: Properties of Materials

Comments on Materials Science 3: Transforming Materials

Comments on Maths for Materials and Earth Scientists

Examination Conventions 2009/10
Common Preliminary Examination
Materials Science and Materials, Economics & Management

The formal procedures determining the conduct of examinations are established and enforced by the University Proctors. These conventions are a guide to the examiners and candidates but the regulations set out in the Examination Regulations have precedence. The examiners are nominated by the Nominating Committee* in the Department and those nominations are submitted for approval by the Vice-Chancellor and the Proctors. In Prelims the examiners are called “moderators”. Formally, moderators are independent both of the Department and of those who lecture. The paragraphs below give an indication of the conventions to which the moderators usually adhere, subject to the guidance of other bodies such as the Academic Committee in the Department, the Mathematical, Physical and Life Sciences Division, the EPSC and the Proctors who may offer advice or make recommendations to the moderators.

It must be stressed that to preserve the independence of the Moderators, candidates are not allowed to make contact directly about matters relating to the content or marking of papers. Any communication must be via the Senior Tutor of your college, who will, if he or she deems the matter of importance, contact the Proctors. The Proctors in turn communicate with the Chairman of Prelims.

(1) *Setting of papers*

The Moderators set the papers, but are advised to consult the course lecturers. The course lecturers are required to provide draft questions if so requested by the Moderators. The Prelims paper on Maths for Materials and Earth Sciences is set jointly by the Departments of Earth Sciences and Materials. There are no external examiners for Prelims.

(2) *Paper Format*

The Materials Science papers 1 - 3 comprise eight questions from which candidates must attempt five. Each question is worth 20 marks. The total marks available for each of these papers are 100. The Prelims paper on Maths for Materials and Earth Sciences consists of two sections, candidates are required to answer all questions in Part A and 4 from Part B.

(3) *Marking of papers*

For prelims double marking is not necessarily double “blind” marking. It is usually considered sufficient for the second marker merely to check the first marker’s marks.

(4) *Marking of course practicals and crystallography classes*

First year practicals are assessed regularly by senior demonstrators in the teaching laboratory. The work done for crystallography classes is assessed by the Crystallography Class Organiser(s). The assessed work for both practicals and crystallography classes constitutes the Coursework Paper. Each of the five papers in Prelims, comprising the 3 Materials Science papers, Maths for Materials and Earth Sciences, and the Coursework Paper, carry equal total marks. Satisfactory performance in the practical work is defined in the MS/MEM Prelims Handbook. Penalties for late submission of practical reports are set out in this handbook.

* for 2009-10 the Nominating Committee comprises Dr Czernuszka (Chair), Professor Grovenor and Dr Taylor.

(5) *Classification*

The pass/fail border is at 40%. Distinctions are usually awarded for average marks of at least 70%. Failure in one or two written papers may be compensated by better performance in other written papers provided the candidate obtains at least 35% on the failed paper. Failure of three papers precludes compensation. Where compensation is permitted, only those marks in excess of 40 on a passed paper may be used towards compensation and normally this shall be at a rate of 3 marks to every deficit mark to be compensated.

For example, if two written papers are passed and marks of 36% and 38% are obtained in the remaining two written papers then the total for the four written papers must be at least 172 marks $\{36 + 38 + 2 \times 40 + \underline{3} \times (4+2)\}$ for both failures to be compensated

The Moderators have the authority to use their discretion and consider each case on its merit.

(6) *Failure of one or more Papers*

Failure of the coursework paper will normally constitute failure of the Preliminary Examination. Materials coursework cannot normally be retaken. Exceptionally a candidate who has failed the coursework may be permitted jointly by the Moderators and the candidate's college to retake the entire academic year.

Candidates who pass the coursework paper and fail 1 or 2 written papers will be asked to resit only those written papers.

Candidates who pass the coursework paper and fail more than 2 written papers will be asked to resit all 4 written papers.

The resits usually take place in September. To pass a resit paper the candidate must obtain at least 40%, and normally no compensation is allowed. There is only one opportunity to resit the examination, and failure to pass a resit examination normally results in the candidate being prevented from continuing to Part I. Exceptionally, a college may allow a student to go down for a year and take Prelims a second time the following June.

The Moderators have the authority to use their discretion and consider each case on its merit.

MS1: Structure of Materials

Examiner: Dr JM Smith (Q1 to Q4), Dr JD Murphy (Q5 to Q8)

Candidates: 30

Mean mark: 61.5 %

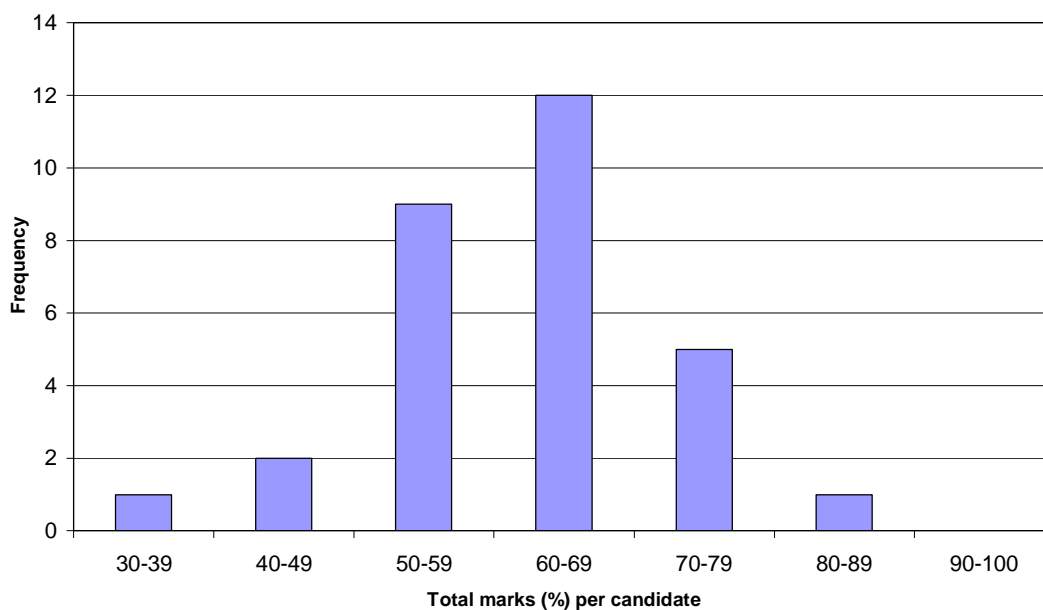
Maximum mark: 88 %

Minimum mark: 34 %

One candidate failed this paper, but passed the Long Vac resit in September. A further candidate sat MS1 for the first time in September and passed.

Question	No of answers	Average mark	Highest mark	Lowest mark
1	19	12.9	19	6
2	16	12.4	17	8
3	19	13.4	17	9
4	28	12.8	19	8
5	13	11.8	18	2
6	7	10.9	16	6
7	24	10.4	15	6
8	24	12.9	18	6

Prelims 2009/10
Materials Science 1



General Comments

1. A question on quantum theory and bonding. 19 attempts. Experimental evidence of wave-particle duality was well answered. Converting the energy of a photon from its wavelength was fine but too many mistakes in calculating the de Broglie wavelength of an electron given its kinetic energy. Candidates were able to show that the wave functions satisfied Schrodinger's equation (although I've now noticed that there's a mistake in the paper – it should show V as a constant not $V(x)$ – that didn't seem to trouble any of the students). Sketching of the moduli squared of the wave functions was poor, and only one candidate scored full marks on section (d). Relatively few could contextualise the different wave functions.
2. A question on crystallography answered by about half the cohort. Part (a) on terminology done well. Part (b) on various crystal parameters for zinc blende GaAs. Bond length, plane separation, and mass density were generally done well. Less good was number density of atoms in $\{111\}$ planes. Part (c) on the complex structure factor was generally quite well done. Many used cosine form and some just applied rules they'd memorised for cubic F (which results in errors). Two candidates went all the way and produced relative intensities from modulus square of complex factor.
3. A question on symmetry answered by 19 candidates. Part (a) was on terminology: 'lattice' and 'motif' were defined well, but a wide variety of answers were given for 'point group' and 'space group' with a common misconception being that they represented symmetries in 2D and 3D respectively. Part (b) required identification of symmetry elements in two sketched 2D objects and was done very well. Part (c) required identification of the plane group elements of a sketched lattice with motif. Most candidates got several but not all, of the symmetry elements. None identified all elements. Part (d) on the symmetry of a simple cubic crystal was done very well.
4. A question on the stereographic projection and simple cubic stereogram viewed along (001). The most popular question on the paper, with most candidates showing some good knowledge. In part (a) many candidates limited their answer to what the projection *does*, rather than what it *is* (ie how to construct it). Although most drew good stereograms in part (b) it followed that most were unable to identify the distance from (001) to (011). Parts c-f were done with mixed success. Everyone knew the Weiss zone law, but most struggled to apply it to finding the position of (112) in (d). Wulff nets in part (e) were variable, but most had some idea of what they were for in (f)
5. This question on the defects course was answered by just under half the candidates. Part (a) was generally well done, although some candidates failed to comment on the local crystallography. Most candidates could sketch the graph in part (b), but only a few could explain the initial rise in energy correctly. Part (c) stumped all but a couple of candidates. About half the candidates could calculate the energy per dislocation, but very few could work out the number of dislocations required for a 2° misorientation.
6. This was an unpopular question. Part (a) was reasonably well done, although most candidates could not (correctly) name a brittle polymer. Only a few candidates could name four mechanisms in part (b). Understanding of the rule of mixtures was not good in many cases. In part (c) most candidates were able to sketch the upper limit (axial), but only a few also sketched the lower limit (transverse). Part (d) was well done by those who correctly did part (c).
7. This was a popular question, but was not, in general, answered well. Answers to part (a) were usually reasonable, although some candidates merely defined the terms, rather than explaining them. Part (b) (i) was answered reasonably. Part (b)

(ii) was answered poorly, with many candidates giving standard answers on precipitation hardening which were of limited relevance to the question. Only a few candidates demonstrated knowledge of the sigma phase. In part (b) (iii), most candidates wrote down the Hume-Rothery rules. Only a few used them to their full potential; valency was too often disregarded.

8. This was a popular question and answers were mostly reasonable. In part (a) all candidates correctly named the bonding types, but a few failed to describe them. Candidates were often rather limited in their discussion of “physical properties” (melting point, thermal conductivity and electrical conductivity were often not discussed). Parts (b) and (d) were generally well answered. In part (c) some candidates got confused by the number of Na or Cl atoms in the unit cell and some candidates seemed strangely reluctant to put any numbers into their expressions.

MS2: Properties of Materials

Examiners: Dr JD Murphy (Q1 to Q5), Dr JM Smith (Q6 to Q8)

Candidates: 30

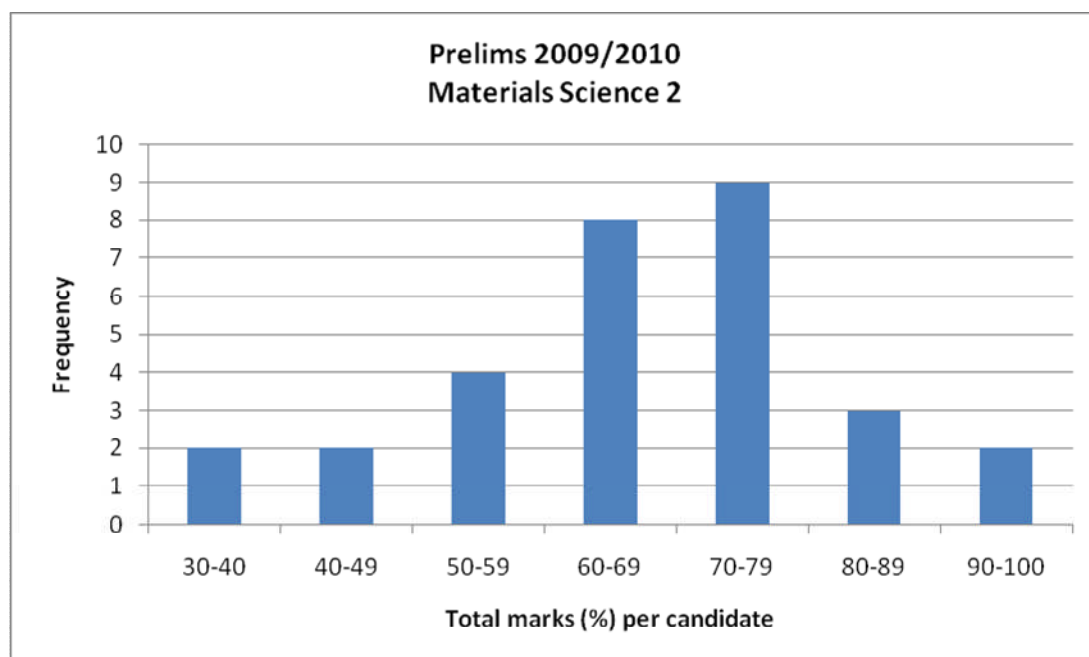
Mean mark: 66.1 %

Maximum mark: 91 %

Minimum mark: 33 %

One candidate failed this paper. Another candidate was given a compensated pass. The candidate who failed passed a re-sit paper in September. A further candidate sat MS2 for the first time in September and passed.

Question	No of answers	Average mark	Highest mark	Lowest mark
1	29	15.7	20	9
2	19	9.8	17	4
3	24	12.5	17	6
4	27	14.1	20	4
5	27	11.8	18	2
6	7	15.4	20	11
7	2	10.0	11	9
8	15	14.1	18	4



General Comments

1. This question was answered by all but one candidate. It was generally well answered and five candidates scored full marks. However, many candidates drew incorrect diagrams in part (b) and in a lot of cases no values were put on axes. Most candidates knew how to do part (d), although there were a worrying number of numerical errors.
2. This was a fairly popular question, but it was not well answered. A significant proportion of candidates confused pure and simple shears. Only a few candidates correctly answered the Mohr's circle part. Most candidates did not understand how to use the engineering strains given. Only a handful of candidates were able to write down correct expressions for the stresses in part (c).
3. This was another popular question. The vast majority of candidates could derive the Griffith equation, but many candidates could not clearly differentiate between toughness and strength. Many candidates described typical strengthening (as opposed to toughening) mechanisms in part (c) and did not argue how they might also contribute to increased toughness. Typical material classes were often omitted too.
4. This was a popular question, answered by all but three candidates. Students who had mastered the stereographic projection tended to do very well and two scored full marks. Common mistakes included not stating or justifying the number of independent slip systems in part (b) or, for candidates who did not use the stereographic projection, thinking that the slip system with second highest Schmid factor in part (c) was the second system to operate in part (d).
5. This was also answered by all but three candidates. Generally, it was not answered very well. Most students knew roughly how to derive the critical stress in part (a), but the number of candidates who thought the integral of $\sin x$ was $\cos x$ was a cause for concern. In part (b) candidates often just ascribed names to phenomena without explaining what was going on. In part (c) most candidates discussed stacking fault energy or more available slip systems generally in BCC, but a large number of candidates didn't discuss both of these.
6. A question on Gauss's Law of electrostatics, answered by seven candidates of the cohort. Most answers were very good, marks being lost where students clearly relied more on memory than on working through the equations and made slips that weren't picked up. This occurred mostly in parts (b) and (c).
7. A question on Ampere's law of magnetic induction, only attempted by two candidates scoring 9 and 11. The level of bookwork and analysis required mirrored that in question 6. Both candidates did OK in parts (a) and (b) but neither candidate got as far as proving the quantitative result in part (c).
8. A question on the kinetic theory of gases, requiring candidates to construct the expression for pressure using distribution functions. Attempted by fifteen students of the cohort, it was generally done well. Most candidates attempting the question got all the 'assumptions' right in part (a) and did well in part (b), but marks were lost in parts (c) and (d) where lapses in understanding and errors in quantitative evaluation were revealed.

**Preliminary Examination in Materials Science 2010
MS3: Transforming Materials**

Examiner: Prof J.M. Sykes

Candidates: 30

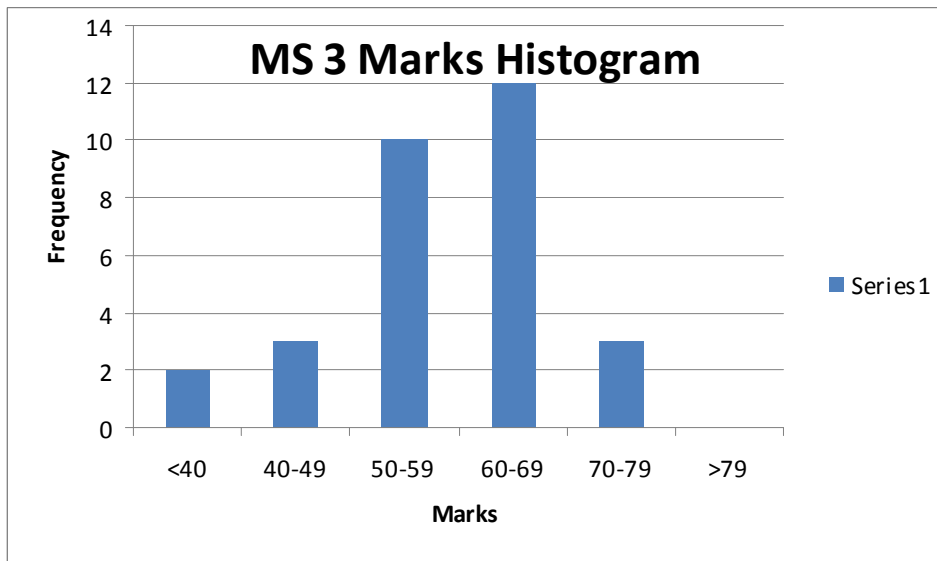
Mean mark: 58.2 %

Maximum mark: 73 %

Minimum mark: 30%

Two candidates failed this paper, but both passed a re-sit paper in September. A further candidate sat all papers for the first time in September and passed the re-sit paper.

Question	No of answers	Average mark	Highest mark	Lowest mark
1	13	11.2	18	3
2	22	8.1	16	4
3	28	13.5	18	4
4	25	9.0	15	2
5	20	12.8	19	4
6	14	16.0	20	10
7	9	9.9	16	4
8	19	13.2	19	7



General Comments

1. **Phase diagram:** There were several good answers to this question, but a number of candidates were unable to remember how the elements of a complex phase diagram fit together, or in some cases what the individual reactions look like.
2. **Ellingham diagram:** Most candidates had a general idea of the diagram, but there were few really good answers. Very many forgot to normalise the data to **one mole of oxygen**, despite a very similar problem on a recent paper. Only one or two actually said **standard** Gibbs Function.
3. **Solidification:** Most candidates could handle basic ideas on nucleation. Not all grasped that large undercoolings arise from the need to nucleate. Ideas on dendrites were mostly sketchy.
4. **Electrochemistry:** This question was poorly answered throughout; few knew the formation cell for PbO, or could write reactions for a metal/metal oxide electrode. Nor were students able to recall the use of Ag/Ag⁺ coupled to Ag/AgCl/Cl⁻ to obtain a solubility product - a question on the lecturer's problem sheet.
5. **Solutions:** plenty of good answers here, but with some careless errors. A few ignored differentiation of ΔG with T as a route to ΔS , preferring the lengthier statistical derivation.
6. **Processing:** The best marks overall, with the majority of answers showing a fair grasp of the basics. Relatively few howlers.
7. **Polymers:** Many started well on this question, but few could explain the concept of, or purpose of weight average and number average molecular weights, or complete the calculation correctly. None could handle the sections on PEEK.
8. **Thermochemistry (Thermit reaction):** Plenty of good answers here to a very basic question. Several thought that integrating the definition of C_p would give the Kirchoff equation in one step. Most could handle basic thermochemistry, but few understood clearly all the enthalpy changes involved in generating molten iron from cold reactants.

Maths for Materials and Earth Sciences

Examiner: Dr SC Benjamin

Candidates: 30

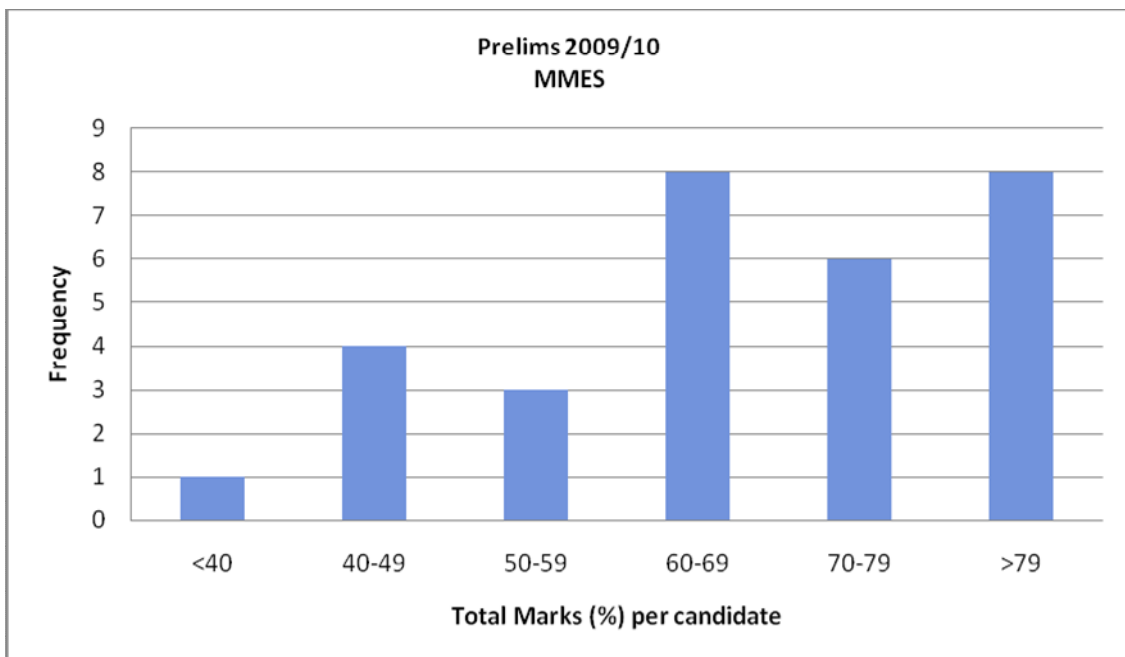
Mean mark: 68.2 %

Maximum mark: 93.9 %

Minimum mark: 36.7 %

Two candidates failed this paper, but passed the Long Vac resit in September. A further candidate sat MMES for the first time in September and passed.

Question	No of Answers	Average Mark	Highest Mark	Lowest mark
1	30	4.83	8	1
2	30	7.10	8	4
3	30	4.90	8	2
4	30	6.63	8	0
5	30	5.20	8	1
6	30	4.17	8	0
7	30	2.30	8	0
8	30	6.50	8	0
9	30	6.63	8	2
10	30	6.33	8	2
11	9	16.89	25	4
12	29	21.72	25	8
13	13	7.85	23	1
14	28	15.79	25	2
15	12	14.92	25	3
16	28	19.29	25	6



General Comments

- Q1-10 Of these, the standout question was 7 (complex numbers) with only a few candidates showing a knowledge of how to approach the question.
- Q11 The least popular question. Reasonably answered by those that attempted it. Probably appeared unusual as similar questions only asked once or twice in last 8 years.
- Q12 Most popular question. Well answered.
- Q13 Unpopular question which was only answered well by a couple of candidates; all others scored poorly. Typically demonstrating lack of understanding of rules of partial differentiation.
- Q14 Popular question. Fairly well answered but lots of slips made.
- Q15 Unpopular question, actually an easy one but candidates were confused on how to approach and tended to take "brute force" approach which is vulnerable to slips.
- Q16 Second most popular question; well answered, candidates demonstrated good knowledge of how to solve diff. eqn., most marks lost through slips.

REPORT ON FINAL HONOURS SCHOOL OF MATERIALS SCIENCE, PART I EXAMINATION

Part I

A. STATISTICS

(1) Numbers and percentages in each category

The Part I Examination in Materials Science is unclassified. No distinctions are awarded.

Category	Number			Percentage		
	2009/10	2008/09	2007/08	2009/10	2008/09	2007/08
Distinction	n/a	n/a	n/a	n/a	n/a	n/a
Pass	24	22	25	100	100	100
Fail	0	0	0	0	0	0

(2) If vivas are used

The Board of Examiners decided at the start of the examination process that Part I students would not be given vivas. Students were informed of this by e-mail on 31 March 2010 and again on 26 April 2010. The information was also made available on the Department website from 26 April 2010.

(3) Marking of scripts

All scripts were double-blind marked by the Examiners and Assessors. The full procedures are described in the Examination Conventions.

B. NEW EXAMINING METHODS AND PROCEDURES

In previous years, examiners could offer half marks for each question. The marks awarded by each examiner for each question were then averaged and if the result was non-integer, the mark assigned to that question was rounded up. This year, again, half marks could be offered for each question. These marks were then added and divided by two to give a total for the entire paper. If this total ended with a half mark, then the paper total was rounded up. This change was introduced to reduce the number of marks rounded up per candidate.

C. CHANGES IN EXAMINING METHODS, PROCEDURES AND CONVENTIONS WHICH THE EXAMINERS WOULD WISH THE FACULTY AND THE DIVISIONAL BOARD TO CONSIDER

(1) Team Design Projects

a. The team design project teams consisted of different numbers of candidates. [REDACTED]
[REDACTED]. We suggest [REDACTED]
[REDACTED] that the report is signed to confirm that it complies with this word limit.

b. We recommend that the course handbook emphasises more strongly that it is a requirement of the team design project report that the primary author of each section is identified.

c. It was noted that the contributions made by individual members of the team could not easily be identified. This could be made clearer by including a table at back of each report, which lists the major contributor(s) to the work contained in each section of the report. We recommend that this possibility is considered.

(2) Unit of Assessment Titles on Examination Schools Results Templates

Currently, in the results templates, no information appears which indicates whether an entry is a percentage or an absolute mark. For example, a practical result which appears as '36' corresponds to a mark of 36 out of 60, whereas a mark of '36' for the team design projects corresponds to a mark of 36 out of 50. This is complicated by the way in which the Part II marks appear, which is as a percentage rather than as a mark out of 400 (or 200 for MEM). It is a further concern that this also appears on the student transcripts. We recommend that the assessment title be redrafted to provide more information concerning the mark awarded.

D. EXAMINATION CONVENTIONS

The previous year's Examination Conventions were included in the Course Handbook that was distributed to all candidates in hard-copy and was also made available on the Departmental website, to which candidates' attention was drawn by e-mail. The current year's Conventions (2010, attached) were put on the Departmental website and sent electronically on 31 March 2010 and again on 26 April 2010 to all candidates. The Examination Conventions were assessed by the Board of Examiners and the Department's Academic Committee.

Part II

A. GENERAL COMMENTS ON THE EXAMINATION

There were 24 candidates for the examination, and all were awarded Honours. The examination consisted of 6 written papers plus coursework that included a team design project, a business plan, industrial visit reports and practical work carried out during the 2nd year. Two candidates opted to take the language option, and one opted to take the History and Philosophy of Science option. These options replaced the business plan. In addition, candidates completed further coursework in the 3rd year in the form of either a module on Materials Characterisation (11 candidates) or one on Materials Modelling (13 candidates). One candidate who withdrew from the Part I Examination last year returned this year to take only the written papers, and was not required to redo the coursework components of the exam.

Each written paper lasted 3 hours. For the General papers, candidates were required to answer 5 questions out of 8, as in previous years. For the Option papers, where candidates were offered 9 questions in 3 sections each containing 3 questions; candidates were required to answer 3 questions, 2 from one section and 1 from either of the remaining sections.

Team design projects were marked by two Examiners, one of whom was the Chairman. Teams were marked as groups. The allocation of bonus or penalty marks is permitted under the Conventions, but was not used.

The business plans were marked by an Assessor from the Said Business School and an Assessor appointed to represent the Faculty of Materials, again with teams being marked as a group.

Candidates' work on the two coursework modules were marked either by 2 Assessors (modelling) or 3 Assessors (characterisation).

Reports for each of the Industrial Visits were assessed as pass/fail by the Industrial Visits Organiser, appointed as an Assessor.

The overall mean mark for Part I was in the middle of the 2(i) range. The mean marks of 5 of the 6 written papers in the examination were in the 2(i) band (60-70%) and so no scaling needed to be considered. The remaining paper had a mean mark of 57.7%. The Examiners, including the external Examiners, considered the need to scale this paper. However, we considered that the paper was set at an appropriate level and that the low mean mark obtained was a result of a small number of students pulling down the average: 3 students having scored less than 40%. Mean marks for the practical work were higher than for the papers, being in the 1st class band, but this is in line with the results from previous years.

