

## **EXAMINERS' REPORTS 2007**

[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

	2007	2006	2005	2004
Distinction	12 (43%)	13 (43%)	6 (23%)	4 (19%)
Pass	15 (53%)	17 (57%)	18 (65%)	16 (76%)
Fail	1 (4%)	0	2 (8%)	1 (5%)

#### 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

28 students were registered for the examination.

26 candidates passed all papers, without the necessity for compensation. Of these 26 successful candidates in June, 12 achieved a marks average above 70 and were awarded Distinctions.

1 candidate failed the Mathematics paper in June, but was re-examined successfully in September.

1 further candidate failed 3 papers in June and so was re-examined on all 4 written papers in September. Of these he failed the Mathematics paper and so was deemed to have failed the whole examination.

The prize for the best performance in Practicals was awarded to Jim Thompson from St Anne's College, and the best overall performance in Prelims to Helen Boffey from St Edmund Hall

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

1 candidate was notified to the Examiners as having Dyspraxia or Dyslexia, and was examined in his college and given extra time.

4 further candidates were allowed by the Proctors the use of dictionaries for the written papers.

### Gender Issues:

Of the 28 candidates 11 were women and 17 men.

Of the 12 distinctions awarded, 4 were to women and 8 to men.

There were no statistically significant differences in the performance of the female and the male candidates in written papers, the Practical Class or the Crystallography Classes. The distribution of distinctions was, within statistical significance, in line with the percentage of male and female candidates.

## D. COMMENTS ON PAPERS AND INDIVIDUAL QUESTIONS

### MS1 Structures of Materials

Overall paper average: 64.0%

Question	1	2	3	4	5	6	7	8
No. of attempts	26	25	14	9	22	12	18	13
Av. mark per question	13.4	14.8	12.1	11.7	15.5	10.6	10.2	11.5
Highest mark	19.0	18.5	18.0	16.0	20.0	14.0	18.0	15.0
Lowest mark	6.5	7.0	7.0	8.0	12.0	7.0	3.0	3.0

This paper was done very well by most candidates, the lowest mark being 51!

Several questions attracted more than one 'perfect' answer indicating a very high level of understanding of the examined material in the best students. Questions 2 (on bonding types) and 5 (on crystallography) were especially well done. This is the second year that the question on the Composites course (traditionally unpopular (perhaps because it comes rather shortly before Prelims) has attracted some good answers.

### MS2 Properties of Materials

Overall paper average: 63.8%

Question	1	2	3	4	5	6	7	8
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<i>No. of attempts</i>	13	19	26	20	24	17	3	17
<i>Av. mark per question</i>	15.1	11.4	13.9	10.3	12.0	16.4	4.0	13.4
<i>Highest mark</i>	20.0	20.0	18.0	15.0	19.0	20.0	6.0	19.0
<i>Lowest mark</i>	5.0	0.0	7.0	8.0	6.0	11.0	3.0	8.0

Most of the scripts were very good. As in MS1, several questions attracted at least one perfect answer. One candidate achieved 38 marks, but performance on other papers precluded compensation.

Q.1. Question on cantilever beams based on worked example in lectures. Some bizarre guesses about worst case assumptions, otherwise most answers were competent.

Q.2. A very simple question on Mohr's circle with a huge range of marks.

Q.3. Most popular question on basic mechanical properties. Generally quite well done but some candidates ignored the instruction to include appropriate diagrams and describe practical significance.

Q.4. Yield strength in age-hardening alloys. Several candidates had trouble defining appropriate strength and time values to the graph.

Q.5. Very standard and popular critical resolved stress question. Several candidates failed to apply Diehl's rule successfully.

Q.6. Kinetic gas theory question that was both popular and well answered.

Q.7. Capacitor properties. Usually an unpopular topic in this paper, and proved so again with only 3 extremely poor attempts.

Q.8. Impedence of circuits. Usually an unpopular topic in this paper, but this year there were 17 attempts, several of them achieving very good marks.

## MS3 Transforming Materials

Overall paper average: 67.3%

<i>Question</i>	1	2	3	4	5	6	7	8
<i>No. of attempts</i>	10	18	3	25	25	20	15	24
<i>Av. mark per question</i>	15.8	16.0	12.7	12.4	15.0	12.1	11.9	12.3
<i>Highest mark</i>	20.0	20.0	16.0	20.0	18.0	18.0	20.0	17.0
<i>Lowest mark</i>	10.0	11.0	10.0	4.0	11.0	6.0	2.0	2.0

The overall paper average was very high, with some excellent scripts. One candidate achieved only 27 marks, and was not considered for compensation.

All the questions apart from 3 (Polymer Synthesis) attracted a substantial number of answers, and there were some excellent answers to the other 7 questions. This is the third year in which the polymer question was hardly attempted at all, although the answers this year were much better than in the past, showing a genuine level of understanding.

There are no other specific points that the examiners wish to point out on this paper.

## Maths for Materials and Earth Scientists

Overall paper average: 57.4%

<i>Question</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>No. of attempts</i>	26	27	28	28	28	28	27	28	25	27	20	27	7	19	13	25
<i>Av. Mark per question</i>	6.9	2.9	7.5	6.9	5.0	4.4	6.1	4.8	4.6	4.1	13.2	19.1	10.4	12.3	9.6	9.2
<i>Highest mark</i>	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	23.0	25.0	25.0	23.0	13.0	20.0
<i>Lowest mark</i>	0.0	0.0	4.0	3.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.0	2.0	0.0	5.0	1.0

### General Comments:

The average mark for Materials students was 57.4%, slightly lower than last year (60.8). 2 candidates failed to achieve 40%, and of these only one passed the resit paper in September.

Question A2 (on vectors) was relatively poorly done, and question B13 (on partial differentiation) was unpopular.

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

None

**F. NAMES OF MEMBERS OF THE BOARD OF EXAMINERS**

**Professor C R M Grovenor (Chairman)**

**Professor D G Pettifor**

**Professor A I Kirkland**

**Dr M Galano**

## REPORT ON FINAL HONOURS SCHOOL OF MATERIALS SCIENCE, PART 1 EXAMINATION

### Part I

#### A. STATISTICS

##### (1) Numbers and percentages in each class/category

###### (a) Classified examinations

Class	Number			Percentage (%)		
	2006/07	2005/06	2004/05	2005/06	2005/06	2004/05
I	n/a	n/a	n/a	n/a	n/a	n/a
II.I	n/a	n/a	n/a	n/a	n/a	n/a
II.II	n/a	n/a	n/a	n/a	n/a	n/a
III	n/a	n/a	n/a	n/a	n/a	n/a
Pass	n/a	n/a	n/a	n/a	n/a	n/a
Fail	n/a	n/a	n/a	n/a	n/a	n/a

###### (b) Unclassified Examinations

Category	Number			Percentage		
	2006/07	2005/06	2004/05	2005/06	2005/06	2004/05
Distinction	n/a	n/a	n/a	n/a	n/a	n/a
Pass	19	12	18	100	100	100
Fail	0	0	0	0	0	0

##### (2) If vivas are used:

The external examiner, Prof. Brian Derby, was offered the opportunity to viva Part I students. However, in consultation with the Board of Examiners it was agreed that no vivas would be required at Part I, PROVIDED the examiners produced a written procedure for how to deal with borderline cases (e.g. pass/fail). Such a procedure was included in the examination conventions. Oral presentations were used in assessment for the Team Design Projects and marks were awarded both for the written report and for the presentation.

##### (3) Marking of scripts

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

#### B. NEW EXAMINING METHODS AND PROCEDURES

(1) This year's Examination Conventions contained a written procedure for how any scaling would be carried out and included for the first time a provision for the automatic initial moderation of papers with extreme marks.

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

(1) The External Examiner discovered that there were many mistakes in adding up the marks from individual parts of questions on the marksheets to reach a total for the question. Though this was easily rectified, this problem needs to be preempted in future by agreeing, for example, that each of the two examiners setting each paper would check the addition of the other.

(2) A serious problem arose on one paper owing to mistaken information, about what was examinable and what was not, being given to a candidate by a lecturer in the lead up to the examinations. During enquiries it became clear that there was confusion amongst the students on this point even before this incident. If the practice of informing students of subject matter to be



excluded is to continue (and thought should be given to that), clearer procedures will be required for how this information is communicated to the students.

#### **D. Examination Conventions**

The previous year's Examination Conventions are found in the course handbook that is distributed to all candidates in hard-copy and is also available on the Departmental website, to which candidates' attention is drawn by email. The current year's (2007 in this case) Conventions are put on the Departmental website, and sent hardcopy to all the Candidates. [Attached]. The Examination Conventions are assessed by the Board of Examiners and the Department's Academic Committee. The Department aims to send the conventions to the students early in Hilary Term.

### **Part II**

#### **A. GENERAL COMMENTS ON THE EXAMINATION**

There were 23 candidates and all were awarded Honours. The examination consisted of six written papers plus course work that for most candidates included a Team Design Project (TDP), a Business Plan, Industrial Visit Reports and Practical Work carried out during the 2<sup>nd</sup> Year. One candidate opted to take the Language Option, which replaced the Business Plan. This was marked by the Language School to the same guidelines as the Business Plan.

The normal procedure for the written papers was followed again this year, namely 5 out of 8 questions were answered for the four General Papers and 3 out of 8 for the two Options Papers. Each written paper lasted 3 hours. All scripts were double marked blind. Each TDP project was marked by two assessors plus the Chairman of Examiners. The possibility of moderation to allow for any differences in standards between markers was discussed by the all the assessors and the Chairman, but was deemed to be unnecessary. Teams were marked as groups, but allocation of bonus, or penalty marks to individuals was permitted. The Business Plan was marked by staff from the Said Business School (SBS) and the Begbroke Directorate. Reports for each of the Industrial Visits were assessed as pass/fail by the Industrial Visits Organiser.

A serious problem arose on paper GP4 owing to incorrect information, about what was examinable and what was not, being given to a candidate by the lecturer of one of the courses examined on the paper in the lead up to the examinations. During enquiries it became clear that there was confusion amongst the students on this point even before this incident. In order to compensate for the resulting disadvantage to some candidates, an adjusted mark was calculated for each candidate comprising the sum of the 4 best question marks from the paper multiplied by 5/4. This followed similar precedent in the Department of Materials (in the Part I examination sat in 2003/04) and was agreed with the Junior Proctor.

The overall mean mark for Part I was near the middle of the 2(i) range for both Materials Science and MEM candidates and the means for the individual elements of examination also lay mostly in the 2(i) band. The exceptions were the total coursework mark, which corresponded to a low 1<sup>st</sup>, and the mark for paper GP3, which was in the 2(ii) band. The examiners regarded the overall mark distribution as an accurate reflection of the ability of the cohort of candidates and therefore no scaling was applied. This represents a further step forward from the year-by-year gradual decrease in the level of scaling necessary in recent years, in which the marks on the written papers in particular have often been scaled to compensate for the fact that the marks have tended to be lower than the Examiners judged appropriate for the overall standards demonstrated by the candidates.