B. EQUAL OPPORTUNITIES ISSUES AND BREAKDOWN OF THE RESULTS BY GENDER

Insofar as can be judged from the small sample size, the performance of male and female candidates was not significantly different. Both male and female groups of candidates performed better in the coursework than in written examinations.

A non-serif font was again used for examination this year, in order to make them comply with SENDA/ADA guidelines. No specific requests were received for enlarged copies, but one request for the exam to be printed on yellow paper was received and allowed. Candidates were allowed extra time on account of dyslexia/dyspraxia, where necessary, and the outcomes seemed satisfactory.

mark (%)	Overall mark		Written Examinations		Coursework	
	Male	Female	Male	Female	Male	Female
40–50	-	■	2	■	-	■
50–60	5	■	3	■	-	■
60–70	6	■	9	■	5	■
70–80	7	■	4	■	14	■
80–90	1	■	1	■	-	■
Totals	19	5	19	5	19	5

C. DETAILED NUMBERS ON CANDIDATES' PERFORMANCE IN EACH PART OF THE EXAMINATION

All candidates took the same papers for the whole examination, in that there were no optional written papers.

D. COMMENTS ON PAPERS AND INDIVIDUAL QUESTIONS

Detailed comments on the written examination papers and overall candidates' performance on individual questions are attached

E. COMMENTS ON THE PERFORMANCE OF IDENTIFIABLE INDIVIDUALS AND OTHER MATERIALS WHICH WOULD USUALLY BE TREATED AS RESERVED BUSINESS

Two medical certificates were received and considered. [REDACTED]

323251	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
838296	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

F. NAMES OF MEMBERS OF THE BOARD OF EXAMINERS

Dr. P. R. Wilshaw (Chairman)	Dr. R.I. Todd
Prof. C.R.M. Grovenor	Dr. A. Kirkland
Dr. P.D. Nellist	Dr. A.J. Wilkinson
Prof. J. Binner (external)	Prof. M. Rainforth (external)

Attachments: Examination Conventions 2009/10 Final Honours School Materials Science

- Comments on General Paper 1
- Comments on General Paper 2
- Comments on General Paper 3
- Comments on General Paper 4
- Comments on Option Paper 1
- Comments on Option Paper 2

Examination Conventions 2009/10

Final Honours School

Materials Science

1. INTRODUCTION

The formal procedures determining the conduct of examinations are established and enforced by the University Proctors. These conventions are a guide to the examiners and candidates but the regulations set out in the Examination Regulations have precedence. The examiners are nominated by the Nominating Committee* in the Department and those nominations are submitted for approval by the Vice-Chancellor and the Proctors. Formally, examiners are independent of the Department and of those who lecture courses. However, for written papers on Materials Science in Part I examiners are expected to consult with course lecturers in the process of setting questions. The paragraphs below indicate the conventions to which the examiners usually adhere, subject to the guidance of the appointed external examiners, and other bodies such as the Academic Committee in the Department, the Mathematical, Physical and Life Sciences Division, the Education Committee of the University and the Proctors who may offer advice or make recommendations to examiners. It must be stressed that to preserve the independence of the examiners, candidates are not allowed to make contact directly about matters relating to the content or marking of papers. Any communication must be via the Senior Tutor of your college, who will, if he or she deems the matter of importance, contact the Proctors. The Proctors in turn communicate with the Chairman of Examiners.

During the marking process the scripts of all written papers remain anonymous to the markers. [In some of the descriptions of marking for individual elements of coursework that are given later in this document the term 'double marked, blind,' is used; this refers to the fact that the second marker does not see the marks awarded by the first marker until he or she has recorded his or her own assessment, and does not indicate that the candidate is anonymous to the markers.]

Marking criteria for the Business Plan, Team Design Project and Part II project are published in the relevant course handbook.

Late Submission of or Failure to Submit Coursework

The Examination Regulations stipulate specific dates for submission of the required pieces of coursework to the Examiners (1. One piece of Engineering & Society Coursework; 2. A set of detailed reports of practical work; 3. A Team Design Project Report; 4. Industrial Visit Reports as specified in the course handbook; 5. A report on the work carried out in either the Characterisation of Materials module or the Introduction to Modelling in Materials module; and 6. A Part II Thesis). Rules governing late submission and any consequent penalties are set out in the 'Late submission of work' sub-section of the 'Regulations for the Conduct of University Examinations' section of the Examination Regulations (pp45-46 of the 2006, 2007 & 2008 Regulations and pp46-47 of the 2009 Regulations).

Under the provisions permitted by the regulation, late submission of coursework for Materials Science or Materials, Economics & Management examinations will normally result in the following penalties:

- (a) With permission from the Proctors under clause (1) of para 16.8 no penalty.
- (b) With permission from the Proctors under clauses (3) + (4) of para 16.8, for the first day or part of the first day that the work is late a penalty of a reduction in the mark for the coursework in question of up to 10% of the maximum mark available for the

* for 2009-10 the Nominating Committee comprises Dr Czernuszka (Chair), Professor Grovenor and Dr Taylor.

piece of work, and for each subsequent day or part of a day that the work is late a further penalty of up to 5% of the maximum mark available for the piece of work; the exact penalty to be set by the Examiners with due consideration given to any advice given in the Proctors' "Notes for the Guidance of Examiners and Chairmen of Examiners".

- (c) Where the candidate is not permitted by the Proctors to remain in the examination he or she will be deemed to have failed the examination as a whole.

Where no work is submitted or it is proffered so late that it would be impractical to accept it for assessment the Proctors may, under their general authority, and after (i) making due enquiries into the circumstances and (ii) consultation with the Chairman of the Examiners, permit the candidate to remain in the examination. In this case the Examiners will award a mark of zero for the piece of coursework in question.

Penalties for late submission of individual practical reports are set out in the MS/MEM FHS Handbook and are separate to the provisions described above.

2. PART I

(1) Setting of papers

Part I General Papers 1 – 4 are set by the examiners in consultation with course lecturers. The responsibility for the setting of each examination paper is assigned to an examiner, and a second examiner is assigned as a checker. Option papers are set by lecturers of the option courses and two examiners, the examiners acting as checkers. The examiners, in consultation with lecturers, produce model answers for every question set. The wording and content of all examination questions set, and the model answers, are scrutinised by all examiners, including, in particular, the external examiners.

(2) Paper Format

All General papers comprise eight questions from which candidates attempt five. Each question is worth 20 marks. The total number of marks available on each general paper is 100. Materials Option papers comprise three sections, each section containing three questions: candidates attempt three questions, two from one section and the third from either of the remaining sections. The total number of marks available on each option paper is 100, and all questions carry equal marks. Questions are often divided into sections, with the approximate marks for each section indicated on the question paper.

(3) Marking of papers

All scripts are double marked, blind, by the setter and the checker. After individual marking the two examiners meet to agree marks question by question. If the differences in marks are small (~10% of the total available for the question, 2-3 marks for most questions), the two marks are averaged. Otherwise the examiners identify the discrepancy and read the answer again, either in whole or in part, to reconcile the differences. If after this process the examiners still cannot agree, they seek the help of the chairman, or another examiner as appropriate, to adjudicate.

Options papers are marked by course lecturers acting as assessors and an examiner acting as a checker.

The external examiners provide an independent check on the whole process of setting and marking. The rubric on each paper indicates a prescribed number of answers required (e.g. "candidates are required to submit answers to no more than five questions"). Candidates will be asked to indicate on their cover sheet which questions, up to the prescribed number, they are submitting for marking. If the cover slip is not completed then the examiners will mark the first five questions in numerical order by question number. The examiners will NOT mark questions in excess of the prescribed number. If fewer questions than the prescribed number are attempted, (i) each missing attempt will

be assigned a mark of zero, (ii) for those questions that are attempted **no** marks beyond the maximum per question indicated under section 2(2) above will be awarded and (iii) the mark for the paper will still be calculated out of 100.

As the total number of students is small, it is not unusual for mean marks to vary from paper to paper, or year to year. It is not therefore normal practice to adjust marks to fit any particular distribution. However, where marks for papers are unusually high or low, the examiners may, having reviewed the difficulty of the paper set or other circumstances, decide with the agreement of the external examiner to adjust all marks for those papers. Such adjustment is referred to as 'scaling' and the normal procedure will be as follows:

- i. Papers with a *mean taken over all candidates* of less than 55% or more than 75% are normally adjusted to bring the *mean* respectively up to 55% or down to 75%. Normally this is achieved by adding/subtracting the same fixed number of marks to/from each candidate's score for the paper.
- ii. For papers with a mean in the ranges either of 55-60% or 70-75%, including those scaled under (i) above, the questions and typical answers are compared in order to ascertain, with the help of the external examiners, whether the marks are a fair reflection of the performance of the candidates as measured against the class descriptors. If not, the marks are adjusted. Normally this is achieved by adding/subtracting the same fixed number of marks to/from each candidate's score for the question or for the paper.
- iii. The mean mark and the distribution of marks, both taken over all written papers, are considered, again with the help of the external examiners, in order to ascertain whether these overall marks are a fair reflection of the performance of the candidates as measured against the class descriptors. If not, the overall marks are adjusted. Normally this is achieved by adding/subtracting the same fixed number of marks to/from each candidate's overall score.

(4) *Marking of Second Year Practicals for Part I*

Second year practicals are assessed continually by senior demonstrators in the teaching laboratory and are allocated 60 marks. Part I examiners have the authority to set a practical examination.

(5) *Marking Industrial Visits*

Four industrial visit reports should be submitted during Part I. Reports are assessed by the Industrial Visit Coordinator on a satisfactory / non-satisfactory basis, and are allocated a total of 20 marks.

(6) *Marking Engineering and Society Essays*

The business plan for "Entrepreneurship and new ventures" is double marked, blind, by two assessors; last year one assessor was from the Said Business School and one was appointed by the Faculty of Materials. The business plan is allocated a total of 20 marks.

If the Foreign Language Option or a Supplementary Subject has been offered instead of the Business Plan, the reported % mark, which is arrived at in accordance with the CVCP degree class boundary descriptors, is divided by five to give a mark out of 20.

(7) *Marking the Team Design Project*

The team design project is double marked, blind, by two of the Part I Examiners. They then compare marks and analyse any significant disagreement between these marks before arriving at a final agreed mark for each project and each team member. Supervisors of the projects submit a written report to the examiners on the work carried out by their teams and these are taken into

consideration when the examiners decide the final agreed marks. Industrial representatives may be asked to contribute to the assessment process. The project is allocated 50 marks, of which 25 are for the written report and 25 for the oral presentation. The same two examiners assess both the reports and the presentations.

(8) *Marking the Characterisation of Materials and the Introduction to Materials Modelling modules*

The reports for these modules are double marked, blind, by the module assessors. Normally, at least one of the two assessors for each report will be a module organizer. The assessors then compare marks and analyse any significant disagreement between these marks before arriving at a final agreed mark for each report. The Chairman of Examiners oversees this process, sampling reports to ensure consistency between the different pairs of assessors and the two modules. The lead organizer for the Characterisation Module submits to the Assessors and Examiners of the module a short report which provides, by sample set only, (i) a summary of the availability of appropriate characterization instruments during the two-week module and (ii) any other pertinent information. An analogous report is provided by the lead organizer for the Modelling Module in respect of the software & hardware required for each mini-project. The Report for the Characterisation module is allocated 50 marks and each of the two reports for the Modelling module are allocated 25 marks.

(9) *Part I vivas*

There will be no Part I vivas in the 2009/10 Examination.

3. PART II

The Part II project is assessed by means of a thesis which is submitted to the Examiners, who will also take into account a written report from the candidate's supervisor*.

The project is allocated 400 marks, which is one third of the total marks for Parts I and II. Two Part II examiners read the thesis, including the project management chapter, together with Part A of the supervisor's report, and each of them independently allocates a provisional mark based on the guidelines** published in the course handbook. In addition, normally the thesis will be read by one of the two external examiners.

A *viva voce* examination is held: the purpose of the viva is to clarify any points the readers believe should be explored, and to ascertain the extent to which the work reported is the candidate's. An examiners' discussion is held after the viva, involving all Part II examiners, and at which time Part B of the supervisor's report is taken into account. The outcome of the discussion is an agreed mark for the project. It is stressed that it is the scientific content of the project that is being considered in the viva. In the overwhelming majority of cases, the viva has only a small influence on the agreed mark awarded to a Part II thesis.

If there are believed to be mitigating circumstances, such as illness, which may have affected the candidate's progress with the project these should, in the normal way, be drawn to the attention of the Senior Tutor at the candidate's college, who will, if appropriate, inform the Proctors. The Proctors may in turn communicate with the Chairman of Examiners about the mitigating circumstances. Subject to guidance from the Proctors, if appropriate the Board of Examiners will take into account these mitigating circumstances in their discussion after the viva.

* The Supervisor's report is divided into Parts A & B: Part A provides simple factual information that is of significance to the examiners, such as availability of equipment, and is seen by the two markers before they read and assess the thesis. Part A does **not** include personal mitigating circumstances which, subject to guidance from the Proctors, normally are considered only in discussion with **all** Part II examiners thus ensuring equitable treatment of all candidates

with mitigating circumstances. Part B of the supervisor's report provides her/his opinion of the candidate's engagement with the project and covers matters such as initiative and independence; it is not seen by the examiners until the discussion held after the viva.

** These guidelines may change and candidates are notified of any such changes before the end of Hilary Term of their 4th year.

4. CLASSIFICATION

The following boundaries (CVCP) and descriptors (MPLSD) are used as guidelines:

Class I Honours 70 – 100	The candidate shows excellent problem-solving skills and excellent knowledge of the material over a wide range of topics, and is able to use that knowledge innovatively and/or in unfamiliar contexts.
Class Ii Honours 60 – 69	The candidate shows good or very good problem-solving skills, and good or very good knowledge of much of the material over a wide range of topics.
Class Iii Honours 50 – 59	The candidate shows basic problem-solving skills and adequate knowledge of most of the material.
Class III Honours 40 - 49	The candidate shows reasonable understanding of at least part of the basic material and some problem solving skills. Although there may be a few good answers, the majority of answers will contain errors in calculations and/or show incomplete understanding of the topics.
Pass 30 - 39	The candidate shows some limited grasp of basic material over a restricted range of topics, but with large gaps in understanding. There need not be any good quality answers, but there will be indications of some competence.
Fail 0 - 29	The candidate shows inadequate grasp of the basic material. The work is likely to show major misunderstanding and confusion, and/or inaccurate calculations; the answers to most of the questions attempted are likely to be fragmentary only.

In borderline cases the examiners use their discretion and consider the overall quality of the work the candidate has presented for examination. The external examiner often plays a key role in such cases.

Part I:

Unclassified Honours – The examiners are required to classify each candidate according to her/his overall average mark in Part I as (a) worthy of Honours, (b) Pass or (c) Fail. A candidate is allowed to proceed to Part II only if he/she has been adjudged worthy of honours by the examiners in Part I. The examiners do not divide the categories further but tutors and students may infer how well they have done from their marks. Candidates adjudged worthy of honours normally proceed to Part II but they may, if they wish and subject to approval from the relevant bodies, leave after Part I in which case an Unclassified Honours B.A. degree will be awarded.

Pass – The examiners consider that the candidate is not worthy of honours and therefore will not be allowed to proceed to Part II. The candidate may leave with a B.A. (without honours) or may retake Part I the following year (subject to college approval).

Fail – The examiners consider that the candidate is not worthy of a B.A. The candidate either leaves without a degree or may retake Part I the following year (subject to college approval).

Part II:

Classified Honours – Once marking is completed for both Parts I and II an overall percentage mark is computed for each candidate and classification then takes place. Subject to the requirement that Part II be adjudged worthy of honours (see below), classification is based solely on the overall percentage mark; the candidate's profile of marks from each element of assessment is only taken into account in borderline cases. However, a candidate cannot be awarded an M.Eng. degree unless his/her performance in Part II is adjudged worthy of honours i.e. a candidate must be adjudged worthy of honours both in Part I and in Part II to be awarded the M.Eng. degree. Failure to achieve honours in Part II will result in the candidate leaving with an unclassified B.A. (Hons) irrespective of the aggregate mark.

Pass – Notwithstanding the award of unclassified honours in Part I, the examiners consider that the candidate’s overall performance is not worthy of an M.Eng. The candidate is listed as a Pass on the class list and is awarded an unclassified B.A. (Hons) on the basis of Part I performance.

Fail – The examiners consider that the candidate’s overall performance is not worthy of an M.Eng. *and* that the performance in Part II is not worthy of a Pass. The candidate is excluded from the class list but is nevertheless awarded an unclassified B.A. (Hons) on the basis of Part I performance.

- The examiners cannot award unclassified honours on the basis of Part II performance unless permitted to do so by the Proctors.
- Nevertheless, candidates awarded a Pass or a Fail by the Part II examiners leave with an unclassified B.A. (Hons) because they were judged worthy of that in Part I (i.e. their degree is the same as if they had left immediately after Part I).
- In terms of the degree awarded, there is no difference between a Pass and a Fail in Part II. The only difference is whether or not the name appears on the class list.
- Candidates cannot normally retake Part II because the Examination Regulations require that they must pass Part II within one year of passing Part I. This rule can only be waived in exceptional circumstances, with permission from the Education Committee.

Annex: Summary of marks to be awarded for different components of the MS Final Examination in 2010 (For Part I and Part II students who embarked on the FHS respectively in 2008/09 and 2007/08)

	Component	Mark
Part I	General Paper 1	100
	General Paper 2	100
	General Paper 3	100
	General Paper 4	100
	Options Paper 1	100
	Options Paper 2	100
	Practicals & Industrial visits	80
	Engineering and Society coursework	20
	Team Design Project	50
	Characterisation or Modelling options module	50
	<i>Part I Total</i>	<i>800</i>
Part II	Thesis	400
<i>Overall Total</i>	<i>1200</i>	

General Paper 1 – Structure and Transformations

Examiner: Professor CRM Grovenor

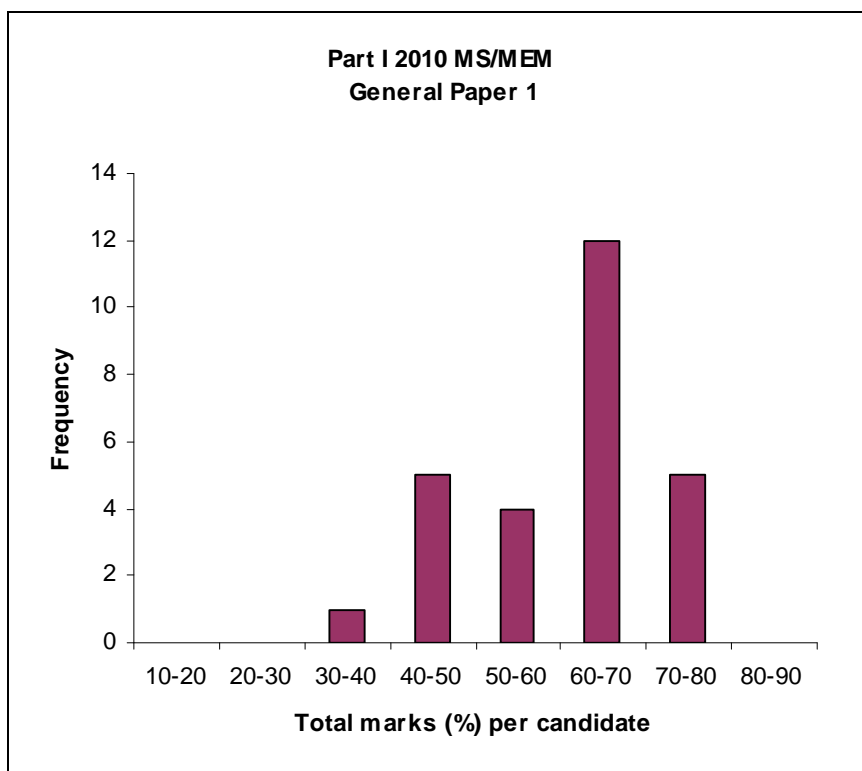
Candidates: 27 (24 MS / 3 MEM)

Mean mark: 62.41%

Maximum mark: 79.5%

Minimum mark: 36%

Question	Topic	No of Answers	Average Mark	Highest Mark	Lowest mark
1	Powder spraying and properties	11	12.27	15.5	7.5
2	Polymer microstructures	13	12.42	16	5.5
3	Corrosion	15	10.23	17	7
4	Ternary phase diagrams	19	14.71	20	4.5
5	Surface structures and energies	19	11.39	15.5	8.5
6	Solidification	22	12.75	18	7
7	Precipitation	13	8.35	14.5	5.5
8	Diffusion	23	15.22	18.5	8.5



General Comments:

There were no surprises with this paper. The questions were very standard in style and content. The spread of answers for particular questions was not too skewed, with the smallest number of answers for any question being 11 (from 27 candidates). The average scores ranged from 8.35 – 15.2, again roughly in line with normal expectations. The overall paper average was 62.4%, well within the target range. There were some excellent scripts showing a very high level of understanding, and a few poor performances where the ability to reproduce even the most standard definitions at the start of questions was lacking.

1. A standard powder processing question that was the least attractive (11 answers), but with an average score of 12.3 was done quite well
2. Polymer microstructures, concentrating on polyethylene and including some diffraction patterns to interpret. Attempted by roughly half the candidates, and with a respectable average score of 12.4.
3. Standard Evans diagram question. Few good attempts at the rather simple calculation, and some very garbled diagrams, brought the average score down to 10.3.
4. Ternary phase diagram question with 2 ternary reactions. Popular (19) and a high overall average (14.7). The isothermal section was the part least well done.
5. Extremely straightforward Surfaces question that was quite popular (19) but with an average of 11.4 was not really very well done. The quality of the prose in the definitions was particularly poor in some cases.
6. Scheil and Bridgman growth profiles, and constitutional supercooling. Popular (22) and a respectable average score (12.7), but some candidates seemed to understand very little about this standard material.
7. Thermodynamics of precipitation and massive transformations. Attempted by about half the candidates, but by some way the poorest overall average (8.35). Many candidates could attempt neither the simple derivation nor explain massive transformations.
8. Solution of Fick's 2nd law for homogenisation of a casting. Most popular and best overall score. Many candidates could reproduce the derivation of the solution to Fick 2 even though the question did not ask for it.

General Paper 2 – Electronic Properties of Materials

Examiner: Dr Peter Wilshaw

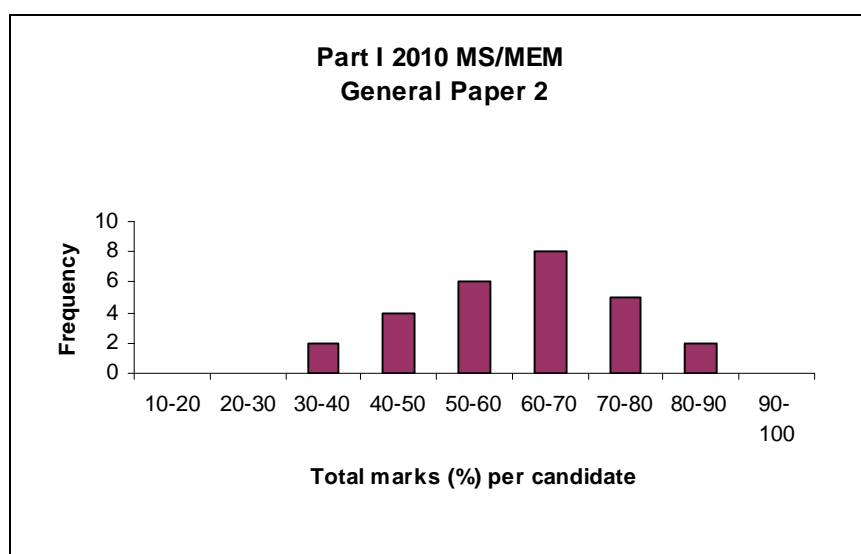
Candidates: 27 (24 MS / 3 MEM)

Mean mark: 61.85%

Maximum mark: 90.0 %

Minimum mark: 32.5 %

Question	Topic	No of Answers	Average Mark	Highest Mark	Lowest mark
1	Electronic structure of materials	24	11.69	19	6
2	Electrical and optical properties of materials.	4	6.88	9.5	6
3	Magnetic properties of materials.	22	14.61	18.5	3.5
4	Electrical and optical properties of materials.	6	13.75	17.5	7
5	Tensors	22	13.39	19	8
6	Semiconductor materials	21	10.31	18	2
7	Quantum and statistical mechanics	24	12.56	16.5	9
8	Quantum and statistical mechanics	12	12.13	19	1



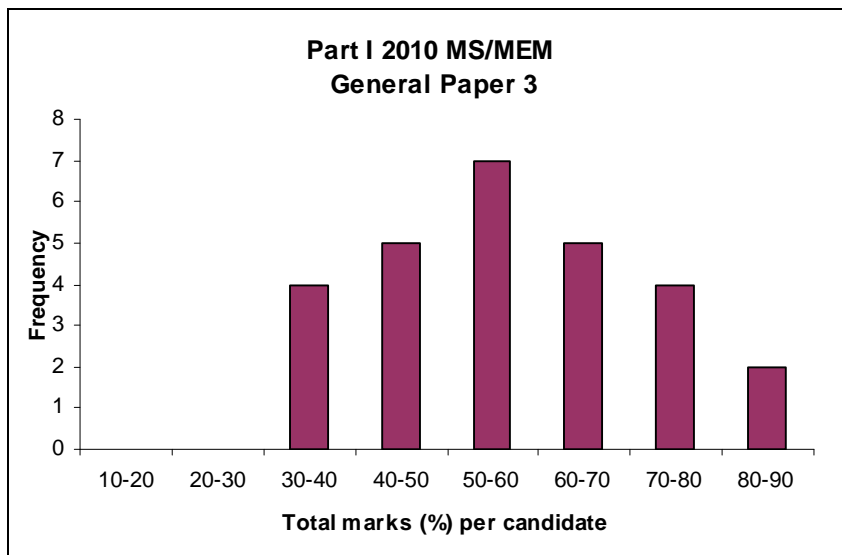
General Comments:

1. A very popular question mostly on standard free electron theory. The first two parts which were book work were very well answered. The final part introduced a nanowire comprising a chain of Au atoms, which students had not met in lectures or tutorials, and this was where most students lost marks.
2. This question on polarised light was the most unpopular on the paper and was attempted by only 4 candidates. The marks were also the lowest for any question. This may be due to it being the first time in many years that a question on this topic had been set. Most of the question was rather straightforward and, had the material been properly learnt and revised, many candidates ought to have scored well on this question.
3. A popular question on the Weiss theory of ferromagnetism which was generally very well answered.
4. An unpopular question on the electrical conductivity of impure ionic solids. Mostly the first part was well answered (a standard but difficult derivation) whereas the second, non-standard, part tended to attract either very high or very low marks, presumably indicating that only some candidates could work out how to solve the problem but those who did then found it straightforward.
5. This question on tensors was well answered by most candidates. There were a few careless mistakes in part b which needlessly lost marks.
6. The first parts of this question on semiconductors, which required essay style answers, were done well. The final part, which required the derivation of expressions for the depletion region width and built in voltage of a pn junction, was done rather poorly. This is particularly disappointing as this part of the question was rather similar to a tutorial question associated with the course.
7. A very popular question on wave-particle duality which produced good marks on the first two parts but surprisingly poor marks on the second two parts. In particular the calculation of the minimum uncertainty in wavelength of a short pulse of light was not answered satisfactorily by any of the 24 candidates who attempted this question.
8. A generally well answered question on statistical mechanics. Most marks were lost on the final section concerning the magnetic component of specific heat capacity.

General Paper 3 – Mechanical Properties

Examiner: Dr Angus Wilkinson
Candidates: 27 (24 MS, 3 MEM)
Mean mark: 56.4 %
Maximum mark: 84.0 %
Minimum mark: 33.0 %

Question	Topic	No of Answers	Average Mark	Highest Mark	Lowest mark
1	Microplasticity	3	10.00	14.5	6
2	Microplasticity	25	12.18	18.5	7
3	Elastic Behaviour in Isotropic Materials	24	14.23	20	6.5
4	Mechanical Properties of Polymers	19	9.24	15	4.5
5	Creep	13	6.81	14.5	1.5
6	Fracture	12	6.88	15	0.5
7	Macroplasticity & Mechanical Working Processes	15	10.77	17.5	3.5
8	Mechanical Properties of Composites	19	15.79	20	8.5



General Comments:

1. very few attempts at this question, with one first class script and two very weak scripts. It is not clear whether candidates were put off this question by not knowing the derivation required for part (a), or by an inability to interpret the TEM micrographs in part (b).
2. in (a) all candidates described the misfit/stress field interaction, with the second mechanism spread over modulus effect, valence effect in ionic crystals and the Suzuki effect. In part (bi) only one candidate converted a calculation of shear strength (carried out correctly by many) to a tensile strength. In part (bi) many candidates suggested the micrograph indicated that the precipitates had been sheared by dislocations.
3. answered by many students with the majority getting full marks for parts (a) and (b). Correctly setting up boundary conditions in (c) was found more difficult by some. There were many instances of using diameters given in the question as radii, and mistakes with the sign convention for pressure and stress.
4. answers to parts (a) and (b) were often rather vague and incomplete. In part (c) most struggled either failing to integrate correctly or to deal with limits. Poor answers to (d) and (e) indicated a lack of physical insight on the part of most candidates.
5. Answers to this question were generally very poor. Many candidates indicated that the boundary between Power law and Coble creep occurred when the two creep rates were equal but then failed to plot/sketch where this boundary lay on the deformation mechanism map.
6. Answers to part (a) were generally disappointing given that this was a rather standard question on a basic fracture mechanics parameter. The more mathematically able made some headway with part (bi). Although the expression for K_{I} was given very few were able to sketch the function to answer part (bii).
7. In part (a) a surprising number of candidates did not mention the insensitivity of the yield stress of most metals to hydrostatic stress or stress normal to the slip plane. Part (b) is a standard derivation for which reasonable answers were given.
8. despite the majority of candidates gaining high marks in parts (b) and (c) there were many weak answers to part (a) suggesting that calculation methods having been learnt without grasping the physical understanding.

General Paper 4 – Engineering Applications of Materials

Examiner: Professor Angus Kirkland

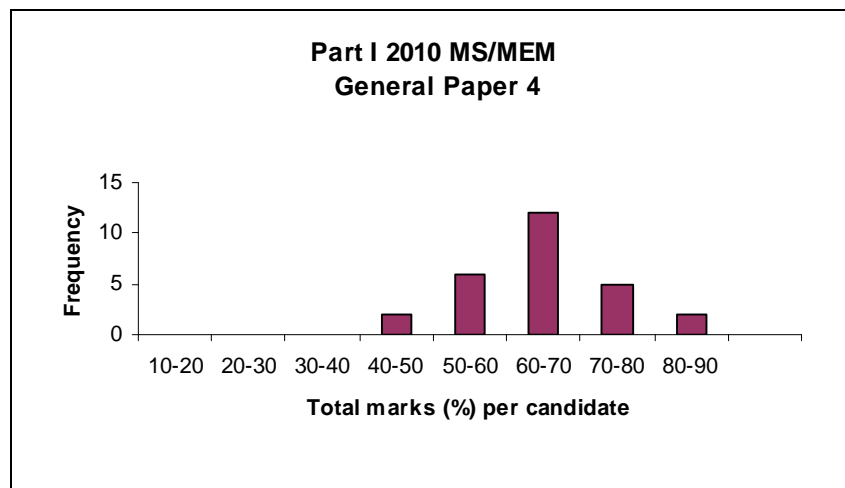
Candidates: 27 (24 MS, 3 MEM)

Mean mark: 65.2 %

Maximum mark: 83.5 %

Minimum mark: 41.5 %

Question	Topic	No of Answers	Average Mark	Highest Mark	Lowest mark
1	Microstructural Analysis	20	12.88	19.5	7
2	Microstructural Characterisation	23	14.54	18.5	6.5
3	Polymers	9	11.61	14	9.5
4	Semiconductor Devices	17	13.21	18	8.5
5	Engineering Alloys	10	13.85	17.5	10
6	Engineering Alloys	22	11.95	16	6
7	Engineering Alloys	11	12.41	16	7
8	Ionic Oxides	18	14.44	18.5	10.5



General Comments:

1. A popular question, generally well answered. Few students correctly identified the energy levels involved in the EDX transitions.
2. A very popular question which was very well answered. Almost all students could give examples of different methods for achieving magnification and were able to draw ray diagrams for the effects of chromatic and spherical aberration. Some students could not write down the resolution expression needed in part c).
3. Few students attempted this question and the attempts were mediocre. Most answers did not address the improvements required for part b) and many answers did not give suitable materials for the LED in part c).
4. A popular question with very good answers to part a). The answers to part b) generally gave only one factor and most students could not sketch the band structure of the HEMT in part c)
5. An unpopular question but generally well answered, particularly parts b) and c). Marks were lost by a number of candidates in part a) where the discussion of the advantages and disadvantages of Mg alloys was too brief.
6. A popular question, reasonably answered. Marks were lost for the most part by insufficient detail in answers to part c).
7. Not a popular question but reasonably well answered. In general marks were lost in parts b) and c) where many answers did not provide sufficient detail particularly with regard to performance and properties.
8. This question was popular and generally very well answered. Marks were lost by a number of candidates who could not provide balanced equations and identify the nature of the defects in part b). Many candidates also failed to critically compare the alternative processing routes required in part c).

Materials Option Paper 1

Examiner: Dr Richard Todd

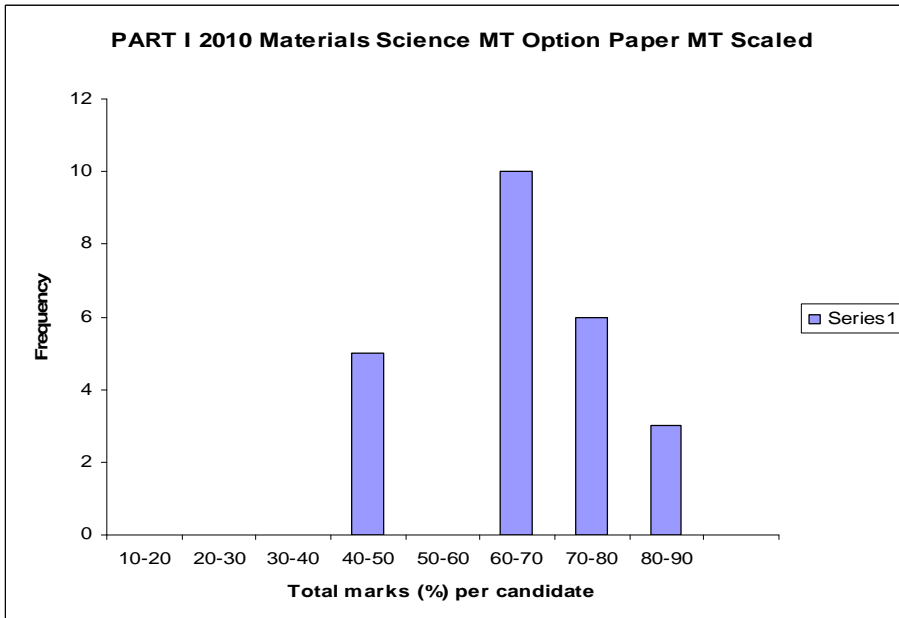
Candidates: 24 (MS)

Mean mark: 65.6 %

Maximum mark: 86.0 %

Minimum mark: 41.5 %

Qu	Topic	No of Answers	Average Mark	Max. Mark	Min. mark
1	Strength and Failure: wear	3	25.33	29.5	21.5
2	Strength and Failure: age hardening, strength and fatigue of Al-Li	12	22.71	29.5	12.5
3	Melt Processing: grain refining and modification	13	22.88	28.5	14
4	Functional Nanomaterials	8	20.50	26.5	14
5	Functional Nanomaterials	1	27.50	27.5	27.5
6	Electroceramics	6	12.83	23	6
7	Properties of Engineering Ceramics	11	19.73	26.5	4.5
8	Biomaterials: bioreactivity and implants	11	25.14	29.5	17
9	Biomaterials: polymerisation, structural hierarchy, bone	7	20.36	24.5	14.5



General Comments:

1. Only three students chose to do this question about wear of metals, but those who did attracted high marks. We conclude that the question was fine but that the other question on this course (q2.) was more attractive to most candidates.
2. Part (a) of the question was a straightforward question about age hardening of aluminium alloys. Given the fact that it went only a little way beyond the base knowledge of this area from the core course, the answers were perhaps a little disappointing. In part (b), however, on Al-Li alloys most students were very knowledgeable and did well. The overall marks on the question were high.
3. The most popular question on the paper concerning grain refinement and modification of cast Al alloys. The specific systems examined were Al-Ti-B and Al-Si which were both covered in the lecture notes. Answers generally showed a reasonable level of knowledge with some scripts giving a high level of detail.
4. This question required the students to describe fabrication methods for 1D and 2D nanomaterials and to give examples of materials to which they could be applied. A final section of greater difficulty required the students to explain the terms in an energy expression for a particular growth mode and to explain how the expression is used. It was generally well answered, with the final section providing greater discrimination between students.
5. This more mathematical question required the students to analyse the mechanical properties and electronic structure of nanorods. Only one candidate attempted the question, achieving a high mark. Students may have been put off by the mathematical content, even though part (a) and (b)(i) were relatively straightforward and b(ii) was bookwork.
6. This question contained a good mix of difficulty. Parts (a) and (d) required to students to state facts that they had learnt during the course, whereas (b) and (c) were more open ended requiring students to apply their overall knowledge of electroceramics. It was rather poorly answered, with students particularly struggling with the more open-ended parts.
7. One student scored 3/33 for this question but the others showed a good all round knowledge of engineering ceramics, their applications and the statistical distribution of their strengths.
8. Question on biomaterials concerning bioreactivity and its control in principle and in practice. Most answers exhibited a wide ranging knowledge of the subject.
9. The core of this question was about the structural hierarchy of bone. Overall, the marks were satisfactory although some students found it difficult to relate the various levels of structural hierarchy to the mechanical properties of bone.

Overall Comments

The mean mark for the paper was 66% which is close to the target. Although the modal mark was also in the 2.1 range, the distribution of marks is bimodal: no-one scored a 2.2 mark but there was a significant number of 3rd class marks, and of very high marks of >80%. The high marks demonstrate the overall fairness of the questions for those who engaged with the options courses. The comprehensive and fluent quality of many of these answers showed great enthusiasm for the subjects studied and are a good advertisement for the options courses. It may be argued that the number of 3rd class marks indicates that some questions were not sufficiently graded for weaker candidates to be able to score well and it is recommended that examiners consider this in future years. It has to be borne in mind, however, that it is difficult to justify the setting of questions on courses which offer extension of courses in years 1 and 2 but which are at a sufficiently basic level for students who have a history of not assimilating the material in these earlier parts the course. There was no clear pattern in those students scoring 3rd class marks: some were moderately weak in all three questions answered, others were satisfactory on some questions (with one scoring nearly 80% on one question) and very weak on others.

Materials Option Paper 2 / Materials Option Paper

Examiner: Dr Peter Nellist

Candidates: 27 (24 MS / 3 MEM Part II)

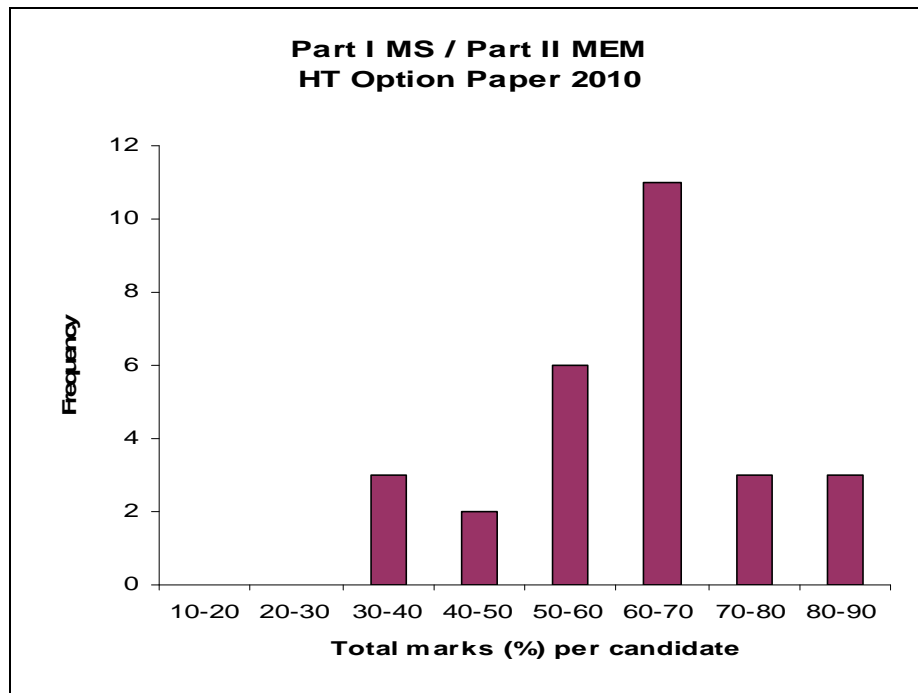
Mean mark: 61.3 %

Maximum mark: 88.5 %

Minimum mark: 33.0 %

Statistics

Question	Topic	No of Answers	Average Mark	Highest Mark	Lowest mark
1	Advanced Engineering Alloys	6	19.67	22.5	16.5
2	Advanced Engineering Alloys	11	17.42	25.5	10
3	Advanced Engineering Alloys: Steels	13	18.76	30	4.5
4	Materials and Devices for Information Technology	8	17.69	28	4
5	Materials and Devices for Information Technology	4	21.38	26.5	18.5
6	Materials and Devices for Information Technology	3	21.00	25.5	16
7	Advanced Polymers	21	22.78	31	11
8	Advanced Polymers	1	13.50	13.5	13.5
9	Ceramic Processing	17	19.07	29.5	9.5



General Comments:

1. Question concerning the role of ordering in strengthening of metallic alloys. The intention was that answers include examples from Ni-based, Al-based and Ti-based systems however the wording could have been read to mean alloys containing Ni, Al and Ti. All but one candidate took this second meaning and restricted their answer to Ni-based superalloys – no marks were deducted for this. Some good scripts but general level was a little disappointing given overlap with general paper courses.
2. Question concerning selection of welding methods for different metal alloys. Answers generally gave good descriptions of the welding methods in some cases with high level of detail. However, in many cases although a reasonable welding method was described the challenges generated by the different materials were not made clear and so the rationale for selecting that method was often not given.
3. Question concerning definitions relating to martensitic transformations and their characteristics in steels. Most marks were in the 2.1 range and this accurately reflects the good, but not outstanding, performance of most of the candidates on this question.
4. This question required descriptive answers addressing techniques for the growth and processing of Si, ending with a discussion of electromigration. It was well graded, producing a much greater spread of marks in the later sections. Overall, the question produced a wide spread of marks. The mean was a bit below that which would be desired, perhaps explained by a tail of weaker candidates that were put off by the other questions in this block.
5. This question started with a bookwork section requiring the students to explain types of magnetic anisotropy. It went on to require students to explain the superparamagnetic effect and to solve a problem about data storage. It was a well-graded question. The relatively low number of attempts were generally of good quality.
6. This question addressed heterojunctions in semiconductor materials. The first two sections were descriptive, finishing with a problem regarding the electronic effects of quantum confinement. There were a relatively low number of attempts, but the question produced some good quality answers. Most candidates struggled with the final problem-solving section.
7. This very popular question addressed phase separation in polymer materials. It contained both descriptive and problem solving parts. It was well-graded and produced a wide spread of marks. Many answers were of high quality, and most candidates know how to approach the problem-solving part.
8. This polymers question addressed interfaces between different polymers, the interaction between polymers and solvents, and the use of polymers in waste water treatment. It contained material from parts of the course delivered by different lecturers - some of the material being delivered for the first time this year, and required significant input from the Examiners' Committee to finalise it for the paper. There was only one attempt at the question producing a weak mark, and perhaps its diversity was a deterrent to students.
9. A well graded question addressing the milling and sintering of ceramics. It was well-graded and required both descriptive answers and the derivation of a formula for pore-closure that was different to that seen in the notes. It was a popular question producing a wide spread of marks but with a mean close to the target.

Overall Comments:

The overall mean was reasonably within the acceptable range. A tail of weaker marks was counteracted by some very strong performances. In sections B and C there were some questions that were very unpopular. In a paper where students study for only certain sections, it is important to ensure that the sections each present a selection of questions that are all reasonably acceptable for the students.

REPORT ON FINAL HONOURS SCHOOL OF MATERIALS SCIENCE, PART II EXAMINATION

Part I

A. STATISTICS

(1) Numbers and percentages in each category

Candidates are given a mark on the basis of their performance in the Part II examination and then given a classification on the basis of their performance across Part I and Part II.

Class	Number			Percentage (%)		
	2009/10	2008/09	2007/08	2009/10	2008/09	2007/08
I	6	11	5	26	45.8	26.3
II.I	14	10	11	61	41.7	57.9
II.II	3	3	3	13	12.5	15.8
III	0	0	0	0	0	0
Pass	0	0	0	0	0	0
Fail	0	0	0	0	0	0

(2) The use of vivas

The Part II examination in Materials Science consists only of a research project, for which a thesis not exceeding 15,000 words, or 120 pages, is produced. Each thesis was read by two internal examiners and one external and the final thesis mark was then agreed. All candidates were given a viva but numerical marks are not given for viva performance. The viva was used to clarify points of detail and to ensure that the thesis presented has been prepared by the candidate being examined.

(3) Marking of scripts

All theses were triple blind marked by the internal Examiners, and one external Examiner. (Due to the small number of candidates, which makes it easy to identify who is working on a particular research topic, anonymous marking was not possible.) Provisional marks were exchanged in advance of the viva, and to allow a brief discussion of differences of assessment, which could be explored further during the viva. Following the viva, a final agreed mark was decided between the three markers.

B. NEW EXAMINING METHODS AND PROCEDURES

(1) The vivas were held over two days. In previous years, both external examiners attended all vivas. This year, each external examiner attended only one of the two days of viva examinations. This new approach was much appreciated by the external examiners.

(2) The supervisor's report form was divided into two parts. Part 1 contained purely objective information as to the progress of the project, for example, such details as availability of equipment and supply of specimens. This section of the report was read by the three readers of the thesis before they read the thesis. Part 2 contained subjective information as to the candidate's competence and application, and the quality of their work. This section was available to all the Part II examiners and was used only if the overall mark of the candidate was near a class boundary.

C. CHANGES IN EXAMINING METHODS, PROCEDURES AND CONVENTIONS WHICH THE EXAMINERS WOULD WISH THE FACULTY AND THE DIVISIONAL BOARD TO CONSIDER

Unit of Assessment Titles on Examination Schools Results Templates

Currently, in the results templates, no information appears which indicates whether an entry is a percentage or an absolute mark. For example, a practical result which appears as '36' corresponds to a mark of 36 out of 60, whereas a mark of '36' for the team design projects corresponds to a mark of 36 out of 50. This is complicated by the way in which the Part II marks appear, which is as a percentage rather than as a mark out of 400 (or 200 for MEM). It is a further concern that this also appears on the student transcripts. We recommend that the assessment title be redrafted to provide more information concerning the mark awarded.

D. EXAMINATION CONVENTIONS

The previous year's Examination Conventions were included in the Course Handbook that was distributed to all candidates in hard-copy and was also made available on the Departmental website, to which candidates' attention was drawn by e-mail. The current year's Conventions (2010, attached) were put on the Departmental website and sent electronically on 31st March 2010 to all candidates. The Examination Conventions were assessed by the Board of Examiners and the Department's Academic Committee.

There was one returning student, whose Part I examinations were conducted under the 2005 Examination Conventions. Under these conventions, the Part I was awarded up to 750 marks, and the Part II up to 350. In order that the balance between Part I and Part II be maintained for this particular candidate, his Part II was awarded a mark out of 350.

Part II

A. GENERAL COMMENTS ON THE EXAMINATION

There were 23 candidates for the examination, and all were awarded Honours. The examination required the candidates to submit a thesis (maximum 15,000 words) on a research project carried out by candidates during the year, usually in the Department of Materials. One research project was carried out overseas, at UCLA. Candidates were then given a 25 minute viva, during which they were asked detailed questions on their research work.

The theses were generally of a very high quality, and the candidates were able to explain their work well in the vivas. In some cases the vivas became short but in-depth scientific discussions with the candidates. The marks for the Part II examination ranged from 55% to 77%, with an overall mean mark almost in the middle of the 2i range. The external Examiners played a crucial role in deciding the final marks for the candidates, and the Chairman would like to express his thanks to both of them for their hard work in marking so many Part II theses and contributing greatly to the vivas.

B. EQUAL OPPORTUNITIES ISSUES AND BREAKDOWN OF THE RESULTS BY GENDER

Insofar as can be judged from the small sample size, the performance of male and female candidates was not significantly different.

mark (%)	Overall mark		Part 2 Project		Part I Mark	
	Male	Female	Male	Female	Male	Female
40–50	-	-	-	-	2	-
50–60	2	2	2	1	-	2
60–70	8	6	8	6	8	5
70–80	4	1	4	2	4	2
80–90	-	-	-	-	-	-
Totals	14	9	14	9	14	9

C. DETAILED NUMBERS ON CANDIDATES' PERFORMANCE IN EACH PART OF THE EXAMINATION

All candidates took the same examination, producing a thesis and attending a viva. The statistics on the final marks for both Part I (2009) and Part II for these candidates is given above.

D. COMMENTS ON PAPERS AND INDIVIDUAL QUESTIONS

Not relevant for this examination.

E. COMMENTS ON THE PERFORMANCE OF IDENTIFIABLE INDIVIDUALS AND OTHER MATERIALS WHICH WOULD USUALLY BE TREATED AS RESERVED BUSINESS

Medical Certificates: One medical certificate was presented

F. NAMES OF MEMBERS OF THE BOARD OF EXAMINERS

Dr. P. R. Wilshaw (Chairman)	Dr. R.I. Todd
Prof. C.R.M. Grovenor	Dr. A. Kirkland
Dr. P.D. Nellist	Dr. A.J. Wilkinson
Prof. J. Binner (external)	Prof. M. Rainforth (external)

Attachments

Information on the Part II Examinations 2010

Information on the Part II Examinations 2010

The MS Examiners for the Part I Examination in Trinity 2010 are: Dr Peter Wilshaw (Chair), Dr Peter Nellist, Dr Angus Wilkinson Prof. Angus Kirkland, Prof. Chris Grovenor, and Dr Richard Todd The external examiners are Prof. Mark Rainforth, University of Cambridge, and Prof. Jon Binner, University of Loughborough.

Candidates are reminded that in order to preserve the independence of the examiners, you are not allowed to contact them directly about matters relating to the content of the exams or the marking of papers. Any communication must be via the Senior Tutor of your college, who will, if he or she deems the matter of importance, contact the Proctors. The Proctors in turn communicate with the Chairman of Examiners. If you have any queries about the Examinations or anything related to the Examinations, for example illness or personal issues, please don't hesitate to seek further advice from your College tutor, or one of the Department's academic support staff as listed in your course handbook.

Examination Conventions

The appropriate Examination Conventions for your degree course are enclosed. Please ensure you read the Conventions thoroughly. Please note that any communication to the Proctors about such matters should be done via **your Senior Tutor in College**.

Deadline for the Submission of Part II theses

Part II theses should be submitted by **noon on Wednesday, week 7, Trinity Term**. You are required to hand in 3 copies of your thesis to the Chairman of Examiners in Materials Science, c/o the Clerk of Schools, Examination Schools. **You must submit your thesis at the Examination Schools**. Paula Topping will be available to assist with Part II thesis binding from **Monday - Friday, week 6 and Monday – Wednesday week 7, 9.30am – 12noon**.

NB: PLEASE NOTE THE CONVENTIONS ON THE LATE SUBMISSION OF COURSEWORK; THESE ARE DETAILED IN THE EXAMINATION CONVENTIONS. Late submission, for whatever reason, can only be with the express permission of the Proctors, and may result in a mark penalty.

Regulations on Format of Thesis

For further details on print format see Examination Regulations 2009 however the Regulations are summarised below:

Word limit: 15,000 words for the main body of the thesis, plus 1,500 words for the mandatory final chapter containing an account of the project management aspects of your investigation. Word counts exclude references, title page, acknowledgements, table of contents and the three project management forms. N.B. The Exam Regulations do not explicitly exclude figure captions, and so they should be included in the word counts.

Page limit: 120 pages. Page count includes an abstract, the text as described in the word limits above, the three project management forms, computer programs, graphs, diagrams, photographs, tables and similar material. **All** pages of the thesis should be numbered sequentially.

If you feel that you have an exceptional case for exceeding the word and/or page limit, and you wish to seek permission to do so, both you and your supervisor should contact the Part II Co-ordinator who will put your case to the Chairman of Part II examiners. Such a

case should be made at the earliest possible stage. The Examiners will enforce the word limit strongly, and any thesis submitted over the word limit may be subject to penalties.

Appendices: the purpose of the above word and page limits is to prevent the excessive inclusion of material that is unnecessary for development of the key argument(s) of the thesis. Material which is additional to the main body of the thesis, e.g. further detailed data, may be included in appendices. However, whilst appendices are not included within the limits of the word or page counts of the thesis, whether examiners read appendices is entirely at their discretion.

In addition all copies of your thesis must include the following:

- a literature survey;
- a description of the engineering context of the investigation;
- a signed declaration that your thesis abides by the word limit regulation, including a word count;
- a signed declaration that it is all your own work, unless where referenced.

Thesis Assessment

The Part II thesis is now allocated 400 marks, about 30% of the total marks for Parts I and II. Two Part II examiners read each thesis, and each of them independently gives a provisional mark based on the assessment guidelines enclosed with this memorandum (see page 4). In addition, an external examiner will read each Part II thesis. The purpose of the viva is to clarify any points the readers believe should be explored, and to ascertain the extent to which the work reported is the candidate's. A discussion is held after the viva involving all Part II examiners during which an agreed mark is allocated to the project. It is stressed that it is the scientific content of the thesis that is being examined *not* the candidate's performance during the viva. In the overwhelming majority of cases, the viva has only a small influence on the agreed mark awarded to a Part II thesis.

Timetable of the viva voce examination.

The Part II vivas will be held over two days this year on Tuesday 29. June and Wednesday 30 June. Candidates will be examined alphabetically, unless a specific slot / day is specifically requested from Katherine Hartwell. Each viva lasts approximately 30 minutes although 35 minutes are scheduled for each viva. Vivas will be held in the Wolfson Meeting Room. A draft timetable will be circulated in Trinity term.

Viva times will only be changed under exceptional circumstances, subject to availability, and all vivas, even those rearranged, will be held during the scheduled times on 29 and 30 June. In no circumstances should candidates contact the examiners directly.

Allocation of Marks for Part II Candidates 2010

		MS
PART I	<i>General Paper 1 Structure and Transformation of Materials</i>	100
	<i>General Paper 2 Electronic Properties of Materials</i>	100
	<i>General Paper 3: Mechanical Properties</i>	100
	<i>General Paper 4 Engineering Applications of Materials</i>	100
	<i>Options Paper 1</i>	100
	<i>Options Paper 2</i>	100
	<i>Laboratory Practicals and Industrial Visits</i>	80
	<i>Engineering and Society Portfolio: Business Plan</i>	20
	<i>Team Design Project</i>	50
	<i>Characterisation or Modelling options module</i>	50
	PART I TOTAL	800
PART II	Part II Project thesis	400
	PART II TOTAL	400
FINAL	GRAND TOTAL	1200

Materials Science Part II Thesis Assessment.

Examiners should write a report of not more than two pages giving their assessment of the thesis under the following headings:

1	a	What were the aims and objectives of the project?
	b	Are these clearly identified in the thesis?
2	a	Is the account of project management clear?
	b	Does it show that the project was well managed?
	c	Were the original objectives kept to, and if they were changed, is it shown why?
3		Has the candidate identified the engineering (or equivalent) context of the work?
4		Is the background literature to project reviewed adequately? (comprehensively, focused on the project's area and <i>critically</i> .)
5	a	Are the methods and analysis of data used in the project clearly described?
	b	Did the student develop any new methods?
6	a	Are the "raw" results attained clearly described?
	b	Are the results analysed adequately and appropriately?
	c	(if appropriate) Are errors handled adequately?
7		Are the results properly discussed -
	a	in themselves?
	b	in relation to previous work in the area?
	c	in relation to the aims and objectives of the project?
8	a	What do you consider to be the main achievements of the project?
	b	Are these clearly identified in the thesis?
9	a	Indicate any weaknesses which you may have found.
	b	Does the thesis show awareness of these?
10		Does the thesis show original thinking on the part of the student?
11		Comment on the quality of the report.(use of English, overall style, quality of diagrams and figures, use of references to previous work, etc.)
12		Additional comments.
Overall mark and short justification:		

The following anticipated marking scheme for borderlines should be borne in mind.