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

Insofar as can be judged from the small sample size the 6 female candidates did not show any significant difference in performance compared to the males. The performance of both sexes in coursework was very good. One candidate was allowed extra time for the examinations on account of dyslexia/dyspraxia; the outcome seemed to be satisfactory.

mark (%)	Overall mark		Written examinations		Course work	
	Male	Female	Male	Female	Male	Female
40–50	-	-	2	-	-	-
50–60	5	1	4	1	1	-
60–70	5	2	4	4	2	-
70–80	2	2	2	1	10	5
80–90	1	1	1	-		1
Totals	13	6	13	6	13	6

**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**

This section is confidential

**F. NAMES OF MEMBERS OF THE BOARD OF EXAMINERS**

Dr R I Todd (Chair)

Prof S G Roberts

Dr J T Czernuszka

Dr J M Smith

Dr M R Castell

Dr P S Grant

Prof B Derby (external)

**COMMENTS ON PAPERS AND INDIVIDUAL QUESTIONS  
MS / MEM Part 1 2007**

**General Paper 1 – Structure and Transformations**

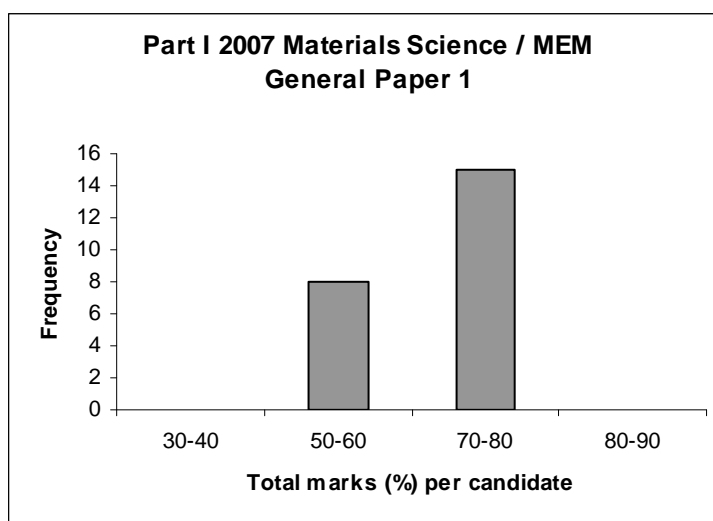
**Examiner: Prof. Patrick Grant**  
**Candidates: 23 (19 MS / 4 MEM)**  
**Mean mark: 63.6 %**  
**Maximum mark: 79.0 %**  
**Minimum mark: 41.0 %**

Detailed comments on the paper are as follows:

Qu. 1	No of Answers	Average Mark	Max. Mark	Min. mark	Description
1	13	10.8	18	8	A straightforward question on Fick's second law involving several basic derivations, relating of equation variables to one another, and a sketch of the concentration variation with time. A moderately popular question with almost all attempts gaining full marks in the early part that was standard bookwork. Most candidates struggled with plotting and fitting of the supplied data.
2	10	14.2	17	10	Phase transformations and kinetics involving a consideration of undercooling, curvature and diffusion on microstructural features in eutectic systems. The joint least popular question owing to a slightly unusual presentation in the first part that may have appeared obscure to less strong candidates. Nonetheless, a relatively high average mark.
3	18	13.9	19	9	A very straightforward and popular question regarding crystallinity in polymers, and the factors that govern the degree of crystallinity. A wide spread of marks with no particular part of the question proving particularly easy or difficult.
4	10	14.5	17	11	Ternary phase diagrams. Relatively long introduction with data that must be used to construct a ternary phase diagram. Joint least favourite paper but gained the highest average mark since, despite appearing difficult, it was very straightforward for reasonably well prepared candidates.
5	12	12.1	16	8	Corrosion related question requiring basic knowledge of polarisation curves in the first part, and specific behaviour under certain conditions in the second. A solid performance overall and reasonably popular. Candidates found it difficult to gain the highest marks that required slightly more in-depth

					knowledge.
<b>6</b>	16	13.1	18	10	Corrosion behaviour in practice. A popular descriptive question with most candidates doing well. Slightly weaker performance in the second part that required application of basic principles to engineering practice.
<b>7</b>	22	12.0	18	8	Powder processing relating to advantages and processes occurring during sintering. The most popular question with many long and excellent descriptive answers, but also relatively large fraction of weak answers, suggesting it was the "least worst" final question selection for some candidates.
<b>8</b>	14	11.9	18	7	Surface and interfaces requiring interpretation of real microstructures. A reasonably popular question with some strong answers but several very poor attempts. In particular, candidates struggled with explaining grain boundary precipitation and growth.

Overall candidate performance in this paper was in line with aims of the examiners with a good spread of questions answered and a range of marks that were felt to represent fairly the range of abilities of the candidates in this subject area. There were no particular areas of concern.



## General Paper 2 – Electronic Properties of Materials

Examiner: Dr Jason Smith

Candidates: 23 (19 MS / 4 MEM)

Mean mark: 65.3 %

Maximum mark: 89.0 %

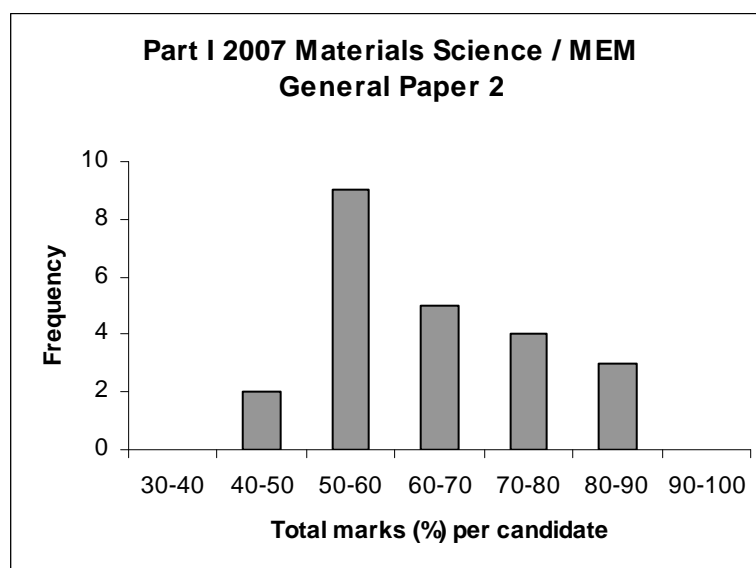
Minimum mark: 48.0 %

### Overall Comments:

Candidates showed neither strong preference nor aversion for particular questions; the distribution of attempts was fairly flat. In general candidates performed better in the bookwork parts of the questions than in the numerical/analytic parts indicating an emphasis on shallower learning rather than deep understanding. This was reflected particularly in questions where candidates were asked to transfer their knowledge to less familiar problems, such as those in qus 5(c) and 7(b), which were answered poorly by most who attempted them. The distribution of marks was monomodal with a mean very close to 13/20 per question, and a median of 65% for the paper as a whole.

Qu.	Topic	No of Answers	Average Mark	Max. Mark	Min. mark	Description
1	Tensor properties	18.0	12.0	18.0	6.0	Parts a and b were generally quite well answered. C posed more problems, with fewer candidates giving good answers. The least popular question, but well answered by those who attempted it providing the highest 'min. mark'.
2	Quantum theory of electronic orbitals in atoms	8.0	14.8	19.0	11.0	Good answers by most, and a popular question. A standard question and the most popular, which provided a good balance of answers.
3	Schroedinger equn in one dimension	19.0	15.4	20.0	8.0	
4	Free electron theory	20.0	13.4	20.0	9.0	

5	Band theory and energy dispersions	12.0	9.9	15.0	4.0	<p>Part c was a little unfamiliar and only a couple of candidates gave substantial answers. A standard question that elicited a good range of answers. Part a answered well. Part b was perhaps too 'wordy' as few candidates made much progress in setting up the problem. A standard question with a good range of responses</p>
6	Dielectric polarization	12.0	13.9	20.0	8.0	
7	Carriers in semiconductors	14.0	11.1	18.0	6.0	
8	Ferromagnetism	12.0	13.9	19.0	9.0	



## General Paper 3 – Mechanical Properties

**Examiner: Dr Richard Todd**

**Candidates: 23 (19 MS, 4 MEM)**

**Mean mark: 56.3 %**

**Maximum mark: 82.0 %**

**Minimum mark: 33.0 %**

### General Comments

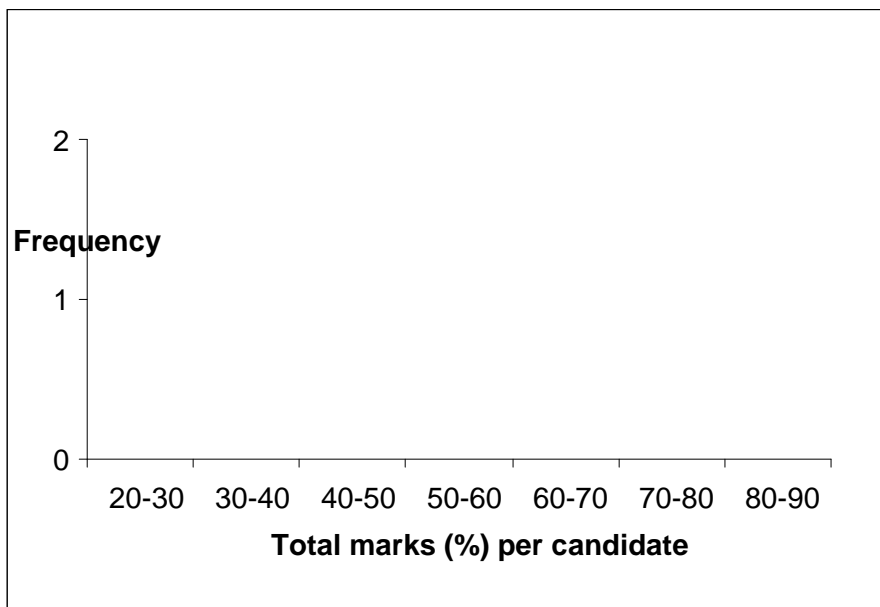
The paper was of the same format used in previous years, viz. 3 hours duration, 5 questions out of 8 to be answered. The paper was set with the aim of giving sufficient opportunity for the weaker candidates to obtain a score corresponding to the CVCP band reflecting their ability, whilst at the same time allowing stronger candidates to demonstrate their ability. We especially tried to set questions that were original, in that they were not minor variations on formats used repeatedly in the past, but which tested the basic knowledge and ability of the candidates on mainstream topics in the mechanical properties of materials. We aimed to produce a mean in the mid 2(i) range.

The mean mark for the paper of 56.3%, a mid 2(ii) score, shows that we did not achieve our aim in this respect. The relatively small variations in the number of answers and mean marks for the individual questions (see below) show that this was attributable to the paper as a whole rather than to problems with individual questions. The highest mark of 82%, with some other candidates scoring in the 70-80% range, demonstrates that this was a fair paper for those who had learned and understood the material examined. Both markers agreed that the low mean for the paper reflects the fact that many candidates had learned too much of the subject matter by rote, without understanding the underlying meaning and were therefore unable to apply their knowledge to the questions set. Informal feedback from candidates supported the fact that they found the questions difficult because they were not simple variations on those set previously. A further factor with this paper may be that it examines a wider range of subject matter than the other papers, as judged from the number of lectures given on the courses included. We recommend that these issues are considered by the Academic Committee of the Department of Materials.