70 – 100	First Class
60 – 69	Upper Second
50 – 59	Lower Second
40 – 49	Third
30 – 39	Pass
0 – 29	Fail

MS Part II Marking Guidelines

- 90-100% Thesis rated very highly in all categories of the assessment guidelines. Typically this would be an extremely high quality thesis showing extensive evidence of original thought, results very well analysed and put in context, very well presented, and with no important deficiencies.
- 80-89% Thesis demonstrating very strong performance across most categories, with some minor weaknesses in one or two areas. Typically this would be a very high quality thesis showing evidence of original thought, results very well analysed and put in context, very well presented, but with some minor deficiencies.
- 70-79% Very strong overall performance, but with significant weakness in one or two categories or minor weaknesses in several. Typically this would be a high quality thesis showing some evidence of original thought, results well analysed and put in context, well presented. May be deficient in one or two areas accounting for a minority of the whole.
- 60-69% Strong overall performance, but with some weaknesses in several categories. Typically the work would have been competently carried out and reasonably well presented and analysed. This mark range should be achievable by an average student with reasonable effort.
- 50-59% Satisfactory overall performance, but with serious weaknesses in several categories. Typically the work would have been carried out mostly with competence, but with some flaws (e.g. errors, misinterpretations). Little evidence of original thought.
- 40-49% Poor overall performance with serious weaknesses in several categories. No evidence of original thought.
- 30-39% Poor overall performance with serious weaknesses in the majority of categories. The thesis of a candidate who has done little work and has presented this work poorly.
- <30% Very poor performance with little or no meaningful content.

PRW (Chair of Examiners)
JTC (Chair of Faculty)
KAQOR (MS Part II Project Coordinator)
2010

REPORT ON FINAL HONOURS SCHOOL OF MATERIALS ECONOMICS AND MANAGEMENT, PART I EXAMINATION

Part I

A. STATISTICS

(1) Numbers and percentages in each category

The Part I Examination in Materials Economics and Management is unclassified. No distinctions are awarded. Since the number of candidates in this and previous years is less than 6, numerical data is confidential (see section E, below).

(2) The use of vivas

The Board of Examiners decided at the start of the examination process that Part I students would not be given vivas. Students were informed of this by e-mail on 31 March 2010 and again on 26 April 2010. The information was also made available on the Department website from 26 April 2010.

(3) Marking of scripts

All scripts were double-blind marked by the Examiners. The full procedures are described in the Examination Conventions.

B. NEW EXAMINING METHODS AND PROCEDURES

In previous years, examiners for the Materials component of the MEM Examination could offer half marks for each question. The marks awarded by each examiner for each question were then averaged and if the result was non-integer, the mark assigned to that question was rounded up. This year, again, half marks could be offered for each question. These marks were then added and divided by two to give a total for the entire paper. If this total ended with a half mark, then the paper total was rounded up. This change was introduced to reduce the number of marks rounded up per candidate.

C. CHANGES IN EXAMINING METHODS, PROCEDURES AND CONVENTIONS WHICH THE EXAMINERS WOULD WISH THE FACULTY AND THE DIVISIONAL BOARD TO CONSIDER

(1) Team Design Projects

a. The team design project teams consisted of different numbers of candidates. [REDACTED]

[REDACTED]. We suggest [REDACTED] that the report is signed to confirm that it complies with this word limit.

b. We recommend that the course handbook emphasises more strongly that it is a requirement of the team design project report that the primary author of each section is identified.

c. It was noted that the contributions made by individual members of the team could not easily be identified. This could be made clearer by including a table at back of each report, which lists

the major contributor(s) to the work contained in each section of the report. We recommend that this possibility is considered.

(2) Unit of Assessment Titles on Examination Schools Results Templates

Currently, in the results templates, no information appears which indicates whether an entry is a percentage or an absolute mark. For example, a practical result which appears as '36' corresponds to a mark of 36 out of 60, whereas a mark of '36' for the team design projects corresponds to a mark of 36 out of 50. This is complicated by the way in which the Part II marks appear, which is as a percentage rather than as a mark out of 200 (or 400 for MS). It is a further concern that this also appears on the student transcripts. We recommend that the assessment title be redrafted to provide more information concerning the mark awarded.

D. EXAMINATION CONVENTIONS

The previous year's Examination Conventions were included in the Course Handbook that was distributed to all candidates in hard-copy and was also made available on the Departmental website, to which candidates' attention was drawn by e-mail. The current year's Conventions (2010, attached) were put on the Departmental website and sent electronically on 31 March 2010 and again on 26 April 2010 to all candidates. The Examination Conventions were assessed by the Board of Examiners and the Department's Academic Committee.

Part II

A. GENERAL COMMENTS ON THE EXAMINATION

There were 3 candidates for the examination. The examination consisted of 7 written papers plus coursework that included a team design project, industrial visit reports and practical work carried out during the 2nd and 3rd years. One of the written papers (Introductory Economics) is taken in the 2nd year.

The written papers consisted of 4 Materials papers, 2 Economics papers and 1 Management paper, each of which lasted 3 hours. For the Materials papers, candidates were required to answer 5 questions out of 8, as in previous years. The Economics and Management Examiners followed their usual procedures. Team design projects were marked by two Examiners, including the Chairman. Teams were marked as groups. The allocation of bonus or penalty marks is permitted under the Conventions, but was not used. Reports for each of the Industrial Visits were assessed as pass/fail by the Industrial Visits Organiser, appointed as Assessor.

The overall mean mark for MEM Part I was at [REDACTED]. The mean marks for the combined MS MEM cohort for three of the four papers sat by MEM students was in the 2(i) band (60-70%) and so no scaling needed to be considered. The remaining paper had a mean mark of 56.4%. The Examiners, including the external Examiners, considered the need to scale this paper. However, we considered that the paper was set at an appropriate level and that the low mean mark obtained was a result of a small number of students pulling down the average: 3 students having scored less than 40%. Mean marks for the practical work were higher than for the papers, but this is in line with the results from previous years.

B. EQUAL OPPORTUNITIES ISSUES AND BREAKDOWN OF THE RESULTS BY GENDER

There were no female candidates.

A non-serif font was again used for Materials examination papers, in order to make them comply with SENDA/ADA guidelines. No specific requests were received for enlarged copies.

C. DETAILED NUMBERS ON CANDIDATES' PERFORMANCE IN EACH PART OF THE EXAMINATION

All candidates took the same papers for the whole examination.

D. COMMENTS ON PAPERS AND INDIVIDUAL QUESTIONS

Detailed comments on the written examination papers and overall candidates' performance on individual questions are attached.

E. COMMENTS ON THE PERFORMANCE OF IDENTIFIABLE INDIVIDUALS AND OTHER MATERIALS WHICH WOULD USUALLY BE TREATED AS RESERVED BUSINESS

(1) Numbers and percentages in each category

The Part I Examination in Materials Economics and Management is unclassified. No distinctions are awarded. There were 3 candidates for the examination [REDACTED]

Category	Number			Percentage		
	2009/10	2008/09	2007/08	2009/10	2008/09	2007/08
Distinction	n/a	n/a	n/a	n/a	n/a	n/a
Pass	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Fail	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

(2) Breakdown of the results by gender

mark (%)	Overall mark		Written Examinations		Coursework	
	Male	Female	Male	Female	Male	Female
40–50	■	-	■	-	■	-
50–60	■	-	■	-	■	-
60–70	■	-	■	-	■	-
70–80	■	-	■	-	■	-
80–90	■	-	■	-	■	-
Totals	3	0	3	0	-	0

(3) Medical Certificates: ■■■■

F. NAMES OF MEMBERS OF THE BOARD OF EXAMINERS

MEM:

Dr. P. R. Wilshaw (Chairman)

Prof. C.R.M. Grovenor

Dr. P.D. Nellist

Dr. R.I. Todd

Dr. A. Kirkland

Dr. A.J. Wilkinson

Dr Chris McKenna (Management)

Dr Dana Brown (Management)

Dr Doug Holt (Management)

Dr Godfrey Keller (Economics)

Dr Howard Smith (Economics)

Prof Jon Binner (External)

Prof Mark Rainforth (External)

Prof Paul Cousins (External, Management)

Prof Robin Mason (External, Economics)

Attachments: Examination Conventions 2009/10

Comments on General Paper 1

Comments on General Paper 2

Comments on General Paper 3

Comments on General Paper 4

Comments on Introduction to Management paper

Comments on Economics papers

Examination Conventions 2009/10

Final Honours School

Materials, Economics and Management

1. INTRODUCTION

The formal procedures determining the conduct of examinations are established and enforced by the University Proctors. These conventions are a guide to the examiners and candidates but the regulations set out in the Examination Regulations have precedence. The examiners are nominated by the Nominating Committee* in the Department of Materials and those nominations are submitted for approval by the Vice-Chancellor and the Proctors. Formally, examiners are independent of the Department and of those who lecture courses. However for written papers on Materials Science in Part I and Part II, examiners are expected to consult with course lecturers in the process of setting questions. The paragraphs below indicate the conventions to which the examiners usually adhere, subject to the guidance of the appointed external examiners, and other bodies such as the Academic Committee in the Department, the E(M)EM Standing Committee, the Mathematical, Physical and Life Sciences Division, the Social Sciences Division, the Education Committee of the University and the Proctors who may offer advice or make recommendations to examiners. It must be stressed that to preserve the independence of the examiners, candidates are not allowed to make contact directly about matters relating to the content or marking of papers. Any communication must be via the Senior Tutor of your college, who will, if he or she deems the matter of importance, contact the Proctors. The Proctors in turn communicate with the Chairman of Examiners.

Marking criteria for the Team Design Project are published in the FHS course handbook.

During the marking process the scripts of all written papers remain anonymous to the markers.

[In some of the descriptions of marking for individual elements of coursework that are given later in this document the term 'double marked, blind,' is used; this refers to the fact that the second marker does not see the marks awarded by the first marker until he or she has recorded his or her own assessment, and does not indicate that the candidate is anonymous to the markers.]

Late Submission of or Failure to Submit Coursework

The Examination Regulations stipulate specific dates for submission of the required pieces of coursework to the Examiners (1. A set of detailed reports of practical work; 2. A Team Design Project Report; 3. Industrial Visit Reports as specified in the course handbook; and 4. A Part II Management Project Report). Rules governing late submission and any consequent penalties are set out in the 'Late submission of work' sub-section of the 'Regulations for the Conduct of University Examinations' section of the Examination Regulations (pp45-46 of the 2006, 2007 & 2008 Regulations and pp46-47 of the 2009 Regulations).

Under the provisions permitted by the regulation, late submission of coursework for Materials Science or Materials, Economics & Management examinations will normally result in the following penalties:

- (a) With permission from the Proctors under clause (1) of para 16.8, no penalty.

* for 2009-10 the Nominating Committee comprises Dr Czernuszka (Chair), Professor Grovenor and Dr Taylor.

- (b) With permission from the Proctors under clauses (3) + (4) of para 16.8, for the first day or part of the first day that the work is late a penalty of a reduction in the mark for the coursework in question of up to 10% of the maximum mark available for the piece of work, and for each subsequent day or part of a day that the work is late a further penalty of up to 5% of the maximum mark available for the piece of work; the exact penalty to be set by the Examiners with due consideration given to any advice given in the Proctors' "Notes for the Guidance of Examiners and Chairmen of Examiners".
- (c) Where the candidate is not permitted by the Proctors to remain in the examination he or she will be deemed to have failed the examination as a whole.

Where no work is submitted or it is proffered so late that it would be impractical to accept it for assessment the Proctors may, under their general authority, and after (i) making due enquiries into the circumstances and (ii) consultation with the Chairman of the Examiners, permit the candidate to remain in the examination. In this case the Examiners will award a mark of zero for the piece of coursework in question.

Penalties for late submission of individual practical reports are set out in the MS/MEM FHS Handbook and are separate to the provisions described above.

2. PARTS I & II

Candidates taking Ec1: Introductory Economics in the 2nd year.

MEM candidates sit the compulsory Ec1: Introductory Economics paper in Trinity Term of their second year. This paper will be set and examined as for all other Part I and Part II Economics papers (see below) and contributes to the Part I mark. The marks for this paper will be formally ratified by the Board of examiners for Part I examinations held in the Trinity Term following that in which the Ec1 paper is sat.

Candidates for Part I (3rd year)

Part I candidates take four compulsory Materials papers (General Papers 1 – 4); one compulsory Economics paper; and one compulsory Management paper. In addition, candidates are assessed on their Materials coursework (practical work, the team design project, and industrial visits). Marks from the Ec1 paper sat in Trinity Term of the 2nd year are included in the Part I total.

Candidates for Part II (4th year)

Part II candidates take one compulsory Materials Options paper and one paper from a range of Management and Economics options. In addition they are assessed on their report of a six-month industrial placement, which carries the weight of two papers.

(1) *Setting of papers*

Part I Materials General Papers 1 – 4 are set by the materials examiners in consultation with course lecturers. The responsibility for the setting of each examination paper is assigned to an examiner, and a second examiner is assigned as a checker. The Materials Option paper in Part II is set by lecturers of option courses and two examiners, the examiners acting as checkers. For the Materials papers, the examiners, in consultation with lecturers, produce model answers for every question set and the wording and content of all examination questions set, and the model answers, are scrutinised by all examiners, including, in particular, the external examiners.

The Economics and Management papers are set by examiners nominated respectively by the Economics Faculty and the Said Business School.

(2) *Paper format*

Materials Papers

All Materials general papers comprise eight questions from which candidates attempt five and are taken in Part I. Each question is worth 20 marks. The total number of marks available on each general paper is 100. The Materials Option paper, taken in Part II, comprises three sections, each section containing three questions: candidates attempt three questions, two from one section and the third from either of the remaining sections. The total number of marks available on the option paper is 100, and all questions carry equal marks. Questions are often divided into sections, with the approximate marks for each section indicated on the question paper.

Economics and Management papers

Candidates are advised to read particularly carefully the specific instructions on the front of each paper as to the number of questions they should submit, since the rubrics on Economics and Management papers differ slightly from those for the Materials papers.

(3) *Marking of papers*

Materials Papers

All scripts are double marked, blind, by the setter and the checker. After individual marking the two examiners meet to agree marks question by question. If the differences in marks are small (~10%, 2-3 marks for most questions), the two marks are averaged. Otherwise the examiners identify the discrepancy and read the answer again, either in whole or in part, to reconcile the differences. If after this process the examiners still cannot agree, they seek the help of the chairman, or another examiner as appropriate, to adjudicate.

The Materials Options paper is marked by course lecturers acting as assessors and an examiner acting as a checker.

The Materials external examiner provides an independent check on the whole process of setting and marking.

The rubric on each paper indicates a prescribed number of answers required (e.g. "candidates are required to submit answers to no more than five questions"). Candidates will be asked to indicate on their cover sheet which questions, up to the prescribed number, they are submitting for marking. If the cover slip is not completed then the examiners will mark the first five questions in numerical order by question number. The examiners will NOT mark questions in excess of the prescribed number. If fewer questions than the prescribed number are attempted, (i) each missing attempt will be assigned a mark of zero, (ii) for those questions that are attempted **no** marks beyond the maximum per question indicated under section 2(2) above will be awarded and (iii) the mark for the paper will still be calculated out of 100.

As the total number of students sitting some papers is small, it is not unusual for mean marks to vary from paper to paper, or year to year. It is not therefore normal practice to adjust marks to fit any particular distribution. However, where marks for papers are unusually high or low, the examiners may, having reviewed the difficulty of the paper set or other circumstances, decide with the agreement of the external examiner to adjust all marks for those papers. For the Materials papers such adjustment is referred to as 'scaling' and the normal procedure will be as follows:

- i. Papers with a *mean taken over all candidates* of less than 55% or more than 75% are normally adjusted to bring the *mean* respectively up to 55% or down to 75%. Normally this is achieved by adding/subtracting the same fixed number of marks to/from each candidate's score for the paper.
- ii. For papers with a mean in the ranges either of 55-60% or 70-75%, including those scaled under (i) above, the questions and typical answers are compared

in order to ascertain, with the help of the external examiners, whether the marks are a fair reflection of the performance of the candidates as measured against the class descriptors. If not, the marks are adjusted. Normally this is achieved by adding/subtracting the same fixed number of marks to/from each candidate's score for the question or for the paper.

- iii. The mean mark and the distribution of marks, both taken over all written papers, are considered, again with the help of the external examiners, in order to ascertain whether these overall marks are a fair reflection of the performance of the candidates as measured against the class descriptors. If not, the overall marks are adjusted. Normally this is achieved by adding/subtracting the same fixed number of marks to/from each candidate's overall score.

Economics and Management Papers

The rubrics on Management and Economics papers differ slightly from the above, but numerical marking is used and all examiners mark to the standard class boundaries [see section on classification] and range of marks (0-100). All scripts in Economics and Management are double-marked. Management examiners mark on a question-by-question basis, whereas in Economics a mark is awarded for the performance on the paper as a whole. Economics and Management examiners mark papers and then consider the marks distribution for the whole cohort taking the paper (including candidates from other joint schools). After careful consideration of such factors as: the marks, the candidate's overall performance and the level of difficulty of the questions, they may make adjustments for each candidate. The adjusted marks for papers and half papers are then forwarded to the Chairman of the MEM Examination Board.

(4) Marking of Practicals for Part I

Practicals are assessed continually by senior demonstrators in the teaching laboratory and are allocated 50 marks. Part I examiners have the authority to set a practical examination.

(5) Marking Industrial Visits

Four industrial visit reports should be submitted during Part I. Reports are assessed by the Industrial Visit Coordinator on a satisfactory / non-satisfactory basis, and are allocated a total of 20 marks.

(6) Marking the Team Design Projects

The team design project is double marked, blind, by two of the Part I Examiners. They then compare marks and analyse any significant disagreement between these marks before arriving at a final agreed mark for each project and each team member. Supervisors of the projects submit a written report to the examiners on the work carried out by their teams and these are taken into consideration when the examiners decide the final agreed marks. Industrial representatives may be asked to contribute to the assessment process. The project is allocated 50 marks, of which 25 are for the written report and 25 for the oral presentation. The same two examiners assess both the reports and the presentations.

(7) Part I and II vivas

With the possible exception of the Part II Management project, there will be no Part I or Part II vivas in the 2009/10 Examination.

(8) Marking the 4th Year Management Project

The management project is allocated 200 marks and is marked by the Saïd Business School. A viva may be held.

The detailed 2009/10 conventions for the marking of the management project are being finalised and when available will be provided to candidates by e-mail.

3. CLASSIFICATION

The following boundaries (CVCP) and descriptors (MPLSD) are used as guidelines:

Class I Honours 70 – 100	The candidate shows excellent problem-solving skills and excellent knowledge of the material over a wide range of topics, and is able to use that knowledge innovatively and/or in unfamiliar contexts.
Class Iii Honours 60 – 69	The candidate shows good or very good problem-solving skills, and good or very good knowledge of much of the material over a wide range of topics.
Class Iiii Honours 50 – 59	The candidate shows basic problem-solving skills and adequate knowledge of most of the material.
Class III Honours 40 - 49	The candidate shows reasonable understanding of at least part of the basic material and some problem solving skills. Although there may be a few good answers, the majority of answers will contain errors in calculations and/or show incomplete understanding of the topics.
Pass 30 - 39	The candidate shows some limited grasp of basic material over a restricted range of topics, but with large gaps in understanding. There need not be any good quality answers, but there will be indications of some competence.
Fail 0 - 29	The candidate shows inadequate grasp of the basic material. The work is likely to show major misunderstanding and confusion, and/or inaccurate calculations; the answers to most of the questions attempted are likely to be fragmentary only.

In borderline cases the examiners use their discretion and consider the overall quality of the work the candidate has presented for examination. The external examiner often plays a key role in such cases.

Part I:

Unclassified Honours – The examiners are required to classify each candidate according to her/his overall average mark in Part I as (a) worthy of Honours, (b) Pass or (c) Fail. A candidate is allowed to proceed to Part II only if he/she has been adjudged worthy of honours by the examiners in Part I. The examiners do not divide the categories further but tutors and students may infer how well they have done from their marks. Candidates adjudged worthy of honours normally proceed to Part II but they may, if they wish and subject to approval from the relevant bodies, leave after Part I in which case an Unclassified Honours B.A. degree will be awarded.

Pass – The examiners consider that the candidate is not worthy of honours and therefore will not be allowed to proceed to Part II. The candidate may leave with a B.A. (without honours) or may retake Part I the following year (subject to college approval).

Fail – The examiners consider that the candidate is not worthy of a B.A. The candidate either leaves without a degree or may retake Part I the following year (subject to college approval).

Part II:

Classified Honours – Once marking is completed for both Parts I and II an overall percentage mark is computed for each candidate and classification then takes place. Subject to the requirement that Part II be adjudged worthy of honours (see below), classification is based solely on the overall percentage mark; the candidate's profile of marks from each element of assessment is only taken into account in borderline cases. However, a candidate cannot be awarded an M.Eng. degree unless his/her performance in Part II is adjudged worthy of honours i.e. a candidate must be adjudged worthy of honours both in Part I and in Part II to be awarded the

M.Eng. degree. Failure to achieve honours in Part II will result in the candidate leaving with an unclassified B.A. (Hons) irrespective of the aggregate mark.

Pass – Notwithstanding the award of unclassified honours in Part I, the examiners consider that the candidate’s overall performance is not worthy of an M.Eng. The candidate is listed as a Pass on the class list and is awarded an unclassified B.A. (Hons) on the basis of Part I performance.

Fail – The examiners consider that the candidate’s overall performance is not worthy of an M.Eng. *and* that the performance in Part II is not worthy of a Pass. The candidate is excluded from the class list but is nevertheless awarded an unclassified B.A. (Hons) on the basis of Part I performance.

- The examiners cannot award unclassified honours on the basis of Part II performance unless permitted to do so by the Proctors.
- Nevertheless, candidates awarded a Pass or a Fail by the Part II examiners leave with an unclassified B.A. (Hons) because they were judged worthy of that in Part I (i.e. their degree is the same as if they had left immediately after Part I).
- In terms of the degree awarded, there is no difference between a Pass and a Fail in Part II. The only difference is whether or not the name appears on the class list.
- Candidates cannot normally retake Part II because the Examination Regulations require that they must pass Part II within one year of passing Part I. This rule can only be waived in exceptional circumstances, with permission from the Education Committee.

Annex: Summary of marks awarded for different components of the Final Examination in MEM (For Part I and Part II students who embarked on the FHS respectively in 2008/09 and 2007/08)

	Component	Mark
Part I	General Paper 1	100
	General Paper 2	100
	General Paper 3	100
	General Paper 4	100
	Introductory Economics (Ec1)	100
	Paper M1	100
	Microeconomics	100
	Practicals & Industrial visits	70
	Team Design Project	50
	<i>Part I Total</i>	
Part II	Management Project	200
	Options Paper 1	100
	One paper from a choice of Economics and Management Papers.	100
<i>Part II Total</i>		<i>400</i>
<i>Overall Total</i>		<i>1220</i>

General Paper 1 – Structure and Transformations

Examiner: Professor CRM Grovenor

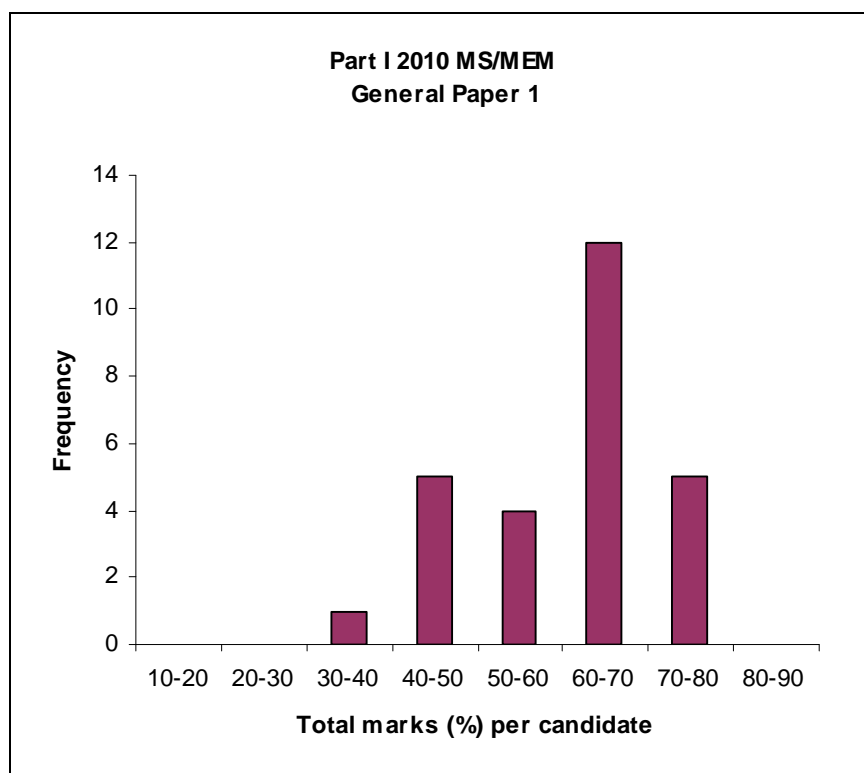
Candidates: 27 (24 MS / 3 MEM)

Mean mark: 62.41%

Maximum mark: 79.5%

Minimum mark: 36%

Question	Topic	No of Answers	Average Mark	Highest Mark	Lowest mark
1	Powder spraying and properties	11	12.27	15.5	7.5
2	Polymer microstructures	13	12.42	16	5.5
3	Corrosion	15	10.23	17	7
4	Ternary phase diagrams	19	14.71	20	4.5
5	Surface structures and energies	19	11.39	15.5	8.5
6	Solidification	22	12.75	18	7
7	Precipitation	13	8.35	14.5	5.5
8	Diffusion	23	15.22	18.5	8.5



General Comments:

There were no surprises with this paper. The questions were very standard in style and content. The spread of answers for particular questions was not too skewed, with the smallest number of answers for any question being 11 (from 27 candidates). The average scores ranged from 8.35 – 15.2, again roughly in line with normal expectations. The overall paper average was 62.4%, well within the target range. There were some excellent scripts showing a very high level of understanding, and a few poor performances where the ability to reproduce even the most standard definitions at the start of questions was lacking.

1. A standard powder processing question that was the least attractive (11 answers), but with an average score of 12.3 was done quite well
2. Polymer microstructures, concentrating on polyethylene and including some diffraction patterns to interpret. Attempted by roughly half the candidates, and with a respectable average score of 12.4.
3. Standard Evans diagram question. Few good attempts at the rather simple calculation, and some very garbled diagrams, brought the average score down to 10.3.
4. Ternary phase diagram question with 2 ternary reactions. Popular (19) and a high overall average (14.7). The isothermal section was the part least well done.
5. Extremely straightforward Surfaces question that was quite popular (19) but with an average of 11.4 was not really very well done. The quality of the prose in the definitions was particularly poor in some cases.
6. Scheil and Bridgman growth profiles, and constitutional supercooling. Popular (22) and a respectable average score (12.7), but some candidates seemed to understand very little about this standard material.
7. Thermodynamics of precipitation and massive transformations. Attempted by about half the candidates, but by some way the poorest overall average (8.35). Many candidates could attempt neither the simple derivation nor explain massive transformations.
8. Solution of Fick's 2nd law for homogenisation of a casting. Most popular and best overall score. Many candidates could reproduce the derivation of the solution to Fick 2 even though the question did not ask for it.