The mean mark, being greater than 55%, did not qualify for automatic scaling under the Examination Conventions and after due consideration the examiners decided not to scale the marks on the grounds that it gave a fair reflection of the abilities of the candidates on the subject matter examined.

Qu.	Topic	No of Answers	Average Mark	Max. Mark	Min. mark	Description
1	elastic deformation (pressurised tube)	14.0	12.6	17.0	5.0	A well-graded question with a good mean mark.
2	microplasticity (dislocation mobility and line energy)	10.0	9.8	16.0	3.0	A test of understanding of fundamental concepts in dislocations that were covered in lectures and tutorials. A majority of the answers were approximate and lacking in understanding.
3	microplasticity (Hall-Petch, age hardening)	15.0	10.6	17.0	0.0	A test of basic knowledge but presented in an original way. Part (b) of the question followed on in concepts directly from part (a), yet many answers were completely contradictory, attributing the same

4	macroplasticity (necking and Considere)	10.0	11.9	19.0	5.0	<p>observations to entirely different effects in part (a) and part (b). Straightforward question with many high marks for some candidates. Other answers suggested rote learning with little understanding.</p> <p>Straightforward question similar to many the students had practised during the corresponding lecture course. Some very high marks, but in contrast to some of the other questions, the most common difficulty encountered was an inability to remember the definitions involved.</p> <p>Some good answers showing good understanding. Some difficulties with the concept of compliance.</p> <p>Test of basic principles. Most popular question, high scoring. Standard parts well done by many. Non-standard parts less so.</p> <p>Test linking several basic concepts. Poor mark reflects difficulties with linking subject matter from different parts of the course.</p>
5	mechanical properties of composites	12.0	9.2	19.0	3.0	
6	mechanical properties of polymers	14.0	12.3	17.0	3.0	
7	fracture and fatigue (toughness)	18.0	12.4	19.0	6.0	
8	fracture and fatigue/creep (ductile fracture and creep)	17.0	10.7	14.0	4.0	





## General Paper 4 – Engineering Applications of Materials

**Examiner: Dr Jan Czernuszka**

**Candidates: 23 (19 MS, 4 MEM)**

**Mean raw/scaled mark: 63.2 % / 68.2 %**

**Maximum raw/scaled mark: 80.0 % / 82.5 %**

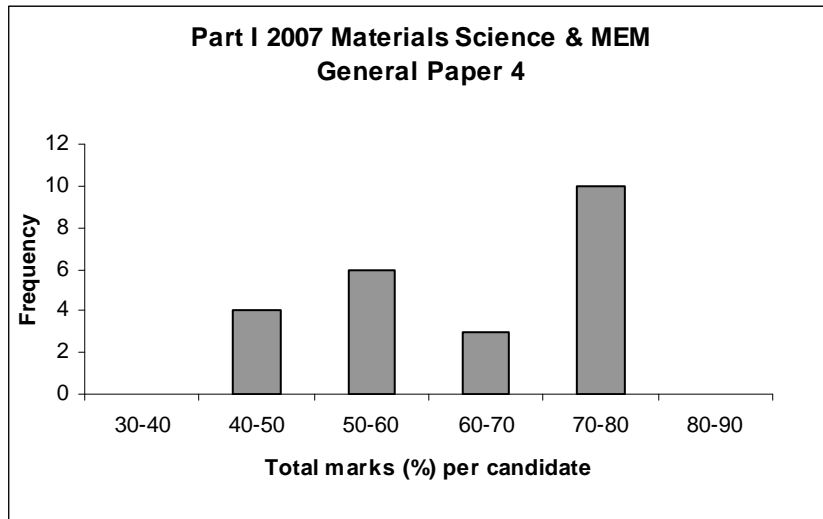
**Minimum raw/scaled mark: 41.0 % / 48.8 %**

### General Comments

See Chairman's report on reason for use of scaling.

This paper produced a mean mark within the range desired by EPSC and to which the Examiners worked. The questions were well set with a straightforward introductory component that the majority of candidates answered. Subsequent parts tested the candidates more thoroughly. The candidates appeared to respond well to such types of questions. The MS cohort performed slightly better (on average) than the MEM candidates.

Qu.	Topic	No of Answers	Average Mark	Max. Mark	Min. mark	Description
1		10.0	14.5	19.0	11.0	Question on electrical properties of polymers, candidates answered this question reasonably well, part 9c) proves the most difficult part
2		4.0	13.0	17.0	6.0	Not a popular question (on the electric arc furnace) but well answered by those candidates who chose to answer it.
3		17.0	13.2	18.0	10.0	Popular and well answered question on aluminium alloys in aerospace.
4		17.0	11.6	19.0	6.0	Popular question comparing different routes to produce a ceramic component.
5		7.0	11.4	18.0	4.0	Straightforward question on fundamental aspects of glasses, not popular.
6		18.0	13.4	19.0	2.0	Popular and well set question on p-n junctions leading to LEDs and solar cells.
7		21.0	11.5	16.0	6.0	The most popular question; aberrations in electromagnetic lenses
8		21.0	12.9	19.0	8.0	The most popular question; comparison of various microanalytical techniques for specific applications. Well answered.



## Materials Option Paper 1

**Examiners: Dr Martin Castell**

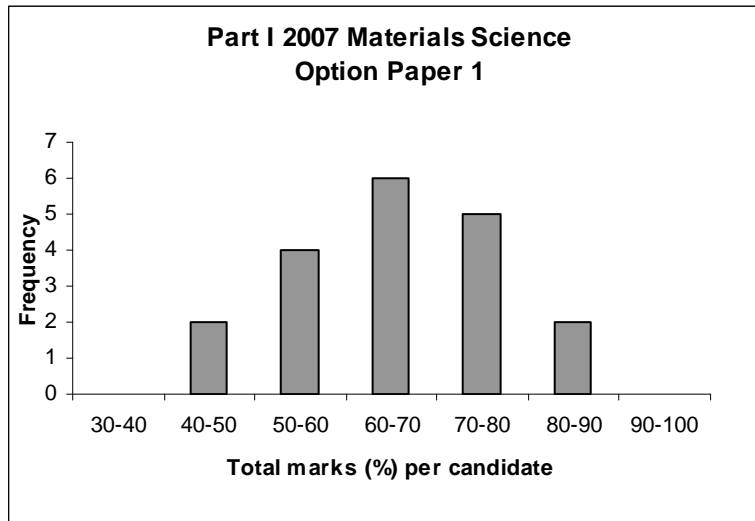
**Candidates: 19**

**Mean mark: 64.9 %**

**Maximum mark: 85 %**

**Minimum mark: 43 %**

Qu.	Topic	No of Answers	Average Mark	Max. Mark	Min. mark	Description
1	Melt Processing	12	23.0	28.0	14.0	Popular descriptive question on alloy castability. Generally well answered.
2	Structural Biomaterials	10	22.5	27.0	17.0	Popular descriptive question on polymerisation, structural hierarchy, and microstructure of bone. Generally well answered.
3	Fracture and fatigue	6	21.5	32.0	11.0	Question combining descriptive and mathematical elements. The range of quality of answers was broad with some very good and some poor.
4	Advanced engineering alloys	10	18.0	22.0	13.0	Popular descriptive question on use of light alloys for automotive applications. On the whole the answers were middling to poor. Many students suffered from regurgitating all they knew rather than specifically addressing the question.
5	Origins and stability of microstructures	0	n/a	n/a	n/a	No attempts were made at this question on eutectic reactions and undercooling. Candidates were possibly put off by having to derive and manipulate equations.
6	Electroceramics and superconductivity	6	19.2	26.0	9.0	Descriptive question on ferro and pyroelectric ceramics. There was a broad range of answers.
7	Fabrication and applications of nanomaterials	3	22.0	29.0	18.0	Question on properties and applications of quantum dots and nanotubes. Only 3 candidates attempted an answer with 2 middling and 1 excellent.
8	Advanced characterisation of materials	10	22.4	28.0	17.0	Popular question with mainly descriptive elements on 3DAP, time of flight mass spectrometry, and TEM techniques. The quality of answers was generally good.



## Materials Option Paper 2

**Examiners: Prof. Steve Roberts**

**Candidates: 19**

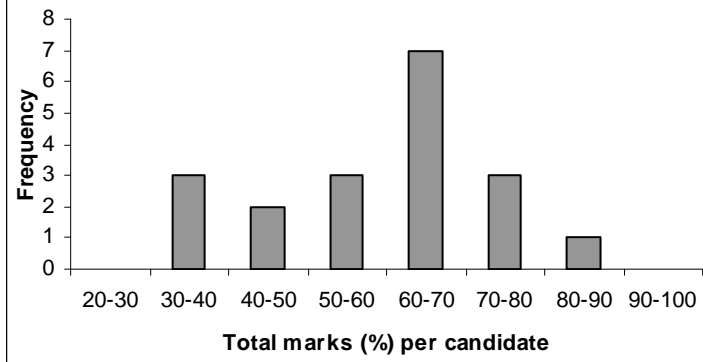
**Mean mark: 60.5 %**

**Maximum mark: 86 %**

**Minimum mark: 36 %**

Qu.	Topic	No of Answers	Average Mark	Max. Mark	Min. mark	Description
1	Advanced polymer materials	11	21.6	30.5	9.5	Spin-casting and phase stability for a two-polymer blend. Most answers covered the main points fairly well; only one showed a real lack of understanding.
2	Bonding & Structure	4	24.0	27.5	18.5	Descriptive question on a wide range of aspects of the course. Generally well answered by those who attempted it.
3	Design with ceramics	16	20.0	25.5	10	Largely a pretty standard question on thermal shock and Weibull statistics. Only a few got most of the important points about thermal shock. Most could do the calculation of Weibull parameters, biggest spread was in being able to use them in the calculation.
4	Optoelectronic devices	4	10.1	13.5	8	Birefringence and non-linear optics. No-one attempting this made a very good job of it. Most had some idea what birefringence was. None could make a decent attempt at describing non-linearity or how it is applied.
5	Materials for nanoscale information storage	1	12			GMR devices. One answer with some parts correct, but mostly confused about the structure of the read-head in question and the materials types required.
6	Physics of nanomaterials	2	18.3	27	9.5	Optical behaviour and particle size. One very good attempt, with only a few points missed; one poor one with only a few of the points being looked for.
7	Processing of ceramics	14	20.7	25.5	16	Powder processing and particle adhesion. Quite a lot was being looked for in the descriptive part that accounted for most of the marks; a few attempts covered pretty well all of what was being looked for, others got only one or two of the main points. The derivation was mostly well done, with only a few unable to do it.
8	Semiconductor device fabrication	5	18.4	21	15	Oxides in CMOS devices and ion implantation. All attempts were middling-good, with all sections done adequately but not particularly well.

**Part I 2007 Materials Science  
Option Paper 2**



## Chair of Examiners Report, Part 2, Materials Trinity Term 2007

### Procedure

Twelve students were examined (nine male, three female). All but one submitted the thesis on their part 2 research project by the deadline of noon, Friday week 7 of Trinity term. (One student handed in late, at 17.19 on that day: see discussion of “late penalties” below). Each thesis was read by two internal examiners (from a team of six) and by the external examiner. A one-page project supervisor’s report form, completed by the supervisor at the end of the project, was supplied to the examiners with the thesis.