General Paper 2 – Electronic Properties of Materials

Examiner: Dr Peter Wilshaw

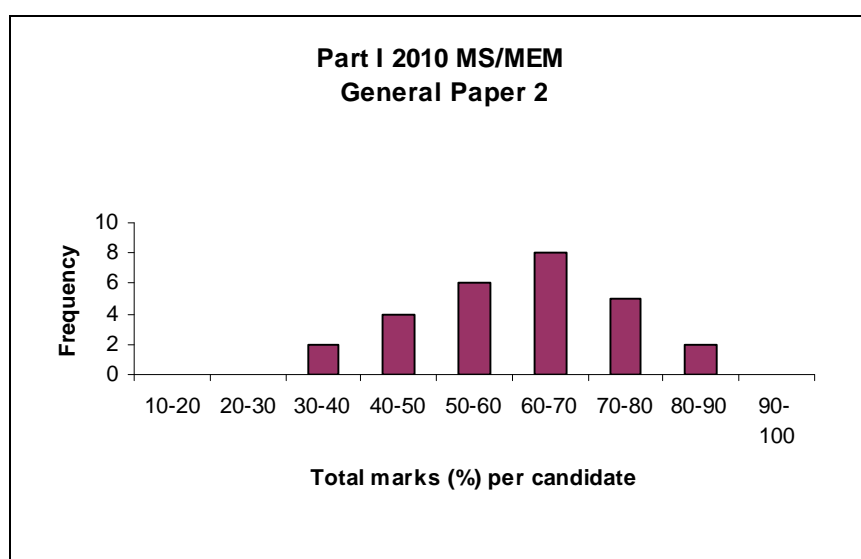
Candidates: 27 (24 MS / 3 MEM)

Mean mark: 61.85%

Maximum mark: 90.0 %

Minimum mark: 32.5 %

Question	Topic	No of Answers	Average Mark	Highest Mark	Lowest mark
1	Electronic structure of materials	24	11.69	19	6
2	Electrical and optical properties of materials.	4	6.88	9.5	6
3	Magnetic properties of materials.	22	14.61	18.5	3.5
4	Electrical and optical properties of materials.	6	13.75	17.5	7
5	Tensors	22	13.39	19	8
6	Semiconductor materials	21	10.31	18	2
7	Quantum and statistical mechanics	24	12.56	16.5	9
8	Quantum and statistical mechanics	12	12.13	19	1



General Comments:

1. A very popular question mostly on standard free electron theory. The first two parts which were book work were very well answered. The final part introduced a nanowire comprising a chain of Au atoms, which students had not met in lectures or tutorials, and this was where most students lost marks.
2. This question on polarised light was the most unpopular on the paper and was attempted by only 4 candidates. The marks were also the lowest for any question. This may be due to it being the first time in many years that a question on this topic had been set. Most of the question was rather straightforward and, had the material been properly learnt and revised, many candidates ought to have scored well on this question.
3. A popular question on the Weiss theory of ferromagnetism which was generally very well answered.
4. An unpopular question on the electrical conductivity of impure ionic solids. Mostly the first part was well answered (a standard but difficult derivation) whereas the second, non-standard, part tended to attract either very high or very low marks, presumably indicating that only some candidates could work out how to solve the problem but those who did then found it straightforward.
5. This question on tensors was well answered by most candidates. There were a few careless mistakes in part b which needlessly lost marks.
6. The first parts of this question on semiconductors, which required essay style answers, were done well. The final part, which required the derivation of expressions for the depletion region width and built in voltage of a pn junction, was done rather poorly. This is particularly disappointing as this part of the question was rather similar to a tutorial question associated with the course.
7. A very popular question on wave-particle duality which produced good marks on the first two parts but surprisingly poor marks on the second two parts. In particular the calculation of the minimum uncertainty in wavelength of a short pulse of light was not answered satisfactorily by any of the 24 candidates who attempted this question.
8. A generally well answered question on statistical mechanics. Most marks were lost on the final section concerning the magnetic component of specific heat capacity.

General Paper 3 – Mechanical Properties

Examiner: Dr Angus Wilkinson

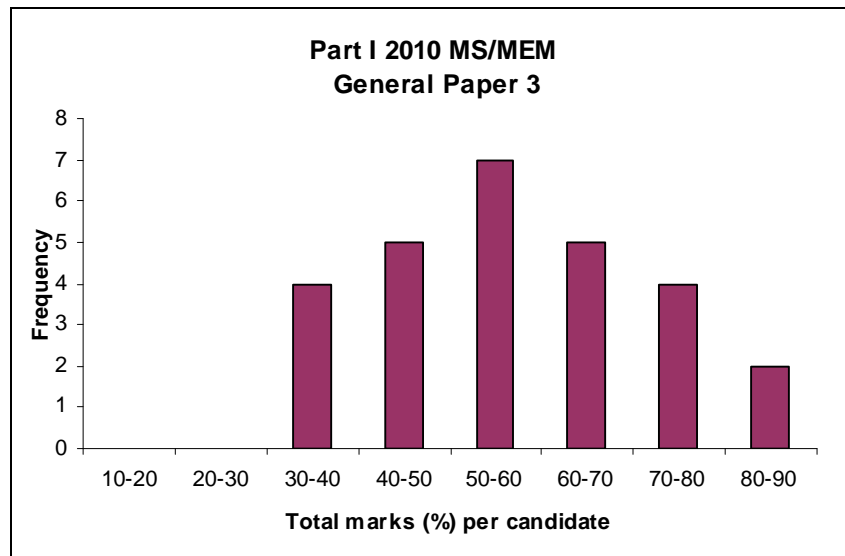
Candidates: 27 (24 MS, 3 MEM)

Mean mark: 56.4 %

Maximum mark: 84.0 %

Minimum mark: 33.0 %

Question	Topic	No of Answers	Average Mark	Highest Mark	Lowest mark
1	Microplasticity	3	10.00	14.5	6
2	Microplasticity	25	12.18	18.5	7
3	Elastic Behaviour in Isotropic Materials	24	14.23	20	6.5
4	Mechanical Properties of Polymers	19	9.24	15	4.5
5	Creep	13	6.81	14.5	1.5
6	Fracture	12	6.88	15	0.5
7	Macroplasticity & Mechanical Working Processes	15	10.77	17.5	3.5
8	Mechanical Properties of Composites	19	15.79	20	8.5



General Comments:

1. very few attempts at this question, with one first class script and two very weak scripts. It is not clear whether candidates were put off this question by not knowing the derivation required for part (a), or by an inability to interpret the TEM micrographs in part (b).
2. in (a) all candidates described the misfit/stress field interaction, with the second mechanism spread over modulus effect, valence effect in ionic crystals and the Suzuki effect. In part (bi) only one candidate converted a calculation of shear strength (carried out correctly by many) to a tensile strength. In part (bi) many candidates suggested the micrograph indicated that the precipitates had been sheared by dislocations.
3. answered by many students with the majority getting full marks for parts (a) and (b). Correctly setting up boundary conditions in (c) was found more difficult by some. There were many instances of using diameters given in the question as radii, and mistakes with the sign convention for pressure and stress.
4. answers to parts (a) and (b) were often rather vague and incomplete. In part (c) most struggled either failing to integrate correctly or to deal with limits. Poor answers to (d) and (e) indicated a lack of physical insight on the part of most candidates.
5. Answers to this question were generally very poor. Many candidates indicated that the boundary between Power law and Coble creep occurred when the two creep rates were equal but then failed to plot/sketch where this boundary lay on the deformation mechanism map.
6. Answers to part (a) were generally disappointing given that this was a rather standard question on a basic fracture mechanics parameter. The more mathematically able made some headway with part (bi). Although the expression for K_I was given very few were able to sketch the function to answer part (bii).
7. In part (a) a surprising number of candidates did not mention the insensitivity of the yield stress of most metals to hydrostatic stress or stress normal to the slip plane. Part (b) is a standard derivation for which reasonable answers were given.
8. despite the majority of candidates gaining high marks in parts (b) and (c) there were many weak answers to part (a) suggesting that calculation methods having been learnt without grasping the physical understanding.

General Paper 4 – Engineering Applications of Materials

Examiner: Professor Angus Kirkland

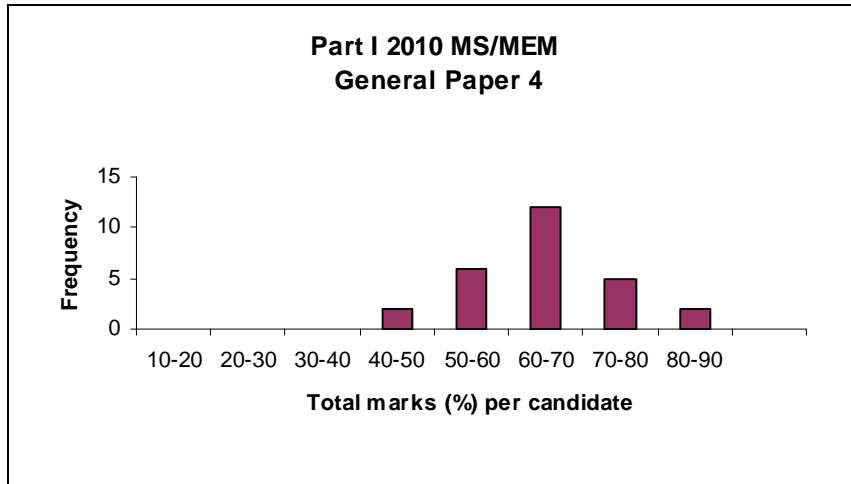
Candidates: 27 (24 MS, 3 MEM)

Mean mark: 65.2 %

Maximum mark: 83.5 %

Minimum mark: 41.5 %

Question	Topic	No of Answers	Average Mark	Highest Mark	Lowest mark
1	Microstructural Analysis	20	12.88	19.5	7
2	Microstructural Characterisation	23	14.54	18.5	6.5
3	Polymers	9	11.61	14	9.5
4	Semiconductor Devices	17	13.21	18	8.5
5	Engineering Alloys	10	13.85	17.5	10
6	Engineering Alloys	22	11.95	16	6
7	Engineering Alloys	11	12.41	16	7
8	Ionic Oxides	18	14.44	18.5	10.5



General Comments:

1. A popular question, generally well answered. Few students correctly identified the energy levels involved in the EDX transitions.
2. A very popular question which was very well answered. Almost all students could give examples of different methods for achieving magnification and were able to draw ray diagrams for the effects of chromatic and spherical aberration. Some students could not write down the resolution expression needed in part c).
3. Few students attempted this question and the attempts were mediocre. Most answers did not address the improvements required for part b) and many answers did not give suitable materials for the LED in part c).
4. A popular question with very good answers to part a). The answers to part b) generally gave only one factor and most students could not sketch the band structure of the HEMT in part c)
5. An unpopular question but generally well answered, particularly parts b) and c). Marks were lost by a number of candidates in part a) where the discussion of the advantages and disadvantages of Mg alloys was too brief.
6. A popular question, reasonably answered. Marks were lost for the most part by insufficient detail in answers to part c).
7. Not a popular question but reasonably well answered. In general marks were lost in parts b) and c) where many answers did not provide sufficient detail particularly with regard to performance and properties.
8. This question was popular and generally very well answered. Marks were lost by a number of candidates who could not provide balanced equations and identify the nature of the defects in part b). Many candidates also failed to critically compare the alternative processing routes required in part c).

PRELIMINARY EXAMINATION IN ECONOMICS AND MANAGEMENT

TRINITY TERM 2010

EXAMINERS' REPORT

PART I

A1. STATISTICS

Category	Number				Percentage			
	2009/10	2008/9	2007/08	2006/07	2009/10	2008/9	2007/08	2006/07
Distinction	31	26	25	15	36.0%	32.5%	26.6%	18.3%
Pass	52	53	66	66	60.5%	66.25%	70.2%	80.5%
Fail	3	1	3	1	3.5%	1.25%	3.2%	1.2%
Total	86	80	94	82				

A2. MARKING OF SCRIPTS

Scripts were single-marked, except when the first marking indicated either a fail (less than 40), or a total mark that fell three marks or less below the 200 required for a distinction (i.e., 197-199). The three scripts (in Economics) that had an initial fail mark were blind second read, resulting in them still being awarded a fail mark. Seven candidates who had total initial marks in the range 197-199 had all three scripts blind second marked. Five of these candidates were raised to a distinction. The final mark awarded to double-marked scripts was agreed between the two examiners. Two candidates withdrew from the examination.

All three of the candidates who failed Economics subsequently passed at the resit in September. One of the withdrawn candidates sat the three papers in September, and passed them all.

A.3 HANDLING OF MEDICAL CERTIFICATES AND OTHER INFORMATION WHICH THE PROCTORS AUTHORISE BOARDS OF EXAMINERS TO TAKE INTO ACCOUNT IN THE ADJUDICATION PROCESS

After the initial classification of candidates the Board considered whether there should be any revision in light of the information received. In no case was the classification affected.

B. NEW EXAMINING METHODS AND PROCEDURES

No new examining methods or procedures were introduced.

C. RECOMMENDATIONS FOR CHANGES IN CONVENTIONS

There are no recommendations for changes in conventions. There was some discussion of whether it would be desirable to standardize the distribution of marks across papers, particularly in light of the large number of distinctions awarded this year. However, it was decided that, given this was the first year of the new style first year course it would be premature to make significant changes. It was noted, though, that the average mark in the General Management paper was particularly high, a factor that the examiners might want to take into account when setting next year's paper.

The procedure for awarding the JP Morgan prize needs to be clarified. The current regulations state that it is for the best performance in Management, but as there are now two papers in Management this is ambiguous. This year's examiners interpreted it as meaning the best performance in General Management (as this is the closest in content to old Introduction to Management paper), and used the Financial Management mark as a tie-breaker.

D. COMMUNICATION OF EXAMINATION PROCEDURES TO CANDIDATES

The Chairman's circular to candidates and the Examination Conventions are attached. In line with previous years the Chairman's circular contained a summary of the aggregation conventions (how marks translate into results) and details of the penalties for short-weight, but did not contain the full version of the conventions with the re-reading rules and the recommended distribution of marks for examiners.

PART II

A. GENERAL COMMENTS ON THE EXAMINATION

B. EQUAL OPPORTUNITIES – BREAKDOWN OF RESULTS BY GENDER

Number of Candidates

Overall Number	Male	Female
86	65	21

Distinctions

Male	% Overall	% Within Grade	% of Males
23	26.7%	74.2%	35.4%
Female	% Overall	% Within Grade	% of Females
8	9.3%	25.8%	38.1%

Pass

Male	% Overall	% Within Grade	% of Males
40	46.5%	76.9%	61.5%
Female	% Overall	% Within Grade	% of Females
12	14.0%	23.1%	57.1%

Fail

Male	% Overall	% Within Grade	% of Males
2	2.3%	66.7%	3.1%
Female	% Overall	% Within Grade	% of Females
1	1.2%	33.3%	4.8%

C. PERFORMANCE ON EACH PART OF THE EXAMINATION

Summary Mark Statistics for Each Paper are as follows (2008-9 in brackets):-

	Introductory Economics	Financial Management	General Management	Total
No of Candidates	86 (80)	86	86 (80)	86 (80)
Maximum Mark	80 (79)	81	72 (71)	228 (230)
Minimum Mark	27 (44)	49	55 (38)	144 (133)
No of Marks > 70	20 (12)	12	7 (1)	n/a
No Marks > 60	51	52	83	n/a
No Marks >= 50	75 (78)	83	86 (78)	n/a
No of Marks < 50	11 (2)	2	0 (2)	n/a
No of Marks < 40	3 (0)	0	0 (1)	n/a
Mean Mark	61.8 (65.0)	63.0	66.3 (60.9)	191.1(189.8)
Median Mark	63.5 (65.25)	62	67 (61)	192 (190)
First Quartile	54	58	64	179.5
Third Quartile	70	68	69	204.5
Standard Deviation	11.0 (6.0)	7.5	3.4 (5.8)	17.6 (18.3)

D. PERFORMANCE IN INDIVIDUAL PAPERS

Economics June 2010

Microeconomics

Question 1 was popular and generally well answered. Most students were able to construct the budget set correctly. Stronger students were able to use income and substitution effects explicitly. Many students made simple algebraic errors in the last part of the question, although most were able to set the problem up appropriately.

Answers to Question 2 were, with a few notable exceptions, very poor. Students appeared to have difficulty in translating the verbal description of the model into an appropriated mathematical representation. Many students attempted to compute workers' surplus by working out the area under rather than above the supply function.

Questions 3 was also generally well done. Many students, however, struggled to distinguish correctly between substitutes and complements and few had the correct intuition for the differentiated goods Bertrand model.

In terms of the essays, most students successfully used knowledge of natural monopoly and price discrimination to answer question 7. Better answers distinguished between productive and allocative efficiency. Several answers to question 8 lacked a correct definition of externalities. Stronger students were able to illustrate externalities in the Edgeworth box.

Macroeconomics

The three questions on macroeconomics in Part A of the paper were deliberately not straightforward, although two of them deliberately contained some straightforward components. Such questions enabled candidates to show that they had mastered the basic models involved and also to show that they had thought intuitively about the underlying economic analysis.

Question 4 was an IS-LM question, but went beyond the normal kind of IS-LM analysis. Part (a) involved straightforward calculation of equilibrium in an IS-LM system and Part (b) required the candidate to apply two shocks at once, and then to recalculate the equilibrium. It was much easier to calculate the equilibrium in Part (c) than initially appeared to be the case. All that was necessary was to find that change in G , or in T , which would neutralise the effect of the shocks in Part (b) on the IS curve; it was then straightforward to show the relative size of the effects on the budget deficit in the two cases. To answer the question in Part (d) one must merely show what would happen to output, after the shock to the IS shown in the answer to Part (b), if, in addition the interest rate falls to zero; one can then easily calculate, at the resulting level of output, the level which the money supply need to be at, in order to make the interest rate go to zero. To answer parts (c) and (d) in this 'back to front' and/or 'inside-out' manner - even if it turns out to be arithmetically easy to do - requires the candidate to have a thorough understanding of the IS-LM model, and of the economics involved.

Question 5 required use of the Mundell-Fleming model, in order to demonstrate the effects of floating exchange rates in insulating an economy from shocks. To show, in Part (a), that floating rates fully isolate the economy requires a full understanding of the model; many candidates did not understand this - or at least they did not know how show - in this model - that this is the outcome. A very few candidates, having shown this properly, then went on to say that, in the real world, all this would take time or might not happen fully. To answer Part

(b) required one to understand that initially output would fall, that eventually it would return to its initial level, and that when that had happened there would be a fall in the real exchange rate exactly the same as that in Part (a). Many candidates got muddled up explaining this. Most candidates got the right answer in part (c), but, again, many candidates messed up their explanation of why this was the right answer. Answers to Part (d) showed that many candidates had thought about this set of issues; there were a number of candidates who made thought-provoking comments about Greece - including about what would happen if there began to be a risk premium on Greek debt.

Question 6 was a demanding question, since it required the use of some (elementary) calculus in the examination of a model which would not be very familiar to first-year students. As a result, the examiners constructed the question so as to specify very fully what candidates were required to demonstrate. Nevertheless, this question was answered by very few candidates indeed. Two candidates produced answers showing the sophistication and understanding which one might expect of a first-year graduate student, and were rewarded accordingly with extremely high marks. Most of the other students who answered this question got extremely confused, but were at least rewarded for tackling a difficult question.

The two essay questions in macroeconomics were deliberately more challenging than the kind of question which allows the candidate to simply write out material which has been learned by rote.

To answer question 9 properly a candidate had to show that, in the macroeconomic models which are used to understand the economy in the first year at university, unemployment is caused by aggregate demand being too low and so causing the demand for labour to be too low. In such a model a reduction in the money wage will not cause unemployment to fall - it will simply cause the price level to fall - unless it also causes aggregate demand to rise. (It can of course do this if the effect of lower wages and so lower prices is to cause the interest rate to fall and so to cause aggregate demand to rise.) Poor students failed to show that they understood this argument; good students explained it thoroughly; the very best students talked about the circumstances in which unemployment can be removed by wage cuts which take place over time in a dynamic adjustment process.

An undistinguished answer to Question 10 said that a liquidity trap happens when the LM curve is flat and that, in that case, monetary policy is totally ineffective - and talked about the difficulty of 'pushing on a string'. Better students give good reasons as to why the LM curve might be flat. Very good answers contained thoughtful comments about how quantitative easing (QE) might be effective even if the LM curve is flat, although, understandably, very few students gave a convincing explanation of how QE actually works.

Financial Management

Financial Reporting

Financial Reporting paper (Questions from 1 to 7) is the first half of Financial Management paper, followed by Finance paper. Section I is General Knowledge Questions (From Questions 1 and 2; 10 points altogether.) which candidates should answer all questions. Section II is Numerical Questions (From Questions 3 to 5; 20 points altogether.) which candidates also need to answer all questions. Finally, Section III is Explanatory and Critical Questions which candidates choose either Question 6 or 7 for 20 points.

Question 1 was a very basic question on IASB or IFRS, which candidates answered very well.

Question 2 was a conceptual question about very basic accounting concepts such as “Realisation” and “Conservatism”. Many candidates could not define these terms in a precise way, and they could not show appropriate examples.

Question 3 was a double-entry bookkeeping question which was a very basic question. Many candidates did very well, and therefore those who did poorly in this question resulted in a relatively less-competitive prostitution overall.

Question 4 is a very basic cashflow question. Similar to Question 3, those who failed answering this question well resulted in a weak overall score.

Question 5 is a Financial Statement interpretation question. Question “A” was well answered. In B, as the interpretations were given as multiple choices, candidates performed relatively well, but C revealed relative weakness of candidates’ ability in critically assessing the financial conditions and performance of companies.

Between Questions 6 and 7, most of candidates attempted to answer Question 6. It was about the appropriate methods of accounting regulation in the global era. Many candidates are still simplistic in understanding the efficiency and effectiveness of accounting regulation. The lectures and classes critically looked into the way who, why, how, for what, etc... accounting started being globally regulated in recent years. Critically minded articulation was required in this question but only a few satisfied this criterion.

Financial Analysis

Numerical Questions (30 points)

This question was compulsory. Students were asked to i) estimate the free cash flows of the investment project, ii) estimate the cost of capital to be used to evaluate the investment project, and iii) make a decision on whether or not to undertake the investment project. Although many students made some mistakes such as those explained below, this question was answered satisfactorily overall. The first part requires students to remember the formula for the free cash flow and apply to the problem, but majority of students made mistakes in this part. It was emphasized that depreciation expenses are non-cash items but the tax savings due to depreciation expenses should be taken into account when calculating free cash flows, but many students made mistake in that points. Another common mistake was in the treatment of changes in working capital. It was also emphasized that the changes in working capital should be subtracted at the earlier stage of the project but should be added at the end of the project to get free cash flows. The second part requires students to calculate the cost of capital. Most students stated the (After-tax) WACC formula correctly but many students failed to make correct choices in cost of debt, cost of equity, and weights. The third part was very straightforward, but some students ended up with a wrong decision because of mistakes in part i) and part ii).

Explanatory Questions (20 points)

Students were allowed to choose one question between two essay-type questions. Part A was related to Capital Asset Pricing Model (CAPM) and Part B was related to capital structure and corporate governance. Both questions were very well answered overall. More students chose Part B. It seems that this is because part i) was very straightforward and part ii) and iii) can

easily be answered with what they learnt from economics or general management courses. Part A required a bit more specific answer than Part B, but those who chose Part A were able to answer quite correctly.

General Management

This was the first year of the new General Management paper, although it is very similar to the old Introduction to Management paper excluding the accounting and finance sections of the paper. The average mark was 66.2, with a standard deviation of 3.2. No candidates failed this paper.

Question 1 was attempted by 20 candidates. Answers were generally fair, but there were few outstanding marks.

Question 2 was one of the most popular questions, being attempted by 48 candidates. The most common problem was a failure to explain principal-agent theory properly. Theories of motivation were somewhat better explained, although there was often a lack of critical perspective in these explanations.

Question 3 was a less popular question with 14 attempts. This perhaps reflected the need for students to have knowledge of how an industry has evolved.

Question 4 was attempted by 13 candidates, and on the whole was not well answered. Some candidates seemed unaware of Chandler's classic ideas on this subject, for example, which is clearly a major omission.

Question 5 was a very popular question, attracting 54 responses. There were some excellent answers to this question, and no really weak ones at all, although it would have been good to see more variation in the examples used by students, with McDonalds being the overwhelming favourite!

Question 6 received only 18 responses, perhaps reflecting the fact that a good answer might have involved comparing the marketing concept of corporate brand and the OB concept of corporate culture. Questions that cross functional boundaries, as it were, are often perceived as more challenging.

Question 7 was the most popular question in the exam, being attempted by 57 people. Most people were able to do a reasonable job of comparing Taylorism with high involvement work systems, but the ability to identify appropriate organizational and social conditions was more mixed.

Question 8 was also very popular, with 50 answers. Those who received lower marks generally ignored the part of the question referring to professional service firms.

Question 9 and question 10 received only a handful of attempts between them. Although neither topic was one that was explicitly covered in lectures or tutorials, it would certainly have been possible to apply more general principles to these questions.

Question 11 was attempted by 36 candidates. Most answers were fine, although weaker students found it harder to explain the contribution to competitive advantage.

Question 12 was answered by 25 people. Weaker students didn't manage to give examples of retailers whose strategies had changed.

Examiners Report for MEM 2010---Economics Papers.

Howard Smith 28th July 2010

Part I

Three (3) MEM candidates were entered for Introductory Economics, which they sit in 2009. The Introductory Economics scripts were double marked for EEM and MEM students. The paper is also taken as a Prelims exam by PPE and E&M students. A detailed report on this paper was produced by the Prelims Examiners for PPE in 2008, including comments on individual questions.

The means for the MEM (year 2009) candidates are compared with the E&M (year 2009) candidates below:

MEM candidates: Mean ■■■.

E&M candidates: Mean 65.

Part II

Five economics papers are available to MEM Part II candidates, of which Microeconomics is compulsory.

Four of these (the papers other than Microeconomics) had no MEM candidates. The remaining paper (Microeconomics) are taken in large numbers by PPE and E&M students, and full reports on these papers can be found in the Examiners Report for PPE. However, for these two papers the means for the MEM candidates are compared with the E&M candidates below:

Microeconomics

MEM (4 candidates): Mean ■■■

E&M (88 candidates): Mean 63

Note that for Microeconomics the paper taken by EEM candidates was the same as that for E&M (and PPE) candidates; however as EEM candidates had 3 hours and E&M candidates only 2 hours 15 minutes, the EEM candidates were asked to answer an extra question.

END

REPORT ON FINAL HONOURS SCHOOL OF MATERIALS ECONOMICS AND MANAGEMENT, PART II EXAMINATION

Part I

A. STATISTICS

(1) Numbers and percentages in each category

Candidates are given a mark on the basis of their performance in the Part II examination and then given a classification on the basis of their performance across Part I and Part II. Since the number of candidates in this and previous years is less than 6, numerical data is confidential (see section E, below).

(2) The use of vivas

Vivas were not used for this Examination.

(3) Marking of scripts

All scripts were double-blind marked by the Examiners and Assessors. The full procedures are described in the Examination Conventions.

B. NEW EXAMINING METHODS AND PROCEDURES

In previous years, examiners could offer half marks for questions in the materials option paper, which was sat by MEM Part II candidates. The marks awarded by each examiner for each question were then averaged and if the result was non-integer, the mark assigned to that question was rounded up. This year, again, half marks could be offered for each question. These marks were then added and divided by two to give a total for the entire paper. If this total ended with a half mark, then the paper total was rounded up. This change was introduced to reduce the number of marks rounded up per candidate.

C. CHANGES IN EXAMINING METHODS, PROCEDURES AND CONVENTIONS WHICH THE EXAMINERS WOULD WISH THE FACULTY AND THE DIVISIONAL BOARD TO CONSIDER

Unit of Assessment Titles on Examination Schools Results Templates

Currently, in the results templates, no information appears which indicates whether an entry is a percentage or an absolute mark. For example, a practical result which appears as '36' corresponds to a mark of 36 out of 60, whereas a mark of '36' for the team design projects corresponds to a mark of 36 out of 50. This is complicated by the way in which the Part II marks appear, which is as a percentage rather than as a mark out of 200 (or 400 for MS). It is a further concern that this also appears on the student transcripts. We recommend that the assessment title be redrafted to provide more information concerning the mark awarded.

D. EXAMINATION CONVENTIONS

The previous year's Examination Conventions were included in the Course Handbook that was distributed to all candidates in hard-copy and was also made available on the Departmental website, to which candidates' attention was drawn by e-mail. The current year's Conventions (2010, attached) were put on the Departmental website and sent electronically on 31st March 2010 to all candidates. The Examination Conventions were assessed by the Board of Examiners and the Department's Academic Committee.

Part II

A. GENERAL COMMENTS ON THE EXAMINATION

There were 4 candidates for the examination. The examination consisted of 2 written papers, one being a compulsory Materials Option paper, and the other paper being selected from a range of Economics and Management options. For the Materials Option paper, which lasted 3 hours, candidates were offered 9 questions in 3 sections of 3 questions, and were required to answer 3 questions, 2 from one section and 1 from either of the remaining sections. In addition to the written papers, candidates are required to submit a report on a 24-week industrial placement, which has the weight of 2 written papers. The reports on these 24-week Management projects are marked by staff at the Said Business School. For reasons of anonymity, the details of the overall mean marks are discussed in Section E, below.

B. EQUAL OPPORTUNITIES ISSUES AND BREAKDOWN OF THE RESULTS BY GENDER

Insofar as can be judged from the small sample size, the performance of male and female candidates was not significantly different. Both male and female groups of candidates performed better in the coursework than in written examinations. Due to the small number of candidates for this examination, the numerical data is confidential (see section E, below).

A non-serif font was used for Materials examination papers for the first time this year, in order to make them comply with SENDA/ADA guidelines. No specific requests were received for enlarged copies.

C. DETAILED NUMBERS ON CANDIDATES' PERFORMANCE IN EACH PART OF THE EXAMINATION

Since the number of candidates in this and previous years is less than 6, numerical data is confidential (see section E, below).

D. COMMENTS ON PAPERS AND INDIVIDUAL QUESTIONS

Detailed comments on the written examination papers and overall candidates' performance on individual questions are attached.

E. COMMENTS ON THE PERFORMANCE OF IDENTIFIABLE INDIVIDUALS AND OTHER MATERIALS WHICH WOULD USUALLY BE TREATED AS RESERVED BUSINESS

For reasons of anonymity, the details of the overall mean marks are discussed in this section. For Parts I and II combined the average mark was in the [redacted] range [redacted]

(1) Numbers and percentages in each category

Candidates are given a mark on the basis of their performance in the Part II examination and then given a classification on the basis of their performance across Part I and Part II. There were 4 candidates for the examination, with [redacted]

Class	Number			Percentage (%)		
	2009/10	2008/09	2007/08	2009/10	2008/09	2007/08
I	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
II.I	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
II.II	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
III	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Pass	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Fail	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

(2) Breakdown of the results by gender

mark (%)	Overall mark		Part 2 Mark		Part 1 Mark	
	Male	Female	Male	Female	Male	Female
0 - 40	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
40-50	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
50-60	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
60-70	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
70-80	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
80-90	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Totals	2	2	2	2	32	2

(3) Candidates' Performance in each part of the examination

All candidates sat the Materials Option paper, for which the mean mark (MS and MEM students combined) was 61.3%. In addition, one candidate sat the Accounting paper, achieving [redacted]%, whilst two candidates sat the Finance paper with an average of [redacted]%.

(4) Medical certificates:



F. NAMES OF MEMBERS OF THE BOARD OF EXAMINERS

MEM:

Dr. P. R. Wilshaw (Chairman)

Prof. C.R.M. Grovenor

Dr. P.D. Nellist

Dr. R.I. Todd

Dr. A. Kirkland

Dr. A.J. Wilkinson

Dr Chris McKenna (Management)

Dr Dana Brown (Management)

Dr Doug Holt (Management)

Dr Godfrey Keller (Economics)

Dr Howard Smith (Economics)

Prof Jon Binner (External)

Prof Mark Rainforth (External)

Prof Paul Cousins (External, Management)

Prof Robin Mason (External, Economics)

Attachments: Examination Conventions 2010
Information to Part II MEM Candidates
Comments on Materials Option Paper
Comments on Management papers
Comments on Economics paper

Examination Conventions 2009/10

Final Honours School

Materials, Economics and Management

1. INTRODUCTION

The formal procedures determining the conduct of examinations are established and enforced by the University Proctors. These conventions are a guide to the examiners and candidates but the regulations set out in the Examination Regulations have precedence. The examiners are nominated by the Nominating Committee* in the Department of Materials and those nominations are submitted for approval by the Vice-Chancellor and the Proctors. Formally, examiners are independent of the Department and of those who lecture courses. However for written papers on Materials Science in Part I and Part II, examiners are expected to consult with course lecturers in the process of setting questions. The paragraphs below indicate the conventions to which the examiners usually adhere, subject to the guidance of the appointed external examiners, and other bodies such as the Academic Committee in the Department, the E(M)EM Standing Committee, the Mathematical, Physical and Life Sciences Division, the Social Sciences Division, the Education Committee of the University and the Proctors who may offer advice or make recommendations to examiners. It must be stressed that to preserve the independence of the examiners, candidates are not allowed to make contact directly about matters relating to the content or marking of papers. Any communication must be via the Senior Tutor of your college, who will, if he or she deems the matter of importance, contact the Proctors. The Proctors in turn communicate with the Chairman of Examiners.

Marking criteria for the Team Design Project are published in the FHS course handbook.

During the marking process the scripts of all written papers remain anonymous to the markers.

[In some of the descriptions of marking for individual elements of coursework that are given later in this document the term 'double marked, blind,' is used; this refers to the fact that the second marker does not see the marks awarded by the first marker until he or she has recorded his or her own assessment, and does not indicate that the candidate is anonymous to the markers.]

Late Submission of or Failure to Submit Coursework

The Examination Regulations stipulate specific dates for submission of the required pieces of coursework to the Examiners (1. A set of detailed reports of practical work; 2. A Team Design Project Report; 3. Industrial Visit Reports as specified in the course handbook; and 4. A Part II Management Project Report). Rules governing late submission and any consequent penalties are set out in the 'Late submission of work' sub-section of the 'Regulations for the Conduct of University Examinations' section of the Examination Regulations (pp45-46 of the 2006, 2007 & 2008 Regulations and pp46-47 of the 2009 Regulations).

Under the provisions permitted by the regulation, late submission of coursework for Materials Science or Materials, Economics & Management examinations will normally result in the following penalties:

* for 2009-10 the Nominating Committee comprises Dr Czernuszka (Chair), Professor Grovenor and Dr Taylor.

- (a) With permission from the Proctors under clause (1) of para 16.8, no penalty.
- (b) With permission from the Proctors under clauses (3) + (4) of para 16.8, for the first day or part of the first day that the work is late a penalty of a reduction in the mark for the coursework in question of up to 10% of the maximum mark available for the piece of work, and for each subsequent day or part of a day that the work is late a further penalty of up to 5% of the maximum mark available for the piece of work; the exact penalty to be set by the Examiners with due consideration given to any advice given in the Proctors' "Notes for the Guidance of Examiners and Chairmen of Examiners".
- (c) Where the candidate is not permitted by the Proctors to remain in the examination he or she will be deemed to have failed the examination as a whole.

Where no work is submitted or it is proffered so late that it would be impractical to accept it for assessment the Proctors may, under their general authority, and after (i) making due enquiries into the circumstances and (ii) consultation with the Chairman of the Examiners, permit the candidate to remain in the examination. In this case the Examiners will award a mark of zero for the piece of coursework in question.

Penalties for late submission of individual practical reports are set out in the MS/MEM FHS Handbook and are separate to the provisions described above.

2. PARTS I & II

Candidates taking Ec1: Introductory Economics in the 2nd year.

MEM candidates sit the compulsory Ec1: Introductory Economics paper in Trinity Term of their second year. This paper will be set and examined as for all other Part I and Part II Economics papers (see below) and contributes to the Part I mark. The marks for this paper will be formally ratified by the Board of examiners for Part I examinations held in the Trinity Term following that in which the Ec1 paper is sat.

Candidates for Part I (3rd year)

Part I candidates take four compulsory Materials papers (General Papers 1 – 4); one compulsory Economics paper; and one compulsory Management paper. In addition, candidates are assessed on their Materials coursework (practical work, the team design project, and industrial visits). Marks from the Ec1 paper sat in Trinity Term of the 2nd year are included in the Part I total.

Candidates for Part II (4th year)

Part II candidates take one compulsory Materials Options paper and one paper from a range of Management and Economics options. In addition they are assessed on their report of a six-month industrial placement, which carries the weight of two papers.

(1) Setting of papers

Part I Materials General Papers 1 – 4 are set by the materials examiners in consultation with course lecturers. The responsibility for the setting of each examination paper is assigned to an examiner, and a second examiner is assigned as a checker. The Materials Option paper in Part II is set by lecturers of option courses and two examiners, the examiners acting as checkers. For the Materials papers, the examiners, in consultation with lecturers, produce model answers for every question set and the wording and content of all examination questions set, and the model answers, are scrutinised by all examiners, including, in particular, the external examiners.

The Economics and Management papers are set by examiners nominated respectively by the Economics Faculty and the Said Business School.

(2) *Paper format*

Materials Papers

All Materials general papers comprise eight questions from which candidates attempt five and are taken in Part I. Each question is worth 20 marks. The total number of marks available on each general paper is 100. The Materials Option paper, taken in Part II, comprises three sections, each section containing three questions: candidates attempt three questions, two from one section and the third from either of the remaining sections. The total number of marks available on the option paper is 100, and all questions carry equal marks. Questions are often divided into sections, with the approximate marks for each section indicated on the question paper.

Economics and Management papers

Candidates are advised to read particularly carefully the specific instructions on the front of each paper as to the number of questions they should submit, since the rubrics on Economics and Management papers differ slightly from those for the Materials papers.

(3) *Marking of papers*

Materials Papers

All scripts are double marked, blind, by the setter and the checker. After individual marking the two examiners meet to agree marks question by question. If the differences in marks are small (~10%, 2-3 marks for most questions), the two marks are averaged. Otherwise the examiners identify the discrepancy and read the answer again, either in whole or in part, to reconcile the differences. If after this process the examiners still cannot agree, they seek the help of the chairman, or another examiner as appropriate, to adjudicate.

The Materials Options paper is marked by course lecturers acting as assessors and an examiner acting as a checker.

The Materials external examiner provides an independent check on the whole process of setting and marking.

The rubric on each paper indicates a prescribed number of answers required (e.g. "candidates are required to submit answers to no more than five questions"). Candidates will be asked to indicate on their cover sheet which questions, up to the prescribed number, they are submitting for marking. If the cover slip is not completed then the examiners will mark the first five questions in numerical order by question number. The examiners will NOT mark questions in excess of the prescribed number. If fewer questions than the prescribed number are attempted, (i) each missing attempt will be assigned a mark of zero, (ii) for those questions that are attempted **no** marks beyond the maximum per question indicated under section 2(2) above will be awarded and (iii) the mark for the paper will still be calculated out of 100.

As the total number of students sitting some papers is small, it is not unusual for mean marks to vary from paper to paper, or year to year. It is not therefore normal practice to adjust marks to fit any particular distribution. However, where marks for papers are unusually high or low, the examiners may, having reviewed the difficulty of the paper set or other circumstances, decide with the agreement of the external examiner to adjust all marks for those papers. For the Materials papers such adjustment is referred to as 'scaling' and the normal procedure will be as follows:

- i. Papers with a *mean taken over all candidates* of less than 55% or more than 75% are normally adjusted to bring the *mean* respectively up to 55% or down to 75%. Normally this is achieved by adding/subtracting the same fixed number of marks to/from each candidate's score for the paper.
- ii. For papers with a mean in the ranges either of 55-60% or 70-75%, including those scaled under (i) above, the questions and typical answers are compared

in order to ascertain, with the help of the external examiners, whether the marks are a fair reflection of the performance of the candidates as measured against the class descriptors. If not, the marks are adjusted. Normally this is achieved by adding/subtracting the same fixed number of marks to/from each candidate's score for the question or for the paper.

- iii. The mean mark and the distribution of marks, both taken over all written papers, are considered, again with the help of the external examiners, in order to ascertain whether these overall marks are a fair reflection of the performance of the candidates as measured against the class descriptors. If not, the overall marks are adjusted. Normally this is achieved by adding/subtracting the same fixed number of marks to/from each candidate's overall score.

Economics and Management Papers

The rubrics on Management and Economics papers differ slightly from the above, but numerical marking is used and all examiners mark to the standard class boundaries [see section on classification] and range of marks (0-100). All scripts in Economics and Management are double-marked. Management examiners mark on a question-by-question basis, whereas in Economics a mark is awarded for the performance on the paper as a whole. Economics and Management examiners mark papers and then consider the marks distribution for the whole cohort taking the paper (including candidates from other joint schools). After careful consideration of such factors as: the marks, the candidate's overall performance and the level of difficulty of the questions, they may make adjustments for each candidate. The adjusted marks for papers and half papers are then forwarded to the Chairman of the MEM Examination Board.

(4) Marking of Practicals for Part I

Practicals are assessed continually by senior demonstrators in the teaching laboratory and are allocated 50 marks. Part I examiners have the authority to set a practical examination.

(5) Marking Industrial Visits

Four industrial visit reports should be submitted during Part I. Reports are assessed by the Industrial Visit Coordinator on a satisfactory / non-satisfactory basis, and are allocated a total of 20 marks.

(6) Marking the Team Design Projects

The team design project is double marked, blind, by two of the Part I Examiners. They then compare marks and analyse any significant disagreement between these marks before arriving at a final agreed mark for each project and each team member. Supervisors of the projects submit a written report to the examiners on the work carried out by their teams and these are taken into consideration when the examiners decide the final agreed marks. Industrial representatives may be asked to contribute to the assessment process. The project is allocated 50 marks, of which 25 are for the written report and 25 for the oral presentation. The same two examiners assess both the reports and the presentations.

(7) Part I and II vivas

With the possible exception of the Part II Management project, there will be no Part I or Part II vivas in the 2009/10 Examination.

(8) Marking the 4th Year Management Project

The management project is allocated 200 marks and is marked by the Saïd Business School. A viva may be held.

The detailed 2009/10 conventions for the marking of the management project are being finalised and when available will be provided to candidates by e-mail.

3. CLASSIFICATION

The following boundaries (CVCP) and descriptors (MPLSD) are used as guidelines:

Class I Honours 70 – 100	The candidate shows excellent problem-solving skills and excellent knowledge of the material over a wide range of topics, and is able to use that knowledge innovatively and/or in unfamiliar contexts.
Class Ii Honours 60 – 69	The candidate shows good or very good problem-solving skills, and good or very good knowledge of much of the material over a wide range of topics.
Class Iii Honours 50 – 59	The candidate shows basic problem-solving skills and adequate knowledge of most of the material.
Class III Honours 40 - 49	The candidate shows reasonable understanding of at least part of the basic material and some problem solving skills. Although there may be a few good answers, the majority of answers will contain errors in calculations and/or show incomplete understanding of the topics.
Pass 30 - 39	The candidate shows some limited grasp of basic material over a restricted range of topics, but with large gaps in understanding. There need not be any good quality answers, but there will be indications of some competence.
Fail 0 - 29	The candidate shows inadequate grasp of the basic material. The work is likely to show major misunderstanding and confusion, and/or inaccurate calculations; the answers to most of the questions attempted are likely to be fragmentary only.

In borderline cases the examiners use their discretion and consider the overall quality of the work the candidate has presented for examination. The external examiner often plays a key role in such cases.

Part I:

Unclassified Honours – The examiners are required to classify each candidate according to her/his overall average mark in Part I as (a) worthy of Honours, (b) Pass or (c) Fail. A candidate is allowed to proceed to Part II only if he/she has been adjudged worthy of honours by the examiners in Part I. The examiners do not divide the categories further but tutors and students may infer how well they have done from their marks. Candidates adjudged worthy of honours normally proceed to Part II but they may, if they wish and subject to approval from the relevant bodies, leave after Part I in which case an Unclassified Honours B.A. degree will be awarded.

Pass – The examiners consider that the candidate is not worthy of honours and therefore will not be allowed to proceed to Part II. The candidate may leave with a B.A. (without honours) or may retake Part I the following year (subject to college approval).

Fail – The examiners consider that the candidate is not worthy of a B.A. The candidate either leaves without a degree or may retake Part I the following year (subject to college approval).

Part II:

Classified Honours – Once marking is completed for both Parts I and II an overall percentage mark is computed for each candidate and classification then takes place. Subject to the requirement that Part II be adjudged worthy of honours (see below), classification is based solely on the overall percentage mark; the candidate's profile of marks from each element of assessment is only taken into account in borderline cases. However, a candidate cannot be awarded an M.Eng. degree unless his/her performance in Part II is adjudged worthy of honours i.e. a

candidate must be adjudged worthy of honours both in Part I and in Part II to be awarded the M.Eng. degree. Failure to achieve honours in Part II will result in the candidate leaving with an unclassified B.A. (Hons) irrespective of the aggregate mark.

Pass – Notwithstanding the award of unclassified honours in Part I, the examiners consider that the candidate's overall performance is not worthy of an M.Eng. The candidate is listed as a Pass on the class list and is awarded an unclassified B.A. (Hons) on the basis of Part I performance.

Fail – The examiners consider that the candidate's overall performance is not worthy of an M.Eng. *and* that the performance in Part II is not worthy of a Pass. The candidate is excluded from the class list but is nevertheless awarded an unclassified B.A. (Hons) on the basis of Part I performance.

- The examiners cannot award unclassified honours on the basis of Part II performance unless permitted to do so by the Proctors.
- Nevertheless, candidates awarded a Pass or a Fail by the Part II examiners leave with an unclassified B.A. (Hons) because they were judged worthy of that in Part I (i.e. their degree is the same as if they had left immediately after Part I).
- In terms of the degree awarded, there is no difference between a Pass and a Fail in Part II. The only difference is whether or not the name appears on the class list.
- Candidates cannot normally retake Part II because the Examination Regulations require that they must pass Part II within one year of passing Part I. This rule can only be waived in exceptional circumstances, with permission from the Education Committee.

Annex: Summary of marks awarded for different components of the Final Examination in MEM (For Part I and Part II students who embarked on the FHS respectively in 2008/09 and 2007/08)

	Component	Mark
Part I	General Paper 1	100
	General Paper 2	100
	General Paper 3	100
	General Paper 4	100
	Introductory Economics (Ec1)	100
	Paper M1	100
	Microeconomics	100
	Practicals & Industrial visits	70
	Team Design Project	50
<i>Part I Total</i>		820
Part II	Management Project	200
	Options Paper 1	100
	One paper from a choice of Economics and Management Papers.	100
<i>Part II Total</i>		400
<i>Overall Total</i>		1220



UNIVERSITY OF OXFORD

DEPARTMENT OF MATERIALS

PARKS ROAD OXFORD OX1 3PH Telephone: (01865) 273700

To: **All Candidates for Part II Examinations in *Materials, Economics and Management* 2010**

From: **Dr Peter Wilshaw, Chairman of Examiners, Part II 2010.**

Subject: **Part II Examinations Trinity 2010**

Date:

Information on the Part II Examinations 2009

The MEM Examiners for the Part II Examination in Trinity 2010 are: Dr Peter Wilshaw (Chair), Dr Peter Nellist, Dr Angus Wilkinson Prof. Angus Kirkland, Prof. Chris Grovenor, Dr Richard Todd (examiners from the Department of Materials Science); Dr D Brown, Dr. D. Holt, (examiners from the Said Business School); and Prof. G Keller, Dr H Smith, (examiners from the Department of Economics). The external examiners are Prof. Mark Rainforth, University of Sheffield; Prof. Jon Binner, University of Loughborough; Professor R. Mason (University of Exeter) and Prof. P. Cousins (Manchester business School).

Candidates are reminded that in order to preserve the independence of the examiners, you are not allowed to contact them directly about matters relating to the content of the exams or the marking of papers. Any communication must be via the Senior Tutor of your college, who will, if he or she deems the matter of importance, contact the Proctors. The Proctors in turn communicate with the Chairman of Examiners. If you have any queries about the Examinations or anything related to the Examinations, for example illness or personal issues, please don't hesitate to seek further advice from your College tutor, or one of the Department's academic support staff as listed in your course handbook.

Examination Conventions

The appropriate Examination Conventions for your degree course are enclosed. Please ensure you read the Conventions thoroughly. Please note that any communication to the Proctors about such matters should be done via **your Senior Tutor in College.**

Format of the Examination Papers

Past papers can be found online at: <http://missun29.offices.ox.ac.uk/pls/oxam/main> (or go to the University's homepage, click on "Current Students", "Examinations & Assessments", and then "[Past Papers \(OXAM\)](#)").

The **Materials Option paper** will consist of three sections, each section containing three questions. You are to answer three questions, two from one section and the third from either of the remaining sections. Within each section, **any** question may cover material from **all** of the 18 hours of lectures, and accompanying classes, which are associated with that section. The total number of marks for this paper is 100, and all questions carry equal marks. Questions will be sub-divided into sections with the breakdown of marks that the examiners expect to give to each part of each question indicated.

A specimen paper to give an indication of format can be found at:

<http://www.materials.ox.ac.uk/uploads/file/specimenexaminationpaper07.pdf>. Last years' exam papers can be found on OxAM.

As in previous years, both general paper and option paper questions are, where possible, likely to have some mathematical or analytical content.

As in previous years, questions are, where possible, likely to have some mathematical or analytical content.

The **Economics papers** (Economics Decisions within the Firm, Statistical Methods within Economics, Econometrics or Macroeconomics) will be in the same format as previous years and more information on these can be found on the Department of Economics' Intranet at: <http://www.economics.ox.ac.uk/index.php/undergraduate/matrix> The **Management papers** (Finance, Accounting, Marketing or Strategic Management) will be in the same format as in recent years.

Timetable of the Examination Papers

The timing of all the examination papers cannot be confirmed until the Examination Schools release the examination schedule. However, it is hoped that the Materials Options Paper will be in week 8, Trinity Term. We cannot comment on the timing of the Economics and Management papers.

Provision of Mathematical Tables for Examinations

SMP Advanced Tables will be available for all written Materials papers.

Use of calculators

The only types of calculators that may be used in Materials Science examinations are from the following series:

CASIO fx-83

CASIO fx-85

SHARP EL-531

Candidates are required to clear any user-entered data or programmes from memories immediately before the exam begins. The examiners may inspect any calculator during the course of an exam.

Vivas

There will be no Part II vivas for Materials, Economics, and Management candidates this year.

Allocation of Marks in Part I and Part II Materials, Economics and Management.

	MEM Course as of 2004/05 (first Part I exam 2005/06)	Mark
Part I	General Paper 1	100
	General Paper 2	100
	General Paper 3	100
	General Paper 4	100
	Introductory Economics (Ec1)	100
	Paper M1	100
	Microeconomics	100
	Practicals & Industrial visits	70
	Team Design Project	50
	<i>Part I Total</i>	<i>820</i>
Part II	Management Project	200
	Materials Option Paper one of Economics or Management option.	100
	<i>Part II Total</i>	<i>400</i>
	<i>Overall Total</i>	<i>1220</i>

Materials Option Paper 2 / Materials Option Paper

Examiner: Dr Peter Nellist

Candidates: 27 (24 MS / 3 MEM Part II)

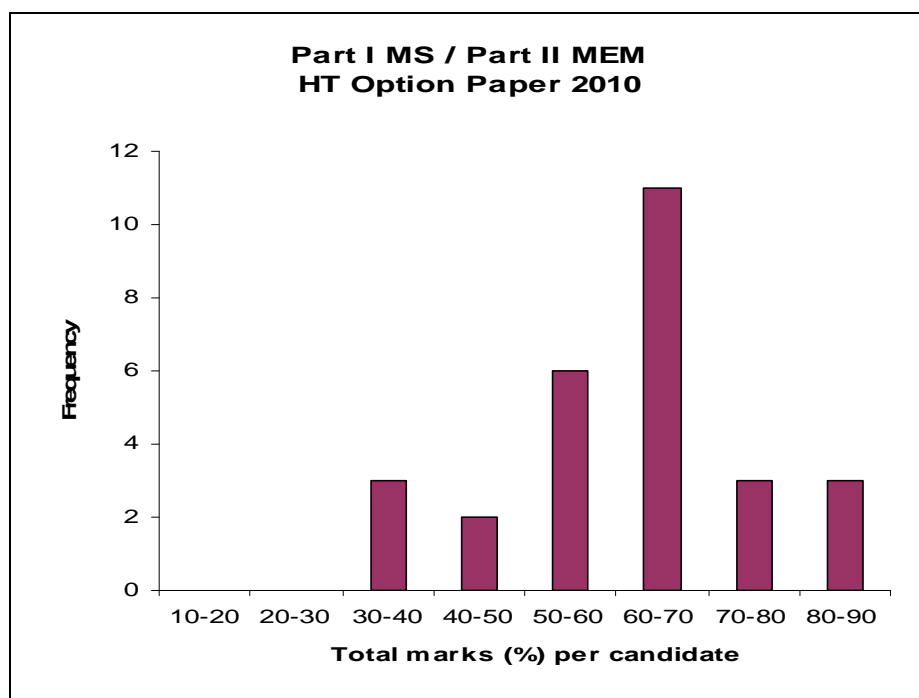
Mean mark: 61.3 %

Maximum mark: 88.5 %

Minimum mark: 33.0 %

Statistics

Question	Topic	No of Answers	Average Mark	Highest Mark	Lowest mark
1	Advanced Engineering Alloys	6	19.67	22.5	16.5
2	Advanced Engineering Alloys	11	17.42	25.5	10
3	Advanced Engineering Alloys: Steels	13	18.76	30	4.5
4	Materials and Devices for Information Technology	8	17.69	28	4
5	Materials and Devices for Information Technology	4	21.38	26.5	18.5
6	Materials and Devices for Information Technology	3	21.00	25.5	16
7	Advanced Polymers	21	22.78	31	11
8	Advanced Polymers	1	13.50	13.5	13.5
9	Ceramic Processing	17	19.07	29.5	9.5



General Comments:

1. Question concerning the role of ordering in strengthening of metallic alloys. The intention was that

answers include examples from Ni-based, Al-based and Ti-based systems however the wording could have been read to mean alloys containing Ni, Al and Ti. All but one candidate took this second meaning and restricted their answer to Ni-based superalloys – no marks were deducted for this. Some good scripts but general level was a little disappointing given overlap with general paper courses.

2. Question concerning selection of welding methods for different metal alloys. Answers generally gave good descriptions of the welding methods in some cases with high level of detail. However, in many cases although a reasonable welding method was described the challenges generated by the different materials were not made clear and so the rationale for selecting that method was often not given.
3. Question concerning definitions relating to martensitic transformations and their characteristics in steels. Most marks were in the 2.1 range and this accurately reflects the good, but not outstanding, performance of most of the candidates on this question.
4. This question required descriptive answers addressing techniques for the growth and processing of Si, ending with a discussion of electromigration. It was well graded, producing a much greater spread of marks in the later sections. Overall, the question produced a wide spread of marks. The mean was a bit below that which would be desired, perhaps explained by a tail of weaker candidates that were put off by the other questions in this block.
5. This question started with a bookwork section requiring the students to explain types of magnetic anisotropy. It went on to require students to explain the superparamagnetic effect and to solve a problem about data storage. It was a well-graded question. The relatively low number of attempts were generally of good quality.
6. This question addressed heterojunctions in semiconductor materials. The first two sections were descriptive, finishing with a problem regarding the electronic effects of quantum confinement. There were a relatively low number of attempts, but the question produced some good quality answers. Most candidates struggled with the final problem-solving section.
7. This very popular question addressed phase separation in polymer materials. It contained both descriptive and problem solving parts. It was well-graded and produced a wide spread of marks. Many answers were of high quality, and most candidates know how to approach the problem-solving part.
8. This polymers question addressed interfaces between different polymers, the interaction between polymers and solvents, and the use of polymers in waste water treatment. It contained material from parts of the course delivered by different lecturers - some of the material being delivered for the first time this year, and required significant input from the Examiners' Committee to finalise it for the paper. There was only one attempt at the question producing a weak mark, and perhaps its diversity was a deterrent to students.
9. A well graded question addressing the milling and sintering of ceramics. It was well-graded and required both descriptive answers and the derivation of a formula for pore-closure that was different to that seen in the notes. It was a popular question producing a wide spread of marks but with a mean close to the target.

Overall Comments:

The overall mean was reasonably within the acceptable range. A tail of weaker marks was counteracted by some very strong performances. In sections B and C there were some questions that were very unpopular. In a paper where students study for only certain sections, it is important to ensure that the sections each present a selection of questions that are all reasonably acceptable for the students.

Assessor's Report for Accounting

DEAM 0371
DEEB 2245
DMMB 2245

Number of candidates: 57

General Comments

Accounting paper comprised of two sections: Section A and Section B (Questions from 1 to 5) which candidates should answer all questions. Section I is Explanatory and Critical Questions (Essay type) comprising of two questions: question 1 and 2 with internal option (either/or) for 40 points in total. Section II is Numerical Questions (From Questions 3 to 5; 60 points altogether.) which candidates also need to answer all questions

Comments on answers to individual questions

Section A- Essay questions

Question 1 (a) Goodwill treatment

This was a popular question with more than half i.e. about 54% (31 candidates) attempted it. Candidates explained the meaning of goodwill but only a few could really highlight its controversial nature and arguing it out critically and as such most marks were in the range of 50-65 points. However, a few candidates critically argued the nature of goodwill by relatively structuring the answers with excellent examples which fetched them high marks.

Question 1 (b) Accounting Regulation – IAS/IFRS

This question formed the OR option. Less than half (about 26 candidates) attempted this. Most answers argued the notion fair value accounting but more so generally and also lacked relevant examples to support their arguments. However, there were a few excellent and thought provoking answers which indeed fetched high marks.

Question 2 (a) Standard costing / Variance analysis

Although this was expected to be a popular examinable topic, less than half (about 27 candidates) attempted this question. Answers were well discussed with good examples and some answers had good and consistent discussion that highlighted managerial performance evaluation in the context of standard costing pros and cons and the relevance of that technique in the modern day context.