As is now standard practice in materials part 2, examiners were issued with a guidance list for assessing the theses, so that reports would as far as possible follow a standard format. This document was also issued to the students, early in Trinity Term, so as to assist them in writing up. It was not felt appropriate to pre-allocate marks to particular “assessment points”, as projects and theses vary very widely in scope, in balance between experiment and analysis, etc. This is especially the case as individual projects may “succeed” or “fail” due to factors outside the students’ control.

Examiners were also issued with a document detailing the criteria for allocating marks within various bands, up to 100% marks, to assist with consistent marking between examiners and to encourage use, where justified, of the full range of available marks for the theses. The external examiner, having read and marked all the theses, provided a synoptic view.

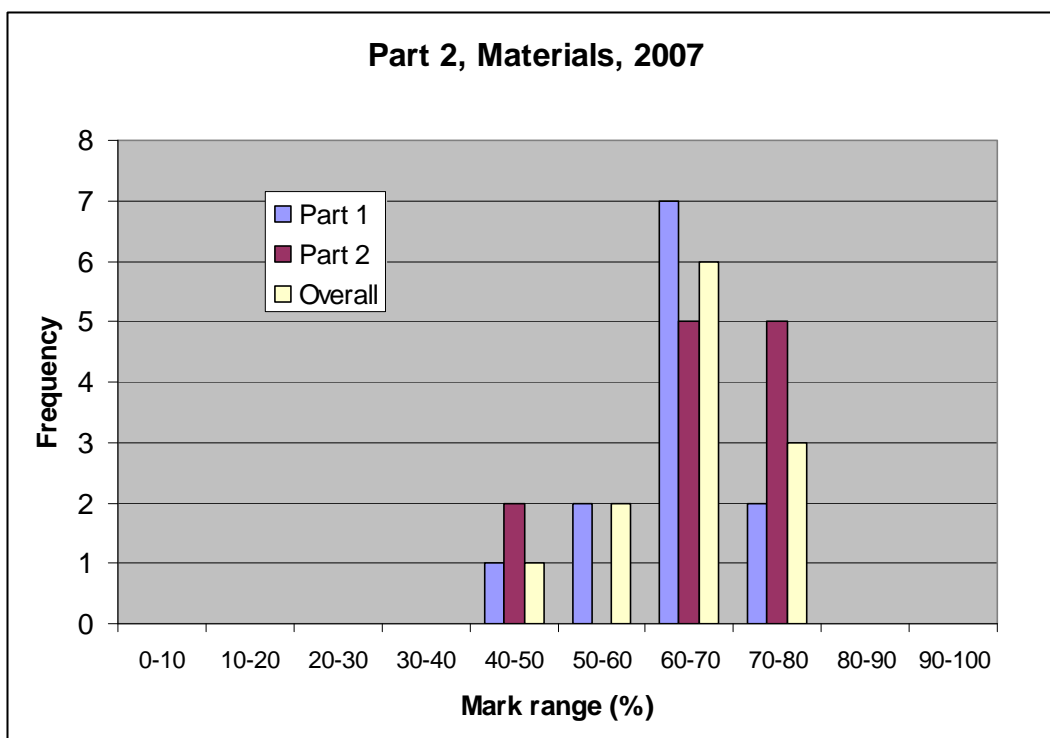
The marks awarded by the all examiners of the thesis formed the basis for the final mark awarded. The viva voce examination was conducted so as to address points of fact that were unclear from the thesis readings. In the viva, questions were asked only by those examiners who had read the thesis. the examiners decided a final mark (as a percentage score). The marks were then adjusted to the 350 marks allocated for part 2, and added to the marks for part 1 (weighted at 800) for degree classification. The candidate who had handed in late then had the penalty agreed by the examiners with the proctors (a subtraction of 7.5 percentage points) applied to his mark. After the viva, any medical notes from the proctors were considered (there were such notes for three candidates) before deciding the final classification. External factors (other than a student’s effort or ability) that might have affected the project outcome wer also considered.

### Results

The recommended break points were used as the basis for degree classification (70% or above for first class honours, 60-69.9% for upper second class, 50-59.9% for lower second class, and 40-49.9% for third class.).Some candidates’ marks fell just below these borderlines; their cases were discussed in depth, and resulted in two candidates whose marks fell just below the hard borderline being awarded the higher degree classification. The marks this year’s part 2 candidates achieved in part 1, in part 2 and overall are summarized in the figure below.

The final results were:

- 1<sup>st</sup> class: 5;
- upper second class: 4;
- lower second class: 2;
- third class: 1.



### EQUAL OPPORTUNITIES ISSUES AND BREAKDOWN OF THE RESULTS BY GENDER

Insofar as it can be judged from the small sample size, there was no significant difference in performance between the 3 female candidates and the 9 male candidates

mark (%)	Overall mark		Part 2 Project		Part I Mark	
	Male	Female	Male	Female	Male	Female
40-50	■	■	■	■	■	■
50-60	■	■	■	■	■	■
60-70	■	■	■	■	■	■
70-80	■	■	■	■	■	■
80-90	■	■	■	■	■	■
Totals	9	3	9	3	9	3

## Comments and Recommendations

### **External factors**

The examiners took care to ensure that what was being judged was a candidates ability and the effort they put in to doing the project and writing it up, and that external factors outside a student's control did not affect the mark awarded. The supervisors' reports, the viva and the readings of the theses were used to judge this.



## ***Late submission and penalties***

This year we had one candidate who handed in his thesis about 5½ hours late, and one candidate who handed in a thesis on time, but where the thesis was clearly incomplete owing to his running out of time during the final printing and collating. Neither thesis (or the project on which it reported) was of a very high standard, but it was clear that the late-handing in candidate had gained advantage in being able to produce a complete thesis, while the other had placed himself at some considerable disadvantage in handing in a thesis reporting on only part of the work done, and discussing none of it, through opting to hand in an incomplete thesis on time. This took some effort in the viva to ascertain, and some care in allotting an appropriate final mark to the incomplete thesis (here the “mark-band guidelines” were of great help).

The Proctors’ rules allow a maximum penalty of 10% of the possible marks for the piece of work in question, or, if the hand-in is so late as “to make assessment impractical”, an award of zero marks.

For the cases that are likely to fall into the late-hand-in penalty area, even a few hour’s grace would be likely to make a considerable difference to the quality or completeness of the thesis. Thus up to 10% is possibly an appropriate penalty for being up to few hours late. However, a candidate may then well think that, as they are already going to get a 10% penalty, they might as well leave it till the next day, and get a whole night’s work in on the thesis – or even a day or two longer. They would not be likely to be judged as being so late as to be given zero marks (given that hand-in for part 2 theses is Friday of 7<sup>th</sup> week, and the examiners normally read the theses in 9<sup>th</sup> week). Someone who has left their writing-up so late that they could either hand an incomplete thesis on time, one a bit better a few hours later, or a fairly complete one a day or two later, could gain far more than a 10% mark penalty could remove, by opting for a few day’s delay.

**I suggest strongly that the Proctor’s rules be changed to allow the possibility of scaled penalties over the whole range from 0% to 100%.** By allowing the examiners to adjust the mark to take full account of the range of advantages that the possible range of late hand-ins could confer, it will act as a true deterrent to candidates choosing cynically to play the rules so as to maximize their marks by handing in late.

## ***Mark-band guidelines***

These guidelines proved very useful in guiding marking of the theses. However, while they now clearly encourage and justify marking up to an upper limit of 100%, with guidelines as to the expected standards in 10%-wide bands, they are not so clear at the lower end of the mark scale. Anything below 30% is in one band, where the guideline is that this should be the mark range for a piece of work of “little or no meaningful content”. While it is to be hoped that theses of this poor standard are very rare, nonetheless **it would be useful to provide some guidance as to positioning of such theses within this 30% range.** This may involve reconsideration of the guidelines for the 30-40% and 40-50% bands.

## ***Reporting of project management***

The marking guidelines indicate that the examiners are to take note of the effectiveness of the project management in assessing the thesis, though, in common with other points for assessment, no fixed mark scheme is applied. As part of the project work for the part 2, four project management forms are required to be completed by the student and agreed by student and supervisor. It has been common, though not universal, practice for these forms to be bound into the thesis as an appendix, with the assumption that this meets the requirement to report on project management. However, it can be difficult for examiners to unpick from these forms the progress of the project, whether obstacles were encountered and overcome, how the student and supervisor changed the aims of the project in response to results either positive or negative, and so forth.

Also, there is a general problem with word limits (see below). Students understandably want to include as much information as possible about what they have done, and there is also a need for theses to act as archival sources of data. One route to this is to include raw data as appendices to the thesis, with the proviso that such appendices do not form any part of material read by the examiners for assessment. Arguably, the project management forms fall into this “raw data” category.

The candidates were thus notified that they should include a short section in the main body of the thesis reporting in narrative form the timing of work done and decisions taken as to the direction of the project (this section could refer to more detailed information in the appended management forms). **This on the whole was helpful to the examiners, and is worth retaining as an expected (short) section of a part 2 thesis.** However, to avoid confusion with more formal “project management”, it is suggested that it be termed “project overview” or similar.

There were concerns about what the appropriate length of this section should be, and about its impact on the allowed length of the thesis overall. I suggest that such a section should be limited to two double-spaced pages.

### ***Thesis length***

Currently part 2 theses are limited to 15,000 words, (including written appendices) but there is no limit on graphs, diagrams, photographs, references, computer programs, tables etc. This year, several theses were very close to this limit, and included a very large number of in-line graphs, tables and micrographs, in one case taking the length of the thesis to nearly 150 double-spaced pages. This is unwelcome for two main reasons:

1. It encourages students to believe that “more is better”, producing a tendency towards flabby, turgid text with large amounts of raw, or nearly raw, data in large quantities, rather than processed or summary data, exemplar micrographs, etc. I would argue that one of the things students should learn as part of the part 2 year is how to present their work on paper in a concise, well-ordered way.
2. It increases the burden on the examiners, especially the external examiner, who reads all theses so as to give a balanced synoptic view.

**I suggest that a shorter word limit and a page limit be imposed.** My suggestion would be a limit of 10 000 words and no more than 80 pages double-spaced for the main body of the thesis, i.e. excluding abstract, acknowledgements, the “project overview”, contents pages, references and (non-examinable) appendices. Some limits would also have to be placed on font and margin sizes. It has also been suggested that there is little merit in double-spacing, since examiners do not currently annotate between the lines of the thesis. However, some wider-than-normal line spacing does assist with legibility. An alternative limit might therefore be 60 pages at 1½ line spacing.

S.G. Roberts  
Chair of Examiners, Materials Part 2  
October 2007.