Question 2 (b) Activity Based Costing

This seemed to be a popular question as it was attempted by more than half (about 30 candidates). The question indeed was framed to test the conceptual knowledge as well as the related problems with the ABC approach. Most answers illustrated ABC with examples and were of balanced type but could not explain the likely problems faced in a specific industry situation. Marks were distributed taking into account conceptual and application oriented issues expected from the candidates.

Section B - Numerical questions

Question 3 (a) Double-entry system

This question was very popular and was aimed to test the practical knowledge of double-entry system. Most computations were correct but only a few could get full marks as they made simple mistakes in some year adjustments reflecting lack of thorough practice for finalizing accounts.

Question 3 (b) Cash Budget

Although this question was set to test the cash flow estimation on a practical scale, some candidates made mistakes in correctly calculating the sales and or purchase figures resulting in poor marks. But largely students were able to exhibit their knowledge pertaining to the monthly cash cycle (based on operations) of a business and could get good to high marks.

Question 4 Financial Analysis (Ratios)

The question had a variety of parts that was really aimed to test students' ability on important issue under financial analysis (conceptual, practical and interpretive) from the relevant treatments of specific items on a company's financial statements. Many students could not figure out the exact double-entry of a particular adjustment indicating poor knowledge of double-entry accounting and its implication on the items on the FS. Only a few could very well interpret the dividend policy of the company and produce critical analysis as the question required to test this significantly based on the available information. As such most marks were in the range of average and a few who demonstrated their conceptual and intellectual understanding of the case were awarded high marks.

Question 5 Activity Based Costing (ABC)

This question was aimed to test students' computational skills under the conventional cost system and contrasting it with the ABC system. The question expected thorough understanding of the technique of overhead allocation under absorption costing and comparing it with the systematic activity-driver technique under ABC based in the scenario. Answers in the practical parts (a) to (c) were good as they were calculative in nature but answers requiring debate on the relevance of ABC under advanced manufacturing environment were not very satisfactory as they could not explicitly contrast the advanced manufacturing techniques vis-à-vis ABC costing.

Report “Finance Paper 2010”:

The exam consisted of two sections; a theoretical section (Section A) that included eight questions and a quantitative section (Section B) that included two questions. Students were asked to answer **THREE** questions, at least **ONE** from Section A and **ONE** from Section B.

Most students chose to answer two theoretical questions (Section A questions) and only one quantitative question (Section B question), which may signal that theoretical questions were perceived as being easier than the quantitative ones. The marks students obtained for theoretical questions were not necessarily better however. An almost universal problem with answers to theoretical questions was their lack of focus. Questions were in general very precise and students should have been able to give a very good answer in a paragraph or so (8 to 10 lines). Instead many students seem to have chosen to write all they knew about the topic without paying much attention to whether they were actually answering the question or not. Sometimes one had to read two pages of poor handwriting before the actual answer to the question started.

Barring the problem mentioned before students’ performance in the exam was satisfactory (15% of those that sit the exam scored 70 or more and only two students scored less than 50). As I pointed out in a previous report I am of the opinion that the exam will work much better with “four” questions to choose from rather than with “ten”. In its current format it creates incentives for students to gamble on the topics they prepare. This not only has a detrimental effect on students’ preparation but it also unnecessarily introduces a degree of randomness in the final grade. Next year I am going to start to transition to a leaner exam format.

Dr Jose V. Martinez

Examiners Report for MEM 2010---Economics Papers.

Howard Smith 28th July 2010

Part I

Three (3) MEM candidates were entered for Introductory Economics, which they sit in 2009. The Introductory Economics scripts were double marked for EEM and MEM students. The paper is also taken as a Prelims exam by PPE and E&M students. A detailed report on this paper was produced by the Prelims Examiners for PPE in 2008, including comments on individual questions. The means for the MEM (year 2009) candidates are compared with the E&M (year 2009) candidates below:

MEM candidates: Mean ■■■.

E&M candidates: Mean 65.

Part II

Five economics papers are available to MEM Part II candidates, of which Microeconomics is compulsory.

Four of these (the papers other than Microeconomics) had no MEM candidates. The remaining paper (Microeconomics) are taken in large numbers by PPE and E&M students, and full reports on these papers can be found in the Examiners Report for PPE. However, for these two papers the means for the MEM candidates are compared with the E&M candidates below:

Microeconomics

MEM (4 candidates): Mean ■■■

E&M (88 candidates): Mean 63

Note that for Microeconomics the paper taken by EEM candidates was the same as that for E&M (and PPE) candidates; however as EEM candidates had 3 hours and E&M candidates only 2 hours 15 minutes, the EEM candidates were asked to answer an extra question.

END

MATERIALS EXTERNAL EXAMINERS' REPORTS

Jon Binner
Head of Department and Professor of Ceramic Materials
Loughborough University
19th August 2010

External Examiners' Report

Department of Materials, Oxford University

Part I and Part II

- (i) *Whether the academic standards set for its awards, or part thereof, are appropriate;*
I found the standards set by the examiners entirely appropriate.
- (ii) *The extent to which its assessment processes are rigorous, ensure equity of treatment for students and have been fairly conducted within institutional regulations and guidance;*
From my observation, the assessment process was rigorous and all students were treated equitably. Notably, all of the suggestions that I made last year have now been adopted.
- (iii) *The standards of student performance in the programmes or parts of programmes which they have been appointed to examine;*
The majority of the students whom I met were clearly hard working, capable individuals that will be a real credit to your university. Some students are clearly more capable than others but all displayed an ability in keeping with the result of the examination process. The provision of a viva to all final year students is an excellent approach since it gives every student the opportunity to demonstrate their ability to the examiners and, in particular, the External Examiners who have not met them before. Whilst taking two full days of External Examiner time, it was also something that I rather enjoyed!
- (iv) *Where appropriate, the comparability of the standards and student achievements with those in some other higher education institutions;*
For the Part I students, the examinations that were set, the answers that were provided by the students and the marking of those answers were entirely comparable with the standards and achievements of students in the other higher education institutions with which I am familiar, this includes my own university obviously (Loughborough) as well as others with which I am familiar, e.g. Nottingham, Surrey, Manchester, Sheffield, etc. The best students are every bit as good as the best students elsewhere – only there are rather more of them at Oxford – and the weaker

students are also broadly comparable. The system that I observed at Oxford is slightly more demanding in that there is no opportunity for resit examinations, (rightly) putting more pressure on the students to pass first time.

It is more difficult for me to make direct comparisons for the Part II students. Our Part II students at Loughborough follow a different path; their individual project is in their 3rd year and their group project in their 4th year. At Oxford, this is reversed allowing the students to really 'go to town' on their individual project. Clearly some students have very much risen to the challenge and some excellent work has been done. I believe, therefore, that the marks awarded are entirely appropriate.

(v) *Issues which should be brought to the attention of supervising committees in the faculty/department, division or wider University;*

None

(vi) *Good practice that should be noted and disseminated more widely as appropriate.*

Subject to my comment in (v) above, I believe that the whole process is performed in an exemplary manner and I particularly appreciated the chance to meet all of the Part II students and be present at an interview conducted in some depth. I would also like to thank all of the staff involved in the process, who made the experience, which is pretty intense and requires a tremendous amount of reading, as much fun as these things ever can be!

Jon Binner
Head of Department and Professor of Ceramic Materials
Loughborough University
19th August 2010



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Professor WM Rainforth, BMet, PhD, FIMMM, FRMS, FInstP, CEng, CPhys
07/8/10

**External Examiners Report: Honour School of Materials Science (XMET/DMTA/DMTB) and
Honour School of Materials, Economics, and Management (XMMA/DMMA/DMMB),
Academic Year 2009/10**

In summary, I found the examination procedures, standards and conventions to be all highly satisfactory. The overall standards were excellent. There are some minor comments, addressed below under the specific topics:

(i) Whether the academic standards set for its awards, or part thereof, are appropriate

The academic standard set is entirely appropriate. The standard within the written examination papers was generally very high. One instance where questions were easier than would be expected was, at my recommendation, rectified prior to the examination of the students. The standard of marking of the written examination papers was rigorous and set high standards. The standard of the Part II theses was largely excellent.

(ii) The extent to which its assessment processes are rigorous, ensure equity of treatment for students and been fairly conducted within institutional regulations and guidance

All examination material is marked blind by two independent markers, which ensures absolute equity of treatment for all students. Where marks awarded by the two examiners differed significantly (which was relatively uncommon) appropriate procedures were in place for the moderation. The examination process is rigorous and transparent and should be thoroughly commended.

(iii) The standards of student performance in the programmes or parts of programmes which they have been appointed to examine

In general, the student performance was excellent. The top students, who were awarded the highest level of degree, will undoubtedly be a tribute to Oxford University. With such a strong entry level for the student cohort, it was interesting to see the divergence of performance amongst students by the end of the course. However, this is simply a reflection of the high standards that are set.

To achieve a high degree standard, the student must produce a high standard Part II thesis. I noted a number of outstanding Part II theses produced, that are equivalent to the standard of an MPhil

degree. However, there were also a number of instances where the student had focused on the volume of data produced to the detriment of the analysis of the data, which had resulted in a lower level of final achievement. Clearly, the planning of project work is a key part of training the student and the standard of achievement by the student. However, this is also an aspect of project supervision by the academic which must be given a prominent role.

(iv) Where appropriate, the comparability of the standards and student achievements with those in some other higher education institutions

In general, the level of attainment by the students is in-line with that expected of Oxford University, namely at a higher level than many other higher education institutions. It is difficult to make an absolute comparison as most other Material Science and Engineering degree courses have quite a different structure, specifically they do not include a Part II thesis which involves a full academic year. In any event, I am confident that the student achievement is as good as, and often better, than other high quality HE institutions.

(v) Issues which should be brought to the attention of supervising committees in the faculty/department, division or wider University

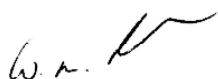
The group design project is excellent. All members of a group receive the same mark for their project. In most cases, the students recorded their input, but in some cases this was left out. I would encourage the examiners to require that students record their individual effort to group projects.

One Part II project was concerned with a theoretical topic for which it was difficult to find examiners with the relevant experience. Whilst I think the examination process adopted was fair and rigorous, it is clear thought should be given to the examination of such projects in the future.

(vi) Good practice that should be noted and disseminated more widely as appropriate

The examination committee, that blind marks examination papers and Part II projects, is an example of excellent practice in ensuring high standards and equitable treatment of all examiners.

In summary, I would like to congratulate the examiners in the high standards that they have maintained.



Professor WM Rainforth

**Faculty of Materials
Department of Materials Academic Committee**

RESPONSE TO EXAMINERS' REPORTS 2010

Honour School of Materials Science (MS) Parts I & II

Honour School of Materials, Economics & Management (MEM) Parts I & II – Materials elements only, main response will be made by the E(M)EM Standing Committee

Following a preparatory meeting between the Chair of DMAC and the incoming Chair of FHS Examiners, the External Examiners' reports, the FHS Chairperson's report and internal reports on all of the individual Materials papers were considered by the Department of Materials Academic Committee (DMAC).

1. Summary of major points

There were no major issues arising from the 2010 Examinations.

2. Points for inclusion in Responses to the External Examiners

MS & MEM Parts I & II: Professor J. Binner

We thank Professor Binner for his positive report and note his strong endorsement of our practise of holding vivas for all candidates as part of the assessment of the Materials Science Part II Project.

We would also like to update Professor Binner on progress in respect of the concern that arose following the 2009 Examinations in respect of a candidate achieving honours despite a substantial number of failed written papers. After careful discussion the Faculty of Materials has now formally approved an additional Examination Regulation that for the award of honours, and hence for progression to Part II, will require a candidate to obtain a mark of at least 40% on at least four of the six written papers sat in Trinity Term of their third year.

[Students who have already embarked on the Final Honours School have a vested interest in the existing Examination Regulations so this new regulation will first apply in the Part I Examination held in Trinity Term 2013.]

MS & MEM Parts I & II: Professor M. Rainforth

We thank Professor Rainforth for his constructive and positive report. In response to specific points:

- (a) The attention of supervisors of Part II projects has been drawn to your comment that some theses focussed on the volume of data to the detriment of its analysis and our guidance to Part II students will be updated to include explicit mention of the need for balance between volume of data and its analysis. From 2011/12 onwards the word and page limit of the thesis has been reduced and this we anticipate will

encourage students to be more judicious in selecting which data to include and analyse.

- (b) For the team design project the students already receive very clear instructions to identify the primary authors of each major section of the report. This has now been reinforced by the additional requirement for each report to include a table that indicates which team members contributed significantly to the work reported on in each major section of the report.
- (c) Where a Part II thesis is on work outside the expertise of the internal examiners we will continue our practise of appointing well in advance an assessor with the necessary expertise. We understand that at the Final Examination Board the internal examiners did not explain as clearly as they might have the process in the case of this kind that arose in the 2010 Part II MS Examination.

MEM Parts I & II, Management Papers: Professor P.D. Cousins

We thank Professor Cousins for his constructive and positive comments and for his careful scrutiny of several scripts and reports. We concur with his desire to see the full range of marks used where appropriate. We hope that in future the Examiners at the Saïd Business School will be able to provide for each paper a summary spreadsheet and associated statistics.

MEM Parts I & II, Economics Papers: Prof R. Mason

We thank Professor Mason for his positive report. The Chairman of the Part II MEM Examination Board apologises for the lack of advance preparation in terms of clarifying the appropriate regulations for the difficult case in question. We will make best efforts to avoid such delay and confusion in future Examination Boards.

3. Further Points

- (a) We have no major comments to make on trends in FHS statistics. Noting the importance of considering averages over five or six years when dealing with small cohorts of students we observe that the proportions of first class and upper second class degrees awarded do not differ greatly from the MPLSD averages. In Materials there continues to be no significant gender gap in the proportions of male and female candidates who gain first class degrees.
- (b) The Chairman of Examiners has suggested a number of minor improvements in procedure:
 - (i) We request the Division to take up the matter of Unit of Assessment Titles on the Examination Schools Templates.
 - (ii) The word limit for the Team Design Projects (TDP) has been set at 1,000 to 3,000 words *per team member* for several years and is well publicised.
 - (iii) The requirement for the primary author(s) of each section of the TDP report to be identified is also well publicised; in the future we will further emphasise this by including a bold footnote on the 'Declaration of Authorship' form that each team is required to submit with their report.
 - (iv) The recommendation that each report should include a table that identifies which team members made significant contributions to the work described in each major section of the report has been implemented in the present year.

4. Examination Conventions

We confirm that DMAC is satisfied that in revising our Examination Conventions we have considered the points in the EdC notes of guidance on Examinations & Assessment, para 3.12, as consulted on the EdC web-pages on 17th November 2010. DMAC and the incoming Board of Examiners have jointly approved the updated conventions.

A.O. Taylor, Chairman of DMAC, 23/11/10

E(M)EM STANDING COMMITTEE

REPORTS FROM THE EXTERNAL EXAMINERS FOR THE ECONOMICS & MANAGEMENT COMPONENTS OF MEM PART I & II

ECONOMICS EXTERNAL EXAMINER'S REPORT

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15 October 2010

Vice-Chancellor
c/o Mrs Sally Powell
Assistant Registrar,
University Offices,
Wellington Square,
Oxford OX1 2JD

Dear Mrs Powell,

External examiner's report for Engineering, Economics and Management, and Materials, Economics and Management, academic year 2009-2010

I acted as external examiner (Economics) for these programmes during 2009-2010. Following the guidelines set for examiners, my report covers five main issues.

Whether the academic standards set for its awards, or part thereof, are appropriate.

In my view, the academic standards are entirely appropriate.

The extent to which its assessment processes are rigorous, ensure equity of treatment for students and have been fairly conducted within institutional regulations and guidance.

I am satisfied that the assessment processes met all of these conditions. There was a potential concern on the paper *Economic Decisions within the Firm*, where the average mark was very high and all but one candidate achieved a first-class mark. (The other candidate scored ■.) I looked carefully at the examination paper and scripts. I found no evidence that the paper was of an

inappropriate standard, or that the scripts had been marked incorrectly. I think two factors explain the distribution of marks on this paper. First, the paper is quite technical; and most students are technically gifted. This combination usually produces a bipolar distribution: some very high marks, some very low ones. Secondly, the paper is optional, and so higher-than-average marks are to be expected through self-selection.

The standards of student performance in the programmes or parts of programmes which they have been appointed to examine (those examining in joint schools are particularly asked to comment on their subject in relation to the whole award).

I was favourably impressed by the standards shown in those scripts that I reviewed. The very best answers were technically very strong indeed.

Where appropriate, the comparability of the standards and student achievements with those in some other higher education institutions.

The students are, on average, as strong as any that I have encountered when examining at other institutions.

Issues which should be brought to the attention of supervising committees in the faculty/department, division or wider University.

The organisation of multi-discipline degrees is always complicated. I felt that the Exam Board for MEM could have been a little better organised. It would have been helpful if the appropriate regulations for certain difficult cases could have been identified in advance, to save time at the Board.

Please do not hesitate to contact me if there is anything else on which you would like me to comment.

Yours sincerely,



Professor Robin Mason
Associate Dean

MANAGEMENT EXTERNAL EXAMINER'S REPORT

PTO

Paul D Cousins

Professor of Operations Management

Email: paul.cousins@mbs.ac.uk

Tel: +44 161 306 3459

Mrs S J Powell
Assistant Registra
University of Oxford
Education Policy Support, University Offices
Wellington Square,
Oxford, OX1 2JD

20th August, 10



Dear Mrs Powell

Re: External Examiner's Report for Said Business School – Undergraduate Options.

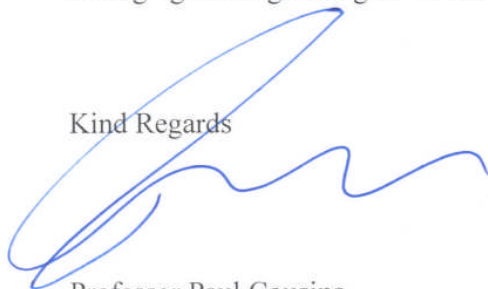
This is my second year as an external for the undergraduate programmes in management studies for the University of Oxford. Overall I was very impressed with the standard of marking (all scripts were double marked) and the general standard of the examination scripts and reports that I was asked to review. The School sent me a representative range of scripts and reports all of which I reviewed and commented upon both before and during the exam boards. I also had several meetings with staff to discuss the marks and procedures prior to and after the examination meetings. In my view the results obtained by the students were impressive and fair. The practices and procedures followed by Oxford are in line with those of my own and other universities.

Dr Brown administered the examination procedures this year, she did an excellent job of managing the process and the meetings and I am very grateful to her for her input. I am also very grateful to Professor Westbrook for providing a very useful summary of the project marking and student performance.

I have attached my detailed report for background information. From this years scripts I would only make one minor observation. While it was clear to me that the marking was rigorous I felt that the examiners could stretch the marks at the top and bottom of the scale – this would help to prevent the inevitable bunching that occurs through averaging. There is provision for this in your marking guidelines. Apart from that I have no further suggestions.

In summary, I confirm that the marking was fair and reasonable and of a high standard. I am confident that the degrees awarded are in line with procedures at other leading institutions. I would like to thank Dr Brown for her excellent management of this year's process and Susan Barrington (Said Business School) for her help in managing and organising the administration process.

Kind Regards

A handwritten signature in blue ink, consisting of a large, sweeping initial 'P' followed by a series of connected loops and a final flourish.

Professor Paul Cousins

There follows a comprehensive report by Professor Cousins which refers to individual candidates on numerous occasions. This report was provided as a pdf and has been deleted from this abridged set of Examiners reports.

[REDACTED]



[REDACTED]

EXTRACT FROM THE MINUTES OF THE STANDING COMMITTEE FOR EEM AND RELATED STUDIES

STANDING COMMITTEE FOR EEM AND RELATED STUDIES

Part II – Reserved Minutes of the meeting held on 28 October 2010

13. Internal and External Examiners' Reports for Examinations in 2010

13.1 Internal Examiner Reports

The Standing Committee received the internal examiners' reports for EEM Parts I and II, Engineering Science Parts I and II, and MEM Parts I and II. No specific concerns were raised in consideration of the reports, but the following points were noted:

- EEM: The Standing Committee noted that whilst 26 candidates had achieved an Honours Pass at Part I, two candidates had achieved only a Pass. It was agreed that it would be important to monitor success rates in Parts A and B of the new course; the first cohort had completed Part A in 2010 and would therefore be sitting Part B in 2011.
- MEM: there had been 3 candidates for the Part I examination [REDACTED]

The Standing Committee thanked the examiners for their efforts with regard to the 2010 examinations.

13.2 External Examiners' Reports

The external examiners' reports were received from:

- Engineering: Professor Dugwell. The reports from Professors Collings and Hanzo had yet to be submitted to the University.
- Materials: Professors Binner and Rainforth.
- Economics: Professor Mason
- Management: Professor Cousins

The Standing Committee expressed disappointment that two of the engineering reports were missing, however the Committee was pleased to note the overall complimentary nature of the comments made by the external examiners who had submitted reports. The following points were noted:

Professor Mason

- The external examiner had raised a potential concern on the paper Economic Decisions within the Firm, where the average mark has been very high and all but one candidate had achieved a first-class mark. However, Professor Mason had gone on to say that there were two factors to explain the distribution marks on the paper. First, that the paper was quite technical and most of the candidates were technically gifted. Second, the paper was optional, so that higher-than-average marks might be expected through self-selection.
- Professor Mason had also suggested that the Exam Board for MEM could have been a little better organised. In particular, it would have been helpful if the appropriate regulations for certain difficult cases could have been identified in advance, to save time at the Board. This suggestion would be brought to the attention of the Chairman of Examiners for 2011.

Professor Cousins

- With regard to assessing the overall performance of students, the external examiner had

indicated that it would be helpful to have available completed spreadsheets showing the actual average marks, a key for the abbreviations and descriptive statics showing, mean, median, mode and standard deviation for each course. This suggestion would be passed on to the Chairman of Examiners with a view to providing such information for examinations in 2011.

- Management Reports: the external had considered that there was a reasonable spread of marks; however, he had felt that the examiners could be a bit more generous at the top end of the marking range. The Standing Committee noted that this would be addressed in compiling the marking guidelines for 2011.



UPDATED EXAMINATION CONVENTIONS FOR 2010/11

Examination Conventions 2010/11 Common Preliminary Examination Materials Science and Materials, Economics & Management

The formal procedures determining the conduct of examinations are established and enforced by the University Proctors. These conventions are a guide to the examiners and candidates but the regulations set out in the Examination Regulations have precedence. The examiners are nominated by the Nominating Committee* in the Department and those nominations are submitted for approval by the Vice-Chancellor and the Proctors. In Prelims the examiners are called "moderators". Formally, moderators are independent both of the Department and of those who lecture. The paragraphs below give an indication of the conventions to which the moderators usually adhere, subject to the guidance of other bodies such as the Academic Committee in the Department, the Mathematical, Physical and Life Sciences Division, the EPSC and the Proctors who may offer advice or make recommendations to the moderators.

It must be stressed that to preserve the independence of the Moderators, candidates are not allowed to make contact directly about matters relating to the content or marking of papers. Any communication must be via the Senior Tutor of your college, who will, if he or she deems the matter of importance, contact the Proctors. The Proctors in turn communicate with the Chairman of Prelims.

(1) *Setting of papers*

The Moderators set the papers, but are advised to consult the course lecturers. The course lecturers are required to provide draft questions if so requested by the Moderators. The Prelims paper on Maths for Materials and Earth Sciences is set jointly by the Departments of Earth Sciences and Materials. There are no external examiners for Prelims.

(2) *Paper Format*

The Materials Science papers 1 - 3 comprise eight questions from which candidates must attempt five. Each question is worth 20 marks. The total marks available for each of these papers are 100. The Prelims paper on Maths for Materials and Earth Sciences consists of two sections, candidates are required to answer all questions in Part A and 4 from Part B.

(3) *Marking of papers*

For prelims double marking is not necessarily double "blind" marking. It is usually considered sufficient for the second marker merely to check the first marker's marks.

(4) *Marking of course practicals and crystallography classes*

First year practicals are assessed regularly by senior demonstrators in the teaching laboratory. The work done for crystallography classes is assessed by the Crystallography Class Organiser(s). The assessed work for both practicals and crystallography classes constitutes the Coursework Paper. Each of the five papers in Prelims, comprising the 3 Materials Science papers, Maths for Materials and Earth Sciences, and the Coursework Paper, carry equal total marks. Satisfactory

* for 2010-11 the Nominating Committee comprises Dr Czernuszka (Chair), Professor Grovenor and Dr Taylor.

performance in the practical work is defined in the MS/MEM Prelims Handbook. Penalties for late submission of practical reports are set out in this handbook.

(5) *Classification*

The pass/fail border is at 40%. Distinctions are usually awarded for average marks of at least 70%. Failure in one or two written papers may be compensated by better performance in other written papers provided the candidate obtains at least 35% on the failed paper. Failure of three papers precludes compensation. Where compensation is permitted, only those marks in excess of 40 on a passed paper may be used towards compensation and normally this shall be at a rate of 3 marks to every deficit mark to be compensated.

For example, if two written papers are passed and marks of 36% and 38% are obtained in the remaining two written papers then the total for the four written papers must be at least 172 marks $\{36 + 38 + 2 \times 40 + 3 \times (4+2)\}$ for both failures to be compensated

The Moderators have the authority to use their discretion and consider each case on its merit.

(6) *Failure of one or more Papers*

Failure of the coursework paper will normally constitute failure of the Preliminary Examination. Materials coursework cannot normally be retaken. Exceptionally a candidate who has failed the coursework may be permitted jointly by the Moderators and the candidate's college to retake the entire academic year.

Candidates who pass the coursework paper and fail 1 or 2 written papers will be asked to resit only those written papers.

Candidates who pass the coursework paper and fail more than 2 written papers will be asked to resit all 4 written papers.

The resits usually take place in September. To pass a resit paper the candidate must obtain at least 40%, and normally no compensation is allowed. There is only one opportunity to resit the examination, and failure to pass a resit examination normally results in the candidate being prevented from continuing to Part I. Exceptionally, a college may allow a student to go down for a year and take Prelims a second time the following June.

The Moderators have the authority to use their discretion and consider each case on its merit.

Examination Conventions 2010/11

Final Honours School

Materials Science

1. INTRODUCTION

The formal procedures determining the conduct of examinations are established and enforced by the University Proctors. These conventions are a guide to the examiners and candidates but the regulations set out in the Examination Regulations have precedence. The examiners are nominated by the Nominating Committee* in the Department and those nominations are submitted for approval by the Vice-Chancellor and the Proctors. Formally, examiners are independent of the Department and of those who lecture courses. However, for written papers on Materials Science in Part I examiners are expected to consult with course lecturers in the process of setting questions. The paragraphs below indicate the conventions to which the examiners usually adhere, subject to the guidance of the appointed external examiners, and other bodies such as the Academic Committee in the Department, the Mathematical, Physical and Life Sciences Division, the Education Committee of the University and the Proctors who may offer advice or make recommendations to examiners. It must be stressed that to preserve the independence of the examiners, candidates are not allowed to make contact directly about matters relating to the content or marking of papers. Any communication must be via the Senior Tutor of your college, who will, if he or she deems the matter of importance, contact the Proctors. The Proctors in turn communicate with the Chairman of Examiners.

During the marking process the scripts of all written papers remain anonymous to the markers. [In some of the descriptions of marking for individual elements of coursework that are given later in this document the term 'double marked, blind,' is used; this refers to the fact that the second marker does not see the marks awarded by the first marker until he or she has recorded his or her own assessment, and does not indicate that the candidate is anonymous to the markers.]

Marking criteria for the Business Plan, Team Design Project and Part II project are published in the relevant course handbook.

Late Submission of or Failure to Submit Coursework

The Examination Regulations stipulate specific dates for submission of the required pieces of coursework to the Examiners (1. One piece of Engineering & Society Coursework; 2. A set of detailed reports of practical work; 3. A Team Design Project Report; 4. Industrial Visit Reports as specified in the course handbook; 5. A report on the work carried out in either the Characterisation of Materials module or the Introduction to Modelling in Materials module; and 6. A Part II Thesis). Rules governing late submission and any consequent penalties are set out in the 'Late submission of work' sub-section of the 'Regulations for the Conduct of University Examinations' section of the Examination Regulations (pp45-46 of the 2006, 2007 & 2008 Regulations and pp46-47 of the 2009 & 2010 Regulations).

Under the provisions permitted by the regulation, late submission of coursework for Materials Science or Materials, Economics & Management examinations will normally result in the following penalties:

- (a) With permission from the Proctors under clause (1) of para 16.8 no penalty.
- (b) With permission from the Proctors under clauses (3) + (4) of para 16.8, for the first day or part of the first day that the work is late a penalty of a reduction in the mark for the coursework in question of up to 10% of the maximum mark available for the piece of work, and for each subsequent day or part of a day that the work is late a further penalty of up to 5% of the maximum mark available for the piece of work; the exact penalty to be set by the Examiners with due consideration given to any advice

* for 2010-11 the Nominating Committee comprises Dr Czernuszka (Chair), Professor Grovenor and Dr Taylor.

- given in the Proctors' "Notes for the Guidance of Examiners and Chairmen of Examiners".
- (c) Where the candidate is not permitted by the Proctors to remain in the examination he or she will be deemed to have failed the examination as a whole.

Where no work is submitted or it is proffered so late that it would be impractical to accept it for assessment the Proctors may, under their general authority, and after (i) making due enquiries into the circumstances and (ii) consultation with the Chairman of the Examiners, permit the candidate to remain in the examination. In this case the Examiners will award a mark of zero for the piece of coursework in question.

Penalties for late submission of individual practical reports are set out in the MS/MEM FHS Handbook and are separate to the provisions described above.

2. PART I

(1) *Setting of papers*

Part I General Papers 1 – 4 are set by the examiners in consultation with course lecturers. The responsibility for the setting of each examination paper is assigned to an examiner, and a second examiner is assigned as a checker. Option papers are set by lecturers of the option courses and two examiners, the examiners acting as checkers. The examiners, in consultation with lecturers, produce model answers for every question set. The wording and content of all examination questions set, and the model answers, are scrutinised by all examiners, including, in particular, the external examiners.

(2) *Paper Format*

All General papers comprise eight questions from which candidates attempt five. Each question is worth 20 marks. The total number of marks available on each general paper is 100. Materials Option papers comprise one section for each twelve-hour Options lecture course, each section containing two questions: candidates are required to answer one question from each of any three sections and a fourth question drawn from any one of the same three sections. The total number of marks available on each option paper is 100, and all questions carry equal marks. Questions are often divided into parts, with the marks for each part indicated on the question paper.

(3) *Marking of papers*

All scripts are double marked, blind, by the setter and the checker. After individual marking the two examiners meet to agree marks question by question. If the differences in marks are small (~10% of the total available for the question, 2-3 marks for most questions), the two marks are averaged, with no rounding applied. Otherwise the examiners identify the discrepancy and read the answer again, either in whole or in part, to reconcile the differences. If after this process the examiners still cannot agree, they seek the help of the Chairman, or another examiner as appropriate, to adjudicate. An integer total mark for each paper is awarded, where necessary rounding up to achieve this.

Options papers are marked by course lecturers acting as assessors and an examiner acting as a checker.

The external examiners provide an independent check on the whole process of setting and marking.

The rubric on each paper indicates a prescribed number of answers required (e.g. "candidates are required to submit answers to no more than five questions"). Candidates will be asked to indicate on their cover sheet which questions, up to the prescribed number, they are submitting for marking. If the cover slip is not completed then the examiners will mark the first five questions in numerical order by question number. The examiners will NOT mark questions in excess of the prescribed number. If fewer questions than the prescribed number are attempted, (i) each missing attempt will be assigned a mark of zero, (ii) for those questions that are attempted **no** marks beyond the maximum per question indicated under section 2(2) above will be awarded and (iii) the mark for the paper will still be calculated out of 100.

As the total number of students is small, it is not unusual for mean marks to vary from paper to paper, or year to year. It is not therefore normal practice to adjust marks to fit any particular distribution. However, where marks for papers are unusually high or low, the examiners may, having reviewed the difficulty of the paper set or other circumstances, decide with the agreement of the external examiner to adjust all marks for those papers. Such adjustment is referred to as 'scaling' and the normal procedure will be as follows:

- i. Papers with a *mean taken over all candidates* of less than 55% or more than 75% are normally adjusted to bring the *mean* respectively up to 55% or down to 75%. Normally this is achieved by adding/subtracting the same fixed number of marks to/from each candidate's score for the paper.
- ii. For papers with a mean in the ranges either of 55-60% or 70-75%, including those scaled under (i) above, the questions and typical answers are compared in order to ascertain, with the help of the external examiners, whether the marks are a fair reflection of the performance of the candidates as measured against the class descriptors. If not, the marks are adjusted. Normally this is achieved by adding/subtracting the same fixed number of marks to/from each candidate's score for the question or for the paper.
- iii. The mean mark and the distribution of marks, both taken over all written papers, are considered, again with the help of the external examiners, in order to ascertain whether these overall marks are a fair reflection of the performance of the candidates as measured against the class descriptors. If not, the overall marks are adjusted. Normally this is achieved by adding/subtracting the same fixed number of marks to/from each candidate's overall score.

(4) *Marking of Second Year Practicals for Part I*

Second year practicals are assessed continually by senior demonstrators in the teaching laboratory and in total are allocated 60 marks. Part I examiners have the authority to set a practical examination.

(5) *Marking Industrial Visits*

Four industrial visit reports should be submitted during Part I. Reports are assessed by the Industrial Visits Academic Organiser on a satisfactory / non-satisfactory basis, and are allocated a total of 20 marks.

(6) *Marking Engineering and Society Essays*

The business plan for "Entrepreneurship and new ventures" is double marked, blind, by two assessors; last year one assessor was from ISIS Innovation and one was appointed by the Faculty of Materials. The business plan is allocated a total of 20 marks.

If the Foreign Language Option or a Supplementary Subject has been offered instead of the Business Plan, the reported % mark, which is arrived at in accordance with the CVCP degree class boundary descriptors, is divided by five to give a mark out of 20.

(7) *Marking the Team Design Project*

The team design project is double marked, blind, by two of the Part I Examiners. They then compare marks and analyse any significant disagreement between these marks before arriving at a final agreed mark for each project and each team member. Supervisors of the projects submit a written report to the examiners on the work carried out by their teams and these are taken into consideration when the examiners decide the final agreed marks. Industrial representatives may be asked to contribute to the assessment process. The project is allocated 50 marks, of which 25 are for the written report and 25 for the oral presentation. The same two examiners assess both the reports and the presentations.

(8) *Marking the Characterisation of Materials and the Introduction to Materials Modelling modules*

The reports for these modules are double marked, blind, by the module assessors. Normally, at least one of the two assessors for each report will be a module organizer. The assessors then compare marks and analyse any significant disagreement between these marks before arriving at a final agreed mark for each report. The Chairman of Examiners oversees this process, sampling reports to ensure consistency between the different pairs of assessors and the two modules. The lead organizer for the Characterisation Module submits to the Assessors and Examiners of the module a short report which provides, by sample set only, (i) a summary of the availability of appropriate characterization instruments during the two-week module and (ii) any other pertinent information. An analogous report is provided by the lead organizer for the Modelling Module in respect of the software & hardware required for each mini-project. The Report for the Characterisation module is allocated 50 marks and each of the two reports for the Modelling module are allocated 25 marks.

(9) *Part I vivas*

There will be no Part I vivas in the 2010/11 Examination.

3. PART II

The Part II project is assessed by means of a thesis which is submitted to the Examiners, who will also take into account a written report from the candidate's supervisor*.

The project is allocated 400 marks, which is one third of the total marks for Parts I and II. Two Part II examiners read the thesis, including the project management chapter, together with Part A of the supervisor's report, and each of them independently allocates a provisional mark based on the guidelines** published in the course handbook. In addition, normally the thesis will be read by one of the two external examiners.

A *viva voce* examination is held: the purpose of the viva is to clarify any points the readers believe should be explored, and to ascertain the extent to which the work reported is the candidate's. An examiners' discussion is held after the viva, involving all Part II examiners, and at which time Part B of the supervisor's report is taken into account. The outcome of the discussion is an agreed mark for the project. It is stressed that it is the scientific content of the project that is being considered in the viva. In the overwhelming majority of cases, the viva has only a small influence on the agreed mark awarded to a Part II thesis.

If there are believed to be mitigating circumstances, such as illness, which may have affected the candidate's progress with the project these should, in the normal way, be drawn to the attention of the Senior Tutor at the candidate's college, who will, if appropriate, inform the Proctors. The Proctors may in turn communicate with the Chairman of Examiners about the mitigating circumstances. Subject to guidance from the Proctors, if appropriate the Board of Examiners will take into account these mitigating circumstances in their discussion after the viva.

* The Supervisor's report is divided into Parts A & B: Part A provides simple factual information that is of significance to the examiners, such as availability of equipment, and is seen by the two markers before they read and assess the thesis. Part A does **not** include personal mitigating circumstances which, subject to guidance from the Proctors, normally are considered only in discussion with **all** Part II examiners thus ensuring equitable treatment of all candidates with mitigating circumstances. Part B of the supervisor's report provides her/his opinion of the candidate's engagement with the project and covers matters such as initiative and independence; it is not seen by the examiners until the discussion held after the viva.

** These guidelines may change and candidates are notified of any such changes before the end of Hilary Term of their 4th year.

4. CLASSIFICATION

The following boundaries (CVCP) and descriptors (MPLSD) are used as guidelines:

Class I Honours 70 – 100	The candidate shows excellent problem-solving skills and excellent knowledge of the material over a wide range of topics, and is able to use that knowledge innovatively and/or in unfamiliar contexts.
Class Ii Honours 60 – 69	The candidate shows good or very good problem-solving skills, and good or very good knowledge of much of the material over a wide range of topics.
Class Iiii Honours 50 – 59	The candidate shows basic problem-solving skills and adequate knowledge of most of the material.
Class III Honours 40 - 49	The candidate shows reasonable understanding of at least part of the basic material and some problem solving skills. Although there may be a few good answers, the majority of answers will contain errors in calculations and/or show incomplete understanding of the topics.
Pass 30 - 39	The candidate shows some limited grasp of basic material over a restricted range of topics, but with large gaps in understanding. There need not be any good quality answers, but there will be indications of some competence.
Fail 0 - 29	The candidate shows inadequate grasp of the basic material. The work is likely to show major misunderstanding and confusion, and/or inaccurate calculations; the answers to most of the questions attempted are likely to be fragmentary only.

In borderline cases the examiners use their discretion and consider the overall quality of the work the candidate has presented for examination. The external examiner often plays a key role in such cases.

Part I:

Unclassified Honours – The examiners are required to classify each candidate according to her/his overall average mark in Part I as (a) worthy of Honours, (b) Pass or (c) Fail. A candidate is allowed to proceed to Part II only if he/she has been adjudged worthy of honours by the examiners in Part I. The examiners do not divide the categories further but tutors and students may infer how well they have done from their marks. Candidates adjudged worthy of honours normally proceed to Part II but they may, if they wish and subject to approval from the relevant bodies, leave after Part I in which case an Unclassified Honours B.A. degree will be awarded.

Pass – The examiners consider that the candidate is not worthy of honours and therefore will not be allowed to proceed to Part II. The candidate may leave with a B.A. (without honours) or may retake Part I the following year (subject to college approval).

Fail – The examiners consider that the candidate is not worthy of a B.A. The candidate either leaves without a degree or may retake Part I the following year (subject to college approval).

Part II:

Classified Honours – Once marking is completed for both Parts I and II an overall percentage mark is computed for each candidate and classification then takes place. Subject to the requirement that Part II be adjudged worthy of honours (see below), classification is based solely on the overall percentage mark; the candidate's profile of marks from each element of assessment is only taken into account in borderline cases. However, a candidate cannot be awarded an M.Eng. degree unless his/her performance in Part II is adjudged worthy of honours i.e. a candidate must be adjudged worthy of honours both in Part I and in Part II to be awarded the M.Eng. degree. Failure to achieve honours in Part II will result in the candidate leaving with an unclassified B.A. (Hons) irrespective of the aggregate mark.

Pass – Notwithstanding the award of unclassified honours in Part I, the examiners consider that the candidate's overall performance is not worthy of an M.Eng. The candidate is listed as a Pass on the class list and is awarded an unclassified B.A. (Hons) on the basis of Part I performance.

Fail – The examiners consider that the candidate's overall performance is not worthy of an M.Eng. *and* that the performance in Part II is not worthy of a Pass. The candidate is excluded from the class list but is nevertheless awarded an unclassified B.A. (Hons) on the basis of Part I performance.

- The examiners cannot award unclassified honours on the basis of Part II performance unless permitted to do so by the Proctors.
- Nevertheless, candidates awarded a Pass or a Fail by the Part II examiners leave with an unclassified B.A. (Hons) because they were judged worthy of that in Part I (i.e. their degree is the same as if they had left immediately after Part I).
- In terms of the degree awarded, there is no difference between a Pass and a Fail in Part II. The only difference is whether or not the name appears on the class list.
- Candidates cannot normally retake Part II because the Examination Regulations require that they must pass Part II within one year of passing Part I. This rule can only be waived in exceptional circumstances, with permission from the Education Committee.

Annex: Summary of marks to be awarded for different components of the MS Final Examination in 2011 (For Part I and Part II students who embarked on the FHS respectively in 2009/10 and 2008/09)

	Component	Mark
Part I	General Paper 1	100
	General Paper 2	100
	General Paper 3	100
	General Paper 4	100
	Options Paper 1	100
	Options Paper 2	100
	Practicals & Industrial visits	80
	Engineering and Society coursework	20
	Team Design Project	50
	Characterisation or Modelling options module	50
	<i>Part I Total</i>	<i>800</i>
Part II	Thesis	400
<i>Overall Total</i>	<i>1200</i>	

Examination Conventions 2010/11

Final Honours School

Materials, Economics and Management

1. INTRODUCTION

The formal procedures determining the conduct of examinations are established and enforced by the University Proctors. These conventions are a guide to the examiners and candidates but the regulations set out in the Examination Regulations have precedence. The examiners are nominated by the Nominating Committee^{*} in the Department of Materials and those nominations are submitted for approval by the Vice-Chancellor and the Proctors. Formally, examiners are independent of the Department and of those who lecture courses. However for written papers on Materials Science in Part I and Part II, examiners are expected to consult with course lecturers in the process of setting questions. The paragraphs below indicate the conventions to which the examiners usually adhere, subject to the guidance of the appointed external examiners, and other bodies such as the Academic Committee in the Department, the E(M)EM Standing Committee, the Mathematical, Physical and Life Sciences Division, the Social Sciences Division, the Education Committee of the University and the Proctors who may offer advice or make recommendations to examiners. It must be stressed that to preserve the independence of the examiners, candidates are not allowed to make contact directly about matters relating to the content or marking of papers. Any communication must be via the Senior Tutor of your college, who will, if he or she deems the matter of importance, contact the Proctors. The Proctors in turn communicate with the Chairman of Examiners.

Marking criteria for the Team Design Project are published in the FHS course handbook.

During the marking process the scripts of all written papers remain anonymous to the markers. [In some of the descriptions of marking for individual elements of coursework that are given later in this document the term 'double marked, blind,' is used; this refers to the fact that the second marker does not see the marks awarded by the first marker until he or she has recorded his or her own assessment, and does not indicate that the candidate is anonymous to the markers.]

Late Submission of or Failure to Submit Coursework

The Examination Regulations stipulate specific dates for submission of the required pieces of coursework to the Examiners (1. A set of detailed reports of practical work; 2. A Team Design Project Report; 3. Industrial Visit Reports as specified in the course handbook; and 4. A Part II Management Project Report). Rules governing late submission and any consequent penalties are set out in the 'Late submission of work' sub-section of the 'Regulations for the Conduct of University Examinations' section of the Examination Regulations (pp45-46 of the 2006, 2007 & 2008 Regulations and pp46-47 of the 2009 Regulations).

Under the provisions permitted by the regulation, late submission of coursework for Materials Science or Materials, Economics & Management examinations will normally result in the following penalties:

- (a) With permission from the Proctors under clause (1) of para 16.8, no penalty.
- (b) With permission from the Proctors under clauses (3) + (4) of para 16.8, for the first day or part of the first day that the work is late a penalty of a reduction in the mark for the coursework in question of up to 10% of the maximum mark available for the piece of work, and for each subsequent day or part of a day that the work is late a further penalty of up to 5% of the maximum mark available for the piece of work; the exact penalty to be set by the Examiners with due consideration given to any advice

^{*} for 2010-11 the Nominating Committee comprises Dr Czernuszka (Chair), Professor Grovenor and Dr Taylor.

- given in the Proctors' "Notes for the Guidance of Examiners and Chairmen of Examiners".
- (c) Where the candidate is not permitted by the Proctors to remain in the examination he or she will be deemed to have failed the examination as a whole.

Where no work is submitted or it is proffered so late that it would be impractical to accept it for assessment the Proctors may, under their general authority, and after (i) making due enquiries into the circumstances and (ii) consultation with the Chairman of the Examiners, permit the candidate to remain in the examination. In this case the Examiners will award a mark of zero for the piece of coursework in question.

Penalties for late submission of individual practical reports are set out in the MS/MEM FHS Handbook and are separate to the provisions described above.

2. PARTS I & II

Candidates taking Ec1: Introductory Economics in the 2nd year.

MEM candidates sit the compulsory Ec1: Introductory Economics paper in Trinity Term of their second year. This paper will be set and examined as for all other Part I and Part II Economics papers (see below) and contributes to the Part I mark. The marks for this paper will be formally ratified by the Board of examiners for Part I examinations held in the Trinity Term following that in which the Ec1 paper is sat.

Candidates for Part I (3rd year)

Part I candidates take four compulsory Materials papers (General Papers 1 – 4); one compulsory Economics paper; and one compulsory Management paper. In addition, candidates are assessed on their Materials coursework (practical work, the team design project, and industrial visits). Marks from the Ec1 paper sat in Trinity Term of the 2nd year are included in the Part I total.

Candidates for Part II (4th year)

Part II candidates take one compulsory Materials Options paper and one paper from a range of Management and Economics options. In addition they are assessed on their report of a six-month industrial placement, which carries the weight of two papers.

(1) *Setting of papers*

Part I Materials General Papers 1 – 4 are set by the materials examiners in consultation with course lecturers. The responsibility for the setting of each examination paper is assigned to an examiner, and a second examiner is assigned as a checker. The Materials Option paper in Part II is set by lecturers of option courses and two examiners, the examiners acting as checkers. For the Materials papers, the examiners, in consultation with lecturers, produce model answers for every question set and the wording and content of all examination questions set, and the model answers, are scrutinised by all examiners, including, in particular, the external examiners. The Economics and Management papers are set by examiners nominated respectively by the Economics Faculty and the Said Business School.

(2) *Paper format*

Materials Papers

All Materials general papers comprise eight questions from which candidates attempt five and are taken in Part I. Each question is worth 20 marks. The total number of marks available on each general paper is 100. Materials Option papers comprise one section for each twelve-hour Options lecture course, each section containing two questions: candidates are required to answer one question from each of any three sections and a fourth question drawn from any one of the same three sections. The total number of marks available on each option paper is 100, and all questions carry equal marks. Questions are often divided into parts, with the marks for each part indicated on the question paper.

Economics and Management papers

Candidates are advised to read particularly carefully the specific instructions on the front of each paper as to the number of questions they should submit, since the rubrics on Economics and Management papers differ slightly from those for the Materials papers.

(3) *Marking of papers*

Materials Papers

All scripts are double marked, blind, by the setter and the checker. After individual marking the two examiners meet to agree marks question by question. If the differences in marks are small (~10%, 2-3 marks for most questions), the two marks are averaged, with no rounding applied. Otherwise the examiners identify the discrepancy and read the answer again, either in whole or in part, to reconcile the differences. If after this process the examiners still cannot agree, they seek the help of the Chairman, or another examiner as appropriate, to adjudicate. An integer total mark for each paper is awarded, where necessary rounding up to achieve this.

The Materials Options paper is marked by course lecturers acting as assessors and an examiner acting as a checker.

The Materials external examiner provides an independent check on the whole process of setting and marking.

The rubric on each paper indicates a prescribed number of answers required (e.g. "candidates are required to submit answers to no more than five questions"). Candidates will be asked to indicate on their cover sheet which questions, up to the prescribed number, they are submitting for marking. If the cover slip is not completed then the examiners will mark the first five questions in numerical order by question number. The examiners will NOT mark questions in excess of the prescribed number. If fewer questions than the prescribed number are attempted, (i) each missing attempt will be assigned a mark of zero, (ii) for those questions that are attempted **no** marks beyond the maximum per question indicated under section 2(2) above will be awarded and (iii) the mark for the paper will still be calculated out of 100.

As the total number of students sitting some papers is small, it is not unusual for mean marks to vary from paper to paper, or year to year. It is not therefore normal practice to adjust marks to fit any particular distribution. However, where marks for papers are unusually high or low, the examiners may, having reviewed the difficulty of the paper set or other circumstances, decide with the agreement of the external examiner to adjust all marks for those papers. For the Materials papers such adjustment is referred to as 'scaling' and the normal procedure will be as follows:

- i. Papers with a *mean taken over all candidates* of less than 55% or more than 75% are normally adjusted to bring the *mean* respectively up to 55% or down to 75%. Normally this is achieved by adding/subtracting the same fixed number of marks to/from each candidate's score for the paper.
- ii. For papers with a mean in the ranges either of 55-60% or 70-75%, including those scaled under (i) above, the questions and typical answers are compared in order to ascertain, with the help of the external examiners, whether the marks are a fair reflection of the performance of the candidates as measured against the class descriptors. If not, the marks are adjusted. Normally this is achieved by adding/subtracting the same fixed number of marks to/from each candidate's score for the question or for the paper.
- iii. The mean mark and the distribution of marks, both taken over all written papers, are considered, again with the help of the external examiners, in order to ascertain whether these overall marks are a fair reflection of the performance of the candidates as measured against the class descriptors. If not, the overall marks are adjusted. Normally this is achieved by adding/subtracting the same fixed number of marks to/from each candidate's overall score.

Economics and Management Papers

The rubrics on Management and Economics papers differ slightly from the above, but numerical marking is used and all examiners mark to the standard class boundaries [see section on

classification] and range of marks (0-100). All scripts in Economics and Management are double-marked. Management examiners mark on a question-by-question basis, whereas in Economics a mark is awarded for the performance on the paper as a whole. Economics and Management examiners mark papers and then consider the marks distribution for the whole cohort taking the paper (including candidates from other joint schools). After careful consideration of such factors as: the marks, the candidate's overall performance and the level of difficulty of the questions, they may make adjustments for each candidate. The adjusted marks for papers and half papers are then forwarded to the Chairman of the MEM Examination Board.

(4) *Marking of Practicals for Part I*

Practicals are assessed continually by senior demonstrators in the teaching laboratory and in total are allocated 50 marks. Part I examiners have the authority to set a practical examination.

(5) *Marking Industrial Visits*

Four industrial visit reports should be submitted during Part I. Reports are assessed by the Industrial Visits Academic Organiser on a satisfactory / non-satisfactory basis, and are allocated a total of 20 marks.

(6) *Marking the Team Design Projects*

The team design project is double marked, blind, by two of the Part I Examiners. They then compare marks and analyse any significant disagreement between these marks before arriving at a final agreed mark for each project and each team member. Supervisors of the projects submit a written report to the examiners on the work carried out by their teams and these are taken into consideration when the examiners decide the final agreed marks. Industrial representatives may be asked to contribute to the assessment process. The project is allocated 50 marks, of which 25 are for the written report and 25 for the oral presentation. The same two examiners assess both the reports and the presentations.

(7) *Part I and II vivas*

There will be no Part I or Part II vivas in the 2010/11 Examination.

(8) *Marking the 4th Year Management Project*

The management project is allocated 200 marks and is marked by the Saïd Business School.

The projects are assessed and graded independently by two Assessors. The supervisor's comments on the performance of the candidate are provided to the Assessors. The marks provided by the Assessors are moderated by an Examiner, and the final mark is ratified by the Board of Examiners.

The process is:

- Supervisors provide a report on the performance of the student, indicating any special circumstances that could have affected the student's performance on the project and report preparation.
- The project reports are graded blind by two Assessors, taking account of the Supervisor's comments. At least one of the Assessors will have knowledge of the area of the project.
- The Supervisor's report, and Assessors' reports and marks are provided to an Examiner, who moderates the marks and provides a final mark for ratification by the Board of Examiners.
- Supervisors may not act as Assessor or Examiner for a project they have supervised.
- An Assessor may also act as Examiner for a project. The Assessor should assess and mark the report before having sight of the other Assessor's report and marks.

3. CLASSIFICATION

The following boundaries (CVCP) and descriptors (MPLSD) are used as guidelines:

Class I Honours 70 – 100	The candidate shows excellent problem-solving skills and excellent knowledge of the material over a wide range of topics, and is able to use that knowledge innovatively and/or in unfamiliar contexts.
Class Ii Honours 60 – 69	The candidate shows good or very good problem-solving skills, and good or very good knowledge of much of the material over a wide range of topics.
Class Iiii Honours 50 – 59	The candidate shows basic problem-solving skills and adequate knowledge of most of the material.
Class III Honours 40 - 49	The candidate shows reasonable understanding of at least part of the basic material and some problem solving skills. Although there may be a few good answers, the majority of answers will contain errors in calculations and/or show incomplete understanding of the topics.
Pass 30 - 39	The candidate shows some limited grasp of basic material over a restricted range of topics, but with large gaps in understanding. There need not be any good quality answers, but there will be indications of some competence.
Fail 0 - 29	The candidate shows inadequate grasp of the basic material. The work is likely to show major misunderstanding and confusion, and/or inaccurate calculations; the answers to most of the questions attempted are likely to be fragmentary only.

In borderline cases the examiners use their discretion and consider the overall quality of the work the candidate has presented for examination. The external examiner often plays a key role in such cases.

Part I:

Unclassified Honours – The examiners are required to classify each candidate according to her/his overall average mark in Part I as (a) worthy of Honours, (b) Pass or (c) Fail. A candidate is allowed to proceed to Part II only if he/she has been adjudged worthy of honours by the examiners in Part I. The examiners do not divide the categories further but tutors and students may infer how well they have done from their marks. Candidates adjudged worthy of honours normally proceed to Part II but they may, if they wish and subject to approval from the relevant bodies, leave after Part I in which case an Unclassified Honours B.A. degree will be awarded.

Pass – The examiners consider that the candidate is not worthy of honours and therefore will not be allowed to proceed to Part II. The candidate may leave with a B.A. (without honours) or may retake Part I the following year (subject to college approval).

Fail – The examiners consider that the candidate is not worthy of a B.A. The candidate either leaves without a degree or may retake Part I the following year (subject to college approval).

Part II:

Classified Honours – Once marking is completed for both Parts I and II an overall percentage mark is computed for each candidate and classification then takes place. Subject to the requirement that Part II be adjudged worthy of honours (see below), classification is based solely on the overall percentage mark; the candidate's profile of marks from each element of assessment is only taken into account in borderline cases. However, a candidate cannot be awarded an M.Eng. degree unless his/her performance in Part II is adjudged worthy of honours i.e. a candidate must be adjudged worthy of honours both in Part I and in Part II to be awarded the M.Eng. degree. Failure to achieve honours in Part II will result in the candidate leaving with an unclassified B.A. (Hons) irrespective of the aggregate mark.

Pass – Notwithstanding the award of unclassified honours in Part I, the examiners consider that the candidate's overall performance is not worthy of an M.Eng. The candidate is listed as a Pass on the class list and is awarded an unclassified B.A. (Hons) on the basis of Part I performance.

Fail – The examiners consider that the candidate's overall performance is not worthy of an M.Eng. *and* that the performance in Part II is not worthy of a Pass. The candidate is excluded from the class list but is nevertheless awarded an unclassified B.A. (Hons) on the basis of Part I performance.

- The examiners cannot award unclassified honours on the basis of Part II performance unless permitted to do so by the Proctors.
- Nevertheless, candidates awarded a Pass or a Fail by the Part II examiners leave with an unclassified B.A. (Hons) because they were judged worthy of that in Part I (i.e. their degree is the same as if they had left immediately after Part I).
- In terms of the degree awarded, there is no difference between a Pass and a Fail in Part II. The only difference is whether or not the name appears on the class list.
- Candidates cannot normally retake Part II because the Examination Regulations require that they must pass Part II within one year of passing Part I. This rule can only be waived in exceptional circumstances, with permission from the Education Committee.

Annex: Summary of marks awarded for different components of the MEM Final Examination in 2011 (For Part I and Part II students who embarked on the FHS respectively in 2009/10 and 2008/09)

	Component	Mark
Part I	General Paper 1	100
	General Paper 2	100
	General Paper 3	100
	General Paper 4	100
	Introductory Economics (Ec1)	100
	Paper M1	100
	Microeconomics	100
	Practicals & Industrial visits	70
	Team Design Project	50
<i>Part I Total</i>		<i>820</i>
Part II	Management Project	200
	Options Paper 1	100
	One paper from a choice of Economics and Management Papers.	100
<i>Part II Total</i>		<i>400</i>
<i>Overall Total</i>		<i>1220</i>