**REPORT ON FINAL HONOURS SCHOOL OF MATERIALS, ECONOMICS AND  
MANAGEMENT, PART 1 EXAMINATION**

**Part I**

**A. STATISTICS**

**(1) Numbers and percentages in each class/category**

**(a) Classified examinations**

Class	Number			Percentage (%)		
	2006/07	2005/06	2004/05	2005/06	2005/06	2004/05
I	n/a	n/a	n/a	n/a	n/a	n/a
II.I	n/a	n/a	n/a	n/a	n/a	n/a
II.II	n/a	n/a	n/a	n/a	n/a	n/a
III	n/a	n/a	n/a	n/a	n/a	n/a
Pass	n/a	n/a	n/a	n/a	n/a	n/a
Fail	n/a	n/a	n/a	n/a	n/a	n/a

**(b) Unclassified Examinations**

Category	Number			Percentage		
	2006/07	2005/06	2004/05	2005/06	2005/06	2004/05
Distinction	n/a	n/a	n/a	n/a	n/a	n/a
Pass						
Fail						

**(2) If vivas are used:**

The external examiner, Prof. Brian Derby, was offered the opportunity to viva Part I students. However, in consultation with the Board of Examiners it was agreed that no vivas would be required at Part I, PROVIDED the examiners produced a written procedure for how to deal with borderline cases (e.g. pass/fail). Such a procedure was included in the examination conventions. Oral presentations were used in assessment for the Team Design Projects and marks were awarded both for the written report and for the presentation.

**(3) Marking of scripts**

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

**B. NEW EXAMINING METHODS AND PROCEDURES**

(1) This year's Examination Conventions contained a written procedure for how any scaling would be carried out and included for the first time a provision for the automatic initial moderation of papers with extreme marks.

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

(1) The External Examiner discovered that there were many mistakes in adding up the marks from individual parts of questions on the mark sheets to reach a total for the question. Though this was easily rectified, this problem needs to be preempted in future by agreeing, for example, that each of the two examiners setting each paper would check the addition of the other.

(2) A serious problem arose on one paper owing to mistaken information, about what was examinable and what was not, being given to a candidate by a lecturer in the lead up to the examinations. During enquiries it became clear that there was confusion amongst the students on this point even before this incident. If the practice of informing students of subject matter to be

excluded is to continue (and thought should be given to that), clearer procedures will be required for how this information is communicated to the students.

#### **D. Examination Conventions**

The previous year's Examination Conventions are found in the course handbook that is distributed to all candidates in hard-copy and is also available on the Departmental website, to which candidates' attention is drawn by email. The current year's (2007 in this case) Conventions are put on the Departmental website, and sent hardcopy to all the Candidates. [Attached]. The Examination Conventions are assessed by the Board of Examiners and the Department's Academic Committee. The Department aims to send the conventions to the students early in Hilary Term.

### **Part II**

#### **A. GENERAL COMMENTS ON THE EXAMINATION**

There were 4 (MEM) candidates [REDACTED]. The examination consisted of 7 written papers plus course work that for most candidates included a Team Design Project (TDP), Industrial Visit Reports and Practical Work carried out during the 2<sup>nd</sup> and 3<sup>rd</sup> Years. One written paper (Introductory Economics) is taken in the second year.

The normal procedure for the written papers was followed again this year, namely 5 out of 8 questions were answered for the four General Papers. Each written paper lasted 3 hours. All scripts were double marked blind. Each TDP project was marked by two assessors plus the Chairman of Examiners. The possibility of moderation to allow for any differences in standards between markers was discussed by the all the assessors and the Chairman, but was deemed to be unnecessary. Teams were marked as groups, but allocation of bonus, or penalty marks to individuals was permitted. Reports for each of the Industrial Visits were assessed as pass/fail by the Industrial Visits Organiser. The Economics and Management examiners followed their normal procedures.

A serious problem arose on paper GP4 owing to incorrect information, about what was examinable and what was not, being given to a candidate by the lecturer of one of the courses examined on the paper in the lead up to the examinations. During enquiries it became clear that there was confusion amongst the students on this point even before this incident. In order to compensate for the resulting disadvantage to some candidates, an adjusted mark was calculated for each candidate comprising the sum of the 4 best question marks from the paper multiplied by 5/4. This followed similar precedent in the Department of Materials (in the Part I examination sat in 2003/04) and was agreed with the Junior Proctor.

The overall mean mark for Part I was near the middle of the 2(i) range for both Materials Science and MEM candidates and the means for the individual elements of examination also lay mostly in the 2(i) band. The exceptions were the total coursework mark, which corresponded to a low 1<sup>st</sup>, and the mark for paper GP3, which was in the 2(ii) band. The examiners regarded the overall mark distribution as an accurate reflection of the ability of the cohort of candidates and therefore no scaling was applied. This represents a further step forward from the year-by-year gradual decrease in the level of scaling necessary in recent years, in which the marks on the written papers in particular have often been scaled to compensate for the fact that the marks have tended to be lower than the Examiners judged appropriate for the overall standards demonstrated by the candidates.

**C. EQUAL OPPORTUNITIES ISSUES AND BREAKDOWN OF THE RESULTS BY GENDER**

There was one female candidate for whom there was no significant difference in performance compared to the males. For both sexes performance in coursework was very good. Overall gender results were also examined in the MS report.

mark (%)	Overall mark		Written examinations		Course work	
	Male	Female	Male	Female	Male	Female
40–50	■	■	■	■	■	■
50–60	■	■	■	■	■	■
60–70	■	■	■	■	■	■
70–80	■	■	■	■	■	■
80–90	■	■	■	■	■	■
Totals	3	1	3	1	3	1

**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**

This section is confidential

**F. NAMES OF MEMBERS OF THE BOARD OF EXAMINERS**

- Dr R I Todd (Chair)
- Prof S G Roberts
- Dr J T Czernuszka
- Dr J M Smith
- Dr M R Castell
- Dr P S Grant
- Prof B Derby (external)

**COMMENTS ON PAPERS AND INDIVIDUAL QUESTIONS  
MS / MEM Part 1 2007**

**General Paper 1 – Structure and Transformations**

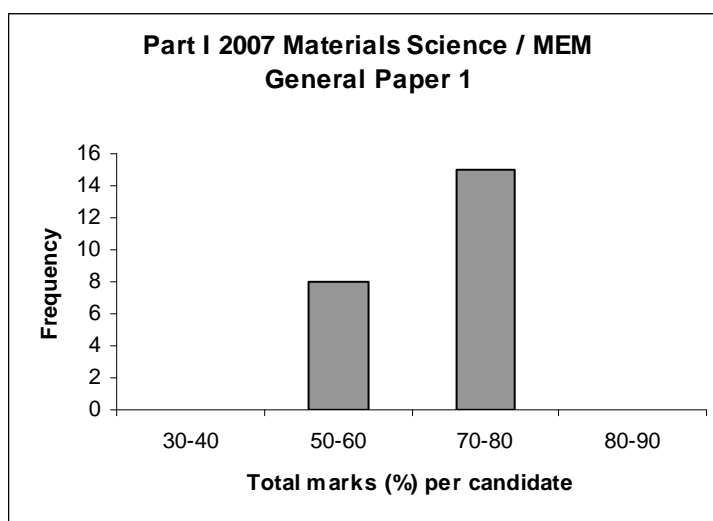
**Examiner: Prof. Patrick Grant**  
**Candidates: 23 (19 MS / 4 MEM)**  
**Mean mark: 63.6 %**  
**Maximum mark: 79.0 %**  
**Minimum mark: 41.0 %**

Detailed comments on the paper are as follows:

Qu. 1	No of Answers	Average Mark	Max. Mark	Min. mark	Description
1	13	10.8	18	8	A straightforward question on Fick's second law involving several basic derivations, relating of equation variables to one another, and a sketch of the concentration variation with time. A moderately popular question with almost all attempts gaining full marks in the early part that was standard bookwork. Most candidates struggled with plotting and fitting of the supplied data.
2	10	14.2	17	10	Phase transformations and kinetics involving a consideration of undercooling, curvature and diffusion on microstructural features in eutectic systems. The joint least popular question owing to a slightly unusual presentation in the first part that may have appeared obscure to less strong candidates. Nonetheless, a relatively high average mark.
3	18	13.9	19	9	A very straightforward and popular question regarding crystallinity in polymers, and the factors that govern the degree of crystallinity. A wide spread of marks with no particular part of the question proving particularly easy or difficult.
4	10	14.5	17	11	Ternary phase diagrams. Relatively long introduction with data that must be used to construct a ternary phase diagram. Joint least favourite paper but gained the highest average mark since, despite appearing difficult, it was very straightforward for reasonably well prepared candidates.
5	12	12.1	16	8	Corrosion related question requiring basic knowledge of polarisation curves in the first part, and specific behaviour under certain conditions in the second. A solid performance overall and reasonably popular. Candidates found it difficult to gain the highest marks that required slightly more in-depth

					knowledge.
<b>6</b>	16	13.1	18	10	Corrosion behaviour in practice. A popular descriptive question with most candidates doing well. Slightly weaker performance in the second part that required application of basic principles to engineering practice.
<b>7</b>	22	12.0	18	8	Powder processing relating to advantages and processes occurring during sintering. The most popular question with many long and excellent descriptive answers, but also relatively large fraction of weak answers, suggesting it was the "least worst" final question selection for some candidates.
<b>8</b>	14	11.9	18	7	Surface and interfaces requiring interpretation of real microstructures. A reasonably popular question with some strong answers but several very poor attempts. In particular, candidates struggled with explaining grain boundary precipitation and growth.

Overall candidate performance in this paper was in line with aims of the examiners with a good spread of questions answered and a range of marks that were felt to represent fairly the range of abilities of the candidates in this subject area. There were no particular areas of concern.



## General Paper 2 – Electronic Properties of Materials

Examiner: Dr Jason Smith

Candidates: 23 (19 MS / 4 MEM)

Mean mark: 65.3 %

Maximum mark: 89.0 %

Minimum mark: 48.0 %

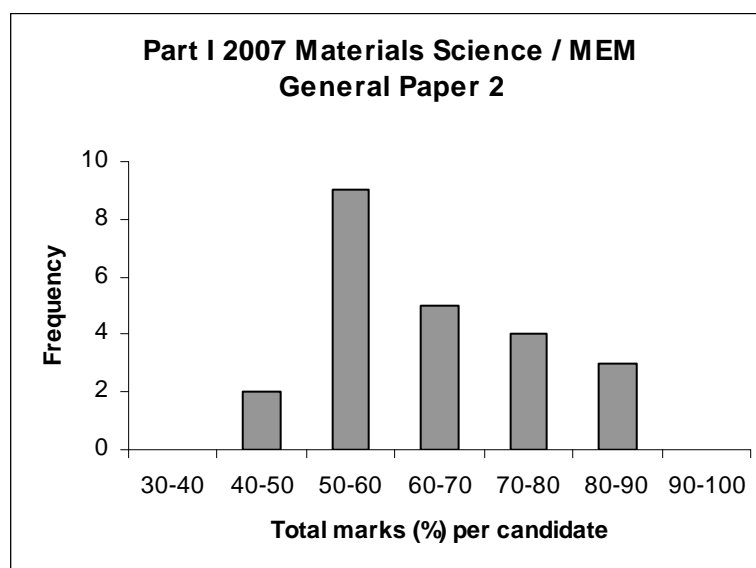
### Overall Comments:

Candidates showed neither strong preference nor aversion for particular questions; the distribution of attempts was fairly flat. In general candidates performed better in the bookwork parts of the questions than in the numerical/analytic parts indicating an emphasis on shallower learning rather than deep understanding. This was reflected particularly in questions where candidates were asked to transfer their knowledge to less familiar problems, such as those in qus 5(c) and 7(b), which were answered poorly by most who attempted them. The distribution of marks was monomodal with a mean very close to 13/20 per question, and a median of 65% for the paper as a whole.

Qu.	Topic	No of Answers	Average Mark	Max. Mark	Min. mark	Description
1	Tensor properties	18.0	12.0	18.0	6.0	Parts a and b were generally quite well answered. C posed more problems, with fewer candidates giving good answers. The least popular question, but well answered by those who attempted it providing the highest 'min. mark'.
2	Quantum theory of electronic orbitals in atoms	8.0	14.8	19.0	11.0	Good answers by most, and a popular question. A standard question and the most popular, which provided a good balance of answers.
3	Schroedinger equn in one dimension	19.0	15.4	20.0	8.0	
4	Free electron theory	20.0	13.4	20.0	9.0	



5	Band theory and energy dispersions	12.0	9.9	15.0	4.0	<p>Part c was a little unfamiliar and only a couple of candidates gave substantial answers. A standard question that elicited a good range of answers. Part a answered well. Part b was perhaps too 'wordy' as few candidates made much progress in setting up the problem. A standard question with a good range of responses</p>
6	Dielectric polarization	12.0	13.9	20.0	8.0	
7	Carriers in semiconductors	14.0	11.1	18.0	6.0	
8	Ferromagnetism	12.0	13.9	19.0	9.0	



## General Paper 3 – Mechanical Properties

**Examiner: Dr Richard Todd**

**Candidates: 23 (19 MS, 4 MEM)**

**Mean mark: 56.3 %**

**Maximum mark: 82.0 %**

**Minimum mark: 33.0 %**

### General Comments

The paper was of the same format used in previous years, viz. 3 hours duration, 5 questions out of 8 to be answered. The paper was set with the aim of giving sufficient opportunity for the weaker candidates to obtain a score corresponding to the CVCP band reflecting their ability, whilst at the same time allowing stronger candidates to demonstrate their ability. We especially tried to set questions that were original, in that they were not minor variations on formats used repeatedly in the past, but which tested the basic knowledge and ability of the candidates on mainstream topics in the mechanical properties of materials. We aimed to produce a mean in the mid 2(i) range.

The mean mark for the paper of 56.3%, a mid 2(ii) score, shows that we did not achieve our aim in this respect. The relatively small variations in the number of answers and mean marks for the individual questions (see below) show that this was attributable to the paper as a whole rather than to problems with individual questions. The highest mark of 82%, with some other candidates scoring in the 70-80% range, demonstrates that this was a fair paper for those who had learned and understood the material examined. Both markers agreed that the low mean for the paper reflects the fact that many candidates had learned too much of the subject matter by rote, without understanding the underlying meaning and were therefore unable to apply their knowledge to the questions set. Informal feedback from candidates supported the fact that they found the questions difficult because they were not simple variations on those set previously. A further factor with this paper may be that it examines a wider range of subject matter than the other papers, as judged from the number of lectures given on the courses included. We recommend that these issues are considered by the Academic Committee of the Department of Materials.

The mean mark, being greater than 55%, did not qualify for automatic scaling under the Examination Conventions and after due consideration the examiners decided not to scale the marks on the grounds that it gave a fair reflection of the abilities of the candidates on the subject matter examined.

Qu.	Topic	No of Answers	Average Mark	Max. Mark	Min. mark	Description
1	elastic deformation (pressurised tube)	14.0	12.6	17.0	5.0	A well-graded question with a good mean mark.
2	microplasticity (dislocation mobility and line energy)	10.0	9.8	16.0	3.0	A test of understanding of fundamental concepts in dislocations that were covered in lectures and tutorials. A majority of the answers were approximate and lacking in understanding.
3	microplasticity (Hall-Petch, age hardening)	15.0	10.6	17.0	0.0	A test of basic knowledge but presented in an original way. Part (b) of the question followed on in concepts directly from part (a), yet many answers were completely contradictory, attributing the same

4	macroplasticity (necking and Considere)	10.0	11.9	19.0	5.0	observations to entirely different effects in part (a) and part (b). Straightforward question with many high marks for some candidates. Other answers suggested rote learning with little understanding.
5	mechanical properties of composites	12.0	9.2	19.0	3.0	Straightforward question similar to many the students had practised during the corresponding lecture course. Some very high marks, but in contrast to some of the other questions, the most common difficulty encountered was an inability to remember the definitions involved.
6	mechanical properties of polymers	14.0	12.3	17.0	3.0	Some good answers showing good understanding. Some difficulties with the concept of compliance.
7	fracture and fatigue (toughness)	18.0	12.4	19.0	6.0	Test of basic principles. Most popular question, high scoring. Standard parts well done by many. Non-standard parts less so.
8	fracture and fatigue/creep (ductile fracture and creep)	17.0	10.7	14.0	4.0	Test linking several basic concepts. Poor mark reflects difficulties with linking subject matter from different parts of the course.

## General Paper 4 – Engineering Applications of Materials

**Examiner: Dr Jan Czernuszka**

**Candidates: 23 (19 MS, 4 MEM)**

**Mean raw/scaled mark: 63.2 % / 68.2 %**

**Maximum raw/scaled mark: 80.0 % / 82.5 %**

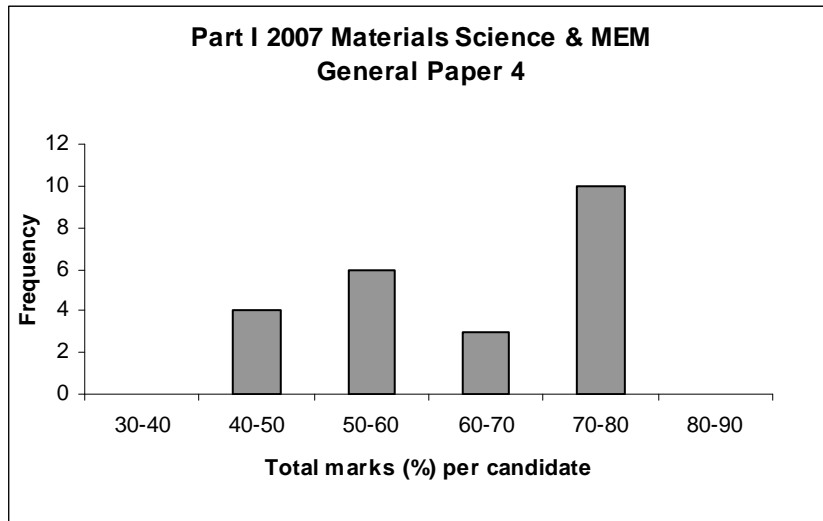
**Minimum raw/scaled mark: 41.0 % / 48.8 %**

### General Comments

See Chairman's report on reason for use of scaling.

This paper produced a mean mark within the range desired by EPSC and to which the Examiners worked. The questions were well set with a straightforward introductory component that the majority of candidates answered. Subsequent parts tested the candidates more thoroughly. The candidates appeared to respond well to such types of questions. The MS cohort performed slightly better (on average) than the MEM candidates.

Qu.	Topic	No of Answers	Average Mark	Max. Mark	Min. mark	Description
1		10.0	14.5	19.0	11.0	Question on electrical properties of polymers, candidates answered this question reasonably well, part 9c) proves the most difficult part
2		4.0	13.0	17.0	6.0	Not a popular question (on the electric arc furnace) but well answered by those candidates who chose to answer it.
3		17.0	13.2	18.0	10.0	Popular and well answered question on aluminium alloys in aerospace.
4		17.0	11.6	19.0	6.0	Popular question comparing different routes to produce a ceramic component.
5		7.0	11.4	18.0	4.0	Straightforward question on fundamental aspects of glasses, not popular.
6		18.0	13.4	19.0	2.0	Popular and well set question on p-n junctions leading to LEDs and solar cells.
7		21.0	11.5	16.0	6.0	The most popular question; aberrations in electromagnetic lenses
8		21.0	12.9	19.0	8.0	The most popular question; comparison of various microanalytical techniques for specific applications. Well answered.



**DMMA 4316 INTRODUCTION TO MANAGEMENT**

**STATISTICS FOR MEM INTRODUCTION TO MANAGEMENT PAPER 2007**

Marks	Number	Percentage
70+		
60-69		
50-59		
40-49		
Total	4	

**GENDER DIFFERENCES**

4 Candidates 3 Male 1 Female

Male	% Overall	% Within Grade	% of Males
Females	% Overall	% within Grade	% of Females

Male	% Overall	% Within Grade	% of Males
Females	% Overall	% Within Grade	% of Females

Please find below an analysis of the questions. No analysis is given where there were no MEM candidates or only one.

1. [Redacted]
2. [Redacted]
3. [Redacted]
4. [Redacted] This was generally answered very well. Candidates typically drew on a wide range of sources to argue that firms had a broader responsibility to their stakeholders and that there were risks in focusing only on profit, narrowly defined.
5. [Redacted]
6. [Redacted]
7. [Redacted] This exhibited a range of quality in the answers. More persuasive answers took seriously the part of the question that asked 'from the perspective of shareholders...' Weaker answers dived too quickly into a more general and well rehearsed discussion of the principal-agent problem.
8. [Redacted]
9. [Redacted]
10. [Redacted] This was answered very well. Candidates clearly understood the concepts of core competence and resource based view and in general provided satisfactory critiques and analysis of both. The weaker answers were more descriptive in character.
11. [Redacted]
12. [Redacted] Answers to this question seemed to be a little too ambitious in scope with many failing to focus sufficiently on the core principles, or to come up with and appropriate analytical structure. The result was that many answers tended towards description of either quality or Taylorism.

## **Report on Economics Papers for MEM Part 1 2007**

### **Microeconomics**

Four candidates took this paper. [REDACTED]. This paper is also taken by PPE, Economics and Management, and Modern History and Economics students. A detailed discussion of the answers to the questions for this paper is provided in the examiners report for PPE.

### **Introductory Economics**

This paper is taken by candidates in their second year and held for one year. We therefore report on the results from last year's candidates. Four candidates took this paper. [REDACTED]. This paper was taken by PPE, Economics and Management, and Modern History and Economics students last year. A detailed discussion of answers for this paper is provided in last year's examiners report for PPE.  
Howard Smith

### **[ Introductory Economics (Report from paper sat in academic year 2006/07)**

Nine candidates took this paper. Four of these were second-year students and five were third year students. The results of the second year students will be released next year. [REDACTED]. This paper is also taken by PPE, Economics and Management, and Modern History and Economics students. A detailed discussion of the answers to the questions for this paper is provided in the examiners report for PPE.]

# Honour School of Materials, Economics & Management

## Examiners' Report: Part II, 2007

### 1. Entry Statistics

There were six candidates in the examination, four male and two female.

### 2. Examination Procedures

Candidates took Materials Options Paper 1, and a choice of economics or management papers: this year three candidates chose the E3 economics paper and three the M2 management paper. They also submitted a report on a project carried out during an industrial attachment (this was weighted as equivalent to two papers). The final degree classification was then based on the sum of 820 marks from part 1 and 400 marks from part 2. (deleted text in which individual candidate could be identified ).

The borderlines between classes were in accordance with CVCP guidelines, i.e. 70% or above for first class honours, 60-69.9% for upper second class, 50-59.9% for lower second class, and 40-49.9% for third class.

### 3. Results

Four were awarded first class honours, one a 2:1 and one a 2:2. All the scores were solidly within the class boundaries; there were no borderline cases. One of the MEM candidates performed considerably better in Part II than Part I; for the others their Part II and Part I performances were roughly the same.

#### EQUAL OPPORTUNITIES ISSUES AND BREAKDOWN OF THE RESULTS BY GENDER

Insofar as can be judged from a small sample size the 2 female candidates did not show any significant difference in performance compared to the males.

mark (%)	Overall mark		Part 2 Mark		Part I Mark	
	Male	Female	Male	Female	Male	Female
40-50	■	■	■	■	■	■
50-60	■	■	■	■	■	■
60-70	■	■	■	■	■	■
70-80	■	■	■	■	■	■
80-90	■	■	■	■	■	■
Totals	4	2	4	2	4	2

### 4. Comments and Recommendations

The examination and assessment procedures worked well; I have no recommendations for changes.

S.G. Roberts  
Chair of Part II Examiners  
2007



## COMMENTS ON PAPERS AND INDIVIDUAL QUESTIONS

### Materials Option Paper

**Examiners: Dr Martin Castell**

**Candidates: 6**

**Mean mark: 74.2 %**

**Maximum mark: 83 %**

**Minimum mark: 56 %**

		N	mean	max	min	
1	Melt Processing	5	23.8	27.0	17.0	Popular descriptive question on alloy castability. Generally well answered with only one poor candidate.
2	Structural Biomaterials	3	23.7	27.0	20.0	Popular descriptive question on polymerisation, structural hierarchy, and microstructure of bone. Generally well answered.
3	Fracture and fatigue	1	28.0	28.0	28.0	Question combining descriptive and mathematical elements. One attempt that was excellent.
4	Advanced engineering alloys	3	25.0	27.0	22.0	Popular descriptive question on use of light alloys for automotive applications. On the whole the answers were good.
5	Origins and stability of microstructures	0	n/a	n/a	n/a	No attempts were made at this question on eutectic reactions and undercooling. Candidates were possibly put off by having to derive and manipulate equations.
6	Electroceramics and superconductivity	2	22.0	26.0	18.0	Descriptive question on ferro and pyroelectric ceramics. One good and one poor answer.
7	Fabrication and applications of nanomaterials	2	27.0	28.0	26.0	Question on properties and applications of quantum dots and nanotubes. Two candidates attempted an answer, both excellent.
8	Advanced characterisation of materials	2	24.0	27.0	21.0	Question with mainly descriptive elements on 3DAP, time of flight mass spectrometry, and TEM techniques. The quality of answers was generally good.

## Report on Economics Papers for MEM Part 2 2007

### Statistical Methods in Economics

No candidates from MEM took this paper.

### Economic Decisions within the Firm

Three MEM candidates took this paper. [REDACTED]. This paper is also taken by EEM and Economics and Management candidates. A separate report has been sent.

### Econometrics

No candidates from MEM took this paper.

Howard Smith

### Report on Economic Decisions within the Firm

29 candidates sat the paper this year, of whom 21 were EEM students, 3 MEM and 5 EM. The overall standard was good.

#### Comments on Individual Questions

1. (Duality) (17 attempts) A straightforward question which attracted good answers.
2. (Simplex) (27 attempts) A standard question which was answered well.
3. (Transportation) (25 attempts) Some weak answers but on the whole answered well.
4. (Assignment/Zero Sum Games) (13 attempts) Some good answers but a number of weak ones.
5. (Decision Trees) (26 attempts) Answers were in general good. The question was not hard but to solve it completely required candidates to think through a number of cases, which not all managed.
6. (Queues) (14 attempts) A standard question but one requiring a fair amount of algebra. Some very good answers.
7. (Dynamic Programming) (14 attempts) A straightforward question answered well.
8. (Inventories) (3 attempts) Few answers.

As can be seen, the mean mark for this paper is not significantly different from E&M papers overall, but the marks are much more dispersed. However, when compared with papers of a similar mathematical nature (Statistics and Econometrics) this dispersion is not so significant.

	No. of cands	Mean mark	%1 <sup>st</sup>	% 2i	% 2ii	% 3 <sup>rd</sup>	% Pass
MEM	3	[REDACTED]					
All Cands	29	64.3	37.9	31.0	20.7	3.4	6.9

### No Report on Paper M2 (Finance)

**Examination Conventions 2007/08**  
**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 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. 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. The moderators have the authority to set a practical examination or a written examination on crystallography.

(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 of the written papers may be compensated by better performance in other written papers provided the candidate obtains at least 35% on the failed paper. Only marks in excess of 160 in total may be used for compensation and the rate required is normally 2 compensation marks for each deficit mark. For example, if a mark of 36% is obtained in one paper then the total for the four written papers must be at least 168

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\* for 2007-08 the Nominating Committee comprises Dr Sykes (Chair), Professor Grovenor and Dr Taylor.

( $4 \times 40 + 2 \times 4$ ) for the failure to be compensated. Failure of three papers precludes compensation.

Candidates who fail 1 or 2 written papers will be asked to resit only those papers. Candidates who 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.

If a candidate fails the coursework paper then the moderators may require the candidate to present such evidence as they require that the candidate has successfully completed, before the resit examination in September, coursework prescribed by the moderators.

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

# Examination Conventions 2007/08

## 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, and Part II in the case of MEM, examiners are expected to consult with course lecturers in the process of setting questions. The paragraphs below give an indication of 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 EPSC 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.

#### **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 2006, 2005 & 2004, respectively on pages 45, 44 & 44) (for the 2003 Regulations the relevant entry is under 'Late Entries', para 9 on page 1059).

Normally the relevant Examination Regulations for a particular candidate are those in force at the time the candidate embarked on his/her FHS. **However in the specific case of the abovementioned regulations on late submission of work the Proctors and the EPSC have stipulated that the 2006 regulation shall apply to all work submitted for examination from 1<sup>st</sup> October 2006 onwards including that by candidates who are otherwise governed by earlier issues of Examination Regulations.** [The 2006 Regulation *omits* the most severe automatic penalty for late submission specified in the earlier regulations.]

Under the provisions permitted by the 2006 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, page 45, no penalty.
- (b) With permission from the Proctors under clauses (3) + (4) of para 16.8, 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; the exact penalty to be set by the Examiners with due consideration to the advice given in the document 'Academic

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\* for 2007-08 the Nominating Committee comprises Dr Sykes (Chair), Professor Grovenor and Dr Taylor.

Penalties for Late Submission of a thesis or other exercise: Proctors Notes for Guidance', dated 1/11/06.

- (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%, 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 examiner for Part I 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. The examiners will NOT mark questions in excess of the prescribed number.

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 marked by two assessors; last year one assessor was from the Said Business School and one from the Begbroke Science Park. 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 organisers who are appointed as Assessors. They 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. 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*

The Examiners have the right to call students to a Part I viva after the Part I Examinations. Examination Regulations provide that a candidate who fails to appear for any part of a University Examination (including a *viva voce* examination), except in the case of acute illness or other urgent cause, will be deemed to have failed the entire Examination or, in the case of a public examination taken over more than one year, the entire Part of the Examination. Hence candidates must see that they are available until the end of 9<sup>th</sup> week Trinity Term, unless informed otherwise by the Chair of Examiners.

### 3. PART II

The Part II thesis is allocated 350 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 guidelines published in an appendix of the course handbook. These guidelines may change and candidates are notified of any such changes before the end of Hilary Term of their 4<sup>th</sup> year. In addition, the external examiner may read all Part II theses. 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 the report from the candidate's supervisor is tabled. The outcome of the discussion is an agreed mark for 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.

### 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	The candidate shows inadequate grasp of the basic material. The work is likely to



0 - 29 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, 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. 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 EPSC.

# Examination Conventions 2007/08

## 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 give an indication of 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 EPSC 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.

#### **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 2006, 2005 & 2004, respectively on pages 45, 44 & 44) (for the 2003 Regulations the relevant entry is under 'Late Entries', para 9 on page 1059).

Normally the relevant Examination Regulations for a particular candidate are those in force at the time the candidate embarked on his/her FHS. **However in the specific case of the abovementioned regulations on late submission of work the Proctors and the EPSC have stipulated that the 2006 regulation shall apply to all work submitted for examination from 1<sup>st</sup> October 2006 onwards including that by candidates who are otherwise governed by earlier issues of Examination Regulations.** [The 2006 Regulation *omits* the most severe automatic penalty for late submission specified in the earlier regulations.]

Under the provisions permitted by the 2006 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, page 45, no penalty.

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\* for 2007-08 the Nominating Committee comprises Dr Sykes (Chair), Professor Grovenor and Dr Taylor.

- (b) With permission from the Proctors under clauses (3) + (4) of para 16.8, 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; the exact penalty to be set by the Examiners with due consideration to the advice given in the document 'Academic Penalties for Late Submission of a thesis or other exercise: Proctors Notes for Guidance', dated 1/11/06.
- (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 2<sup>nd</sup> 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 (3<sup>rd</sup> 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 2<sup>nd</sup> 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 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.

#### (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.

### (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. The examiners will NOT mark questions in excess of the prescribed number.

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 MEM.

(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 vivas*

The Examiners have the right to call students to a Part I viva after the Part I Examinations. Examination Regulations provide that a candidate who fails to appear for any part of a University Examination (including a *viva voce* examination), except in the case of acute illness or other urgent cause, will be deemed to have failed the entire Examination or, in the case of a public examination taken over more than one year, the entire Part of the Examination. Hence candidates must see that they are available until the end of 9<sup>th</sup> week, unless informed otherwise by the Chair of Examiners.

(8) *Marking the 4<sup>th</sup> Year Management Project*

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

### 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	The candidate shows reasonable understanding of at least part of the basic

Honours 40 - 49	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. 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 EPSC.



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Dr. John Hood  
Vice Chancellor  
University of Oxford  
Wellington Square  
Oxford  
OX1 2JD

28 September 2007

Dear Dr. Hood

I enclose a copy of my report as External Examiner for the Final Honour Schools of: Natural Science (Materials Science) (Part 1); Materials Economics and Management (Part 1); Engineering and Materials (Part 1) for the academic year 2006-2007.  
Yours sincerely

Brian Derby

Professor Brian Derby  
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# **Final Honour Schools of: Natural Science (Materials Science) (Part 1); Materials Economics and Management (Part 1); Engineering and Materials (Part 1).**

## **Report of External Examiner for Academic Year 2006/07**

### **Summary**

As external examiner I am happy that the procedures and assessments used in the Final Honour Schools of: Natural Science (Materials Science) (Part 1); Materials Economics and Management (Part 1); Engineering and Materials (Part 1) have resulted in a fair outcome. I expect that, in combination with the results these students achieve in Part 2 of the appropriate honour school, this will lead to a final degree classification that reflects their attainment.

An unfortunate error of communication by one of the lecturers to the students had apparently led to a misunderstanding as to the examinable subject matter of one of the courses assessed in general paper IV. To make allowance for this the examiners devised an equitable method by which the 4 questions with the highest mark were selected from the 5 answered by the students. I considered this to be a satisfactory solution that did not disadvantage the candidates.

I have serious concerns this year about the procedures used by the examiners in ensuring that their individual marks and their agreed marks are both computed correctly and transferred correctly to the master spreadsheet used to compute each candidate's mark. This year I found an unacceptable level of error that might have seriously affected the outcome of the examination for some candidates. It is imperative that these procedures are reviewed and that appropriate mechanisms of checking and assurance are put in place to ensure that this problem does not recur in the future.

I note that the recommendations I made in my examiners reports of the previous two years, concerning the procedures for scaling and normalisation of marks appear to have been implemented. I was pleased to discover that this year the papers appeared to have been set such that these procedures were not required as much as in previous years.

Finally I wish to congratulate the Chairman and Examiners on their rapid response to my comments and concerns during the examination period. This ensured that the examination process moved on smoothly and a satisfactory outcome achieved.

### **Introduction**

I acted as external examiner for three Final Honour Schools in the University of Oxford: Natural Science (Materials Science) (MS); Materials, Economics and Management (MEM); and Engineering and Materials (EMS), all at Part 1 level. I read and commented on all the papers taken by the MS students. In the case of MEM and EMS students, who are on courses where Materials is only one component of the degree, I read and commented on the Materials papers, chiefly set by staff within the department of Materials. I am pleased to say that I had good and regular communication with Dr. Todd, the Chairman of Examiners in the Department of Materials. I was made aware of the timetable set out for the preparation of the examinations in Oxford in good time and I was kept informed of progress at all stages of the preparation and examination process.

I was provided with explanation of the conventions used in setting examination papers, the balance between questions that required a derivation or calculation in their answers and those requiring more of an essay style. The proposed examination papers were sent for my approval in good time and I was also supplied with model answers so that I could be aware of the appropriate

level of knowledge/appreciation of issues that was required from the students at Oxford. My comments on the questions were, for the most part, taken on board and where I felt there to be lack of clarity or other minor problems, appropriate action was taken by the examiners in Oxford. Where the examiners disagreed with my comments, they provided me with an acceptable justification for their course of action.

On arrival in Oxford prior to the examiners' meetings I was presented with the marked scripts, access to records of the assessed work presented for examination and copies of the examination papers seen by the candidates. The papers were double marked and an appropriate mechanism had been devised to present the reasoning of the examiners, where this was required in addition to a model answer to explain how the mark was awarded. However, this year there was considerable inconsistency and error in the procedures used to transcribe the final mark from a number of the papers set to the spreadsheet used to determine overall performance. The number of errors I identified was unacceptably high. I will comment on this in more detail later.

## Academic Performance

The performance of the students in the examination as a cohort was good. There were a number of clearly excellent students and very few whose performance offered real concern. The performance of the MS students was a little better as a class than that of the MEM students, but as there were only 4 students taking the MEM course this observation is not significant statistically. There was a single student taking the EMS course, which is about to be terminated by the University. The cohort of students as a whole appears to have performed very well in comparison with students at other Universities that offer Materials based courses.

I carefully read through a number of scripts and considered the final agreed marks of the examiners and the examiners' comments where appropriate. The part 1 examination is not classified but through marking conventions, I was aware where the class divisions are notionally made. Hence I selected a number of candidates whose performance covered the spectrum of ability as assessed by the examination. From reading the scripts of the candidates I generally concurred with the notional final classification of the candidates.

## Structure of the Examination and Assessment

*Honour School of Natural Science (Materials Science) and Honour School of Materials, Economics and Management*

The structure of the examination of MS (Part 1) consists of four general papers and two option papers. The general papers examine the aspects of the course that are considered to be core knowledge for graduates in Materials Science based disciplines. Students are allowed to specialise in aspects of Materials Science through taking a number of optional courses and these are examined in the option papers. Candidates for MEM (Part 1) take the same four general papers set for the MS students but in addition take one paper each on economics and management. The two courses are well balanced in the coverage of core material and produce candidates with the appropriate level of knowledge and understanding that will lead to a qualification at M.Eng. level.

Unlike previous years, the mean mark in three of the general papers (GP 1, 2 and 3) and the 2 option papers were close to the target set by the sub-faculty guidance notes and no significant rescaling was required. This is a significant improvement on previous years and I hope that the examiners will continue to set questions at an appropriate level and mark accordingly in future.

General paper 4 had a different outcome. In the week before I arrived to study the examination scripts, I was informed by the Chairman (Dr. R.I. Todd) that one of the teaching staff in the Department of Materials had erroneously informed some of the students that some

aspects of the course delivered would not be examinable. Unfortunately, GP 4 contained a question that covered the allegedly unexaminable topics. This was a very unfortunate position and I advise that in future students are never informed verbally whether topics are examinable or unexaminable, especially considering the structure of examinations at Oxford where the staff member delivering the course may not have set the assessment. Thus when the examination was taken by the candidates, one question may not have been revised. The following solution to this dilemma was proposed by Dr. Todd. Normally the candidates present answers to 5 questions, in this case the best 4 marks would be considered and the marks rescaled as if 5 questions had been returned. This solution seemed equitable although it almost certainly favoured the weaker students.

The content of the courses on economics and management taken by the candidates for MEM are outside my area of competence and are, I believe, considered by other external examiners. However, the procedures followed in the considering and inclusion of these marks is satisfactory.

#### *Honour School of Engineering and Materials*

The examiners in this honour school are different from those in MS and MEM. There are a number of external examiners common with the Honour School of Engineering Science and my responsibility is to consider the examination process of the Materials Papers ME1, ME2 and ME3.

Papers ME1, ME2 and ME3 contain a few questions in common with the General Papers in MS but are mostly examining students at a lower level of knowledge/understanding consistent with this being a joint honours degree. The sole student was [REDACTED]. I am satisfied with the examination procedures for this student.

#### **Comment on Standards**

I have carefully read the Examination regulations of the University of Oxford for MS, MEM and EMS. I have also read a sample number of examination scripts and carefully studied the records used in assessing the students' performance in examination and other assessed work. From this I am happy that in all three honour schools the standards are appropriate for the assessment of degree courses to Honours and Engineering Masters level.

#### **Design Structure and Marking of Assessments**

The University of Oxford follows relies almost exclusively on the performance of students in traditional examination as the chief method of assessing students at Part 1 level. The examination questions were provided for my inspection in advance and I made a number of minor comments, all of which were addressed to my satisfaction or else the approach used retained with satisfactory argument as to why this was done. I have no concerns with the assessment of the materials papers within the Honour School of Engineering and Materials.

#### **Procedures for Assessment and Examination**

I have some serious concerns this year regarding the procedures used for the marking of examination scripts by the examiners, the accurate recording of agreed marks between the two markers, and the transfer of these marks accurately to the master spreadsheet used to determine student performance. I fortunately was provided with a full record of the marking of these papers so I was able to identify these errors and communicate through the Chairman of Examiners to the appropriate individual examiners so that they could correct the errors and ensure that each student had the true numerical value of their performance recorded. The quality of marking/mark record keeping was different for each paper as outlined below.

GP1:

[REDACTED]

GP2: This paper had an insignificant error level.

GP3: This paper was marked to a different degree of precision than the other general papers with extensive use of  $\frac{1}{2}$  marks. Although there is nothing wrong with this in principle, it was at odds with the marking methods used in the other papers and could lead to rounding errors [REDACTED]. The average mark returned on this paper was low but not so low as to require scaling. I would remind the examiners that I gave an opinion that many of the questions set on this paper seemed rather long and difficult. However, I was assured that they were well within the capabilities of the candidates. The low average mark returned appears to confirm my comments.

GP4: This had an unfortunate history. In the week before I arrived to study the examination scripts, I was informed by the Chairman (Dr. R.I. Todd) that one of the teaching staff in the Department of Materials had erroneously informed some of the students that some aspects of the course delivered would not be examinable. Unfortunately, GP 4 contained a question that covered the allegedly unexaminable topics. This was a very unfortunate position and I advise that in future students are never informed verbally whether topics are examinable or unexaminable, especially considering the structure of examinations at Oxford where the staff member delivering the course may not have set the assessment. Thus when the examination was taken by the candidates, one question may not have been revised. The following solution to this dilemma was proposed by Dr. Todd. Normally the candidates present answers to 5 questions, in this case the best 4 marks would be considered and the marks rescaled as if 5 questions had been returned.

This solution seemed equitable although it almost certainly favoured the weaker students and had the effect of boosting the average mark by + 5% with a few candidates achieving even greater increases.

OP1: This paper was also marked to a precision of  $\frac{1}{2}$ .

OP2:

[REDACTED]

On occasions the error in an individual question was as much as 3 out of 20. Clearly the level of marking/transcription error identified was unacceptable. I am very concerned and I trust that every effort will be made to identify procedures to ensure this will not occur again.

## Recommendations

- It is clear that there has been much improvement in setting questions at an appropriate level for the candidates. The reasons for the success achieved this year should be identified and best practice followed in future.
- The precision to which marks are recorded should be agreed and the use of  $\frac{1}{2}$  marks either used throughout or not at all. Individual markers can of course continue to apportion marks any way they choose within a question but the recorded mark after agreement should be to uniform precision.
- A procedure should be devised and a formal checking system agreed to prevent the errors of transcription and mark addition discovered this year. As an example, the method in the

University of Manchester is to assign an official “Double-Checker”, who has not marked the script, to check addition and other mechanical procedures and formally sign his/her agreement to the mark (or agreed mark) for each script. This may seem tedious but the outcome of this year’s examination has clearly identified shortcomings in the current procedures.

Brian Derby  
Professor of Materials Science  
School of Materials  
University of Manchester

From Professor A Lindsay Greer  
Head of Department

5 June 2008

Vice-Chancellor,  
University of Oxford.

Dear Vice-Chancellor,

**Report of the External Examiner for Part II Materials Science, Engineering & Materials Science, and Materials Economics & Management Degrees, 2007**

Please accept my apologies for the delay in submitting this report; with the exception of the matter that my fellow External Examiner, Professor Brian Derby of the University of Manchester, who scrutinised the Part I examinations in 2007, will have raised in his report, my observations during the Examinations process were entirely positive. The internal examiners are aware of this from my verbal comments at the time of the examinations so I do hope that my delay in submitting this report has not interfered too greatly in your internal quality control processes. Indeed my lack of resolve in submitting reports reflects my conviction that all is fundamentally well with the examining procedures I have seen, with no significant concerns that I wish to highlight.

Before turning to matters of detail I have one further general comment to make. The standard of the examinations set by the Department of Materials at Oxford is, in my opinion, very high and can be taken as an exemplar for departments in the subject across the UK, where I fear that in some places a less rosy picture would emerge. The features that I commend are: the papers are certainly testing, involving a mixture of quantitative and non-quantitative exercises; the academic level is well into what would be a Masters level course in the US; the topics cover a good range of the subject and furthermore include some of the latest developments in the subject.

The matter mentioned in the opening paragraph is the discovery of errors in the adding up of marks by some of the individual internal examiners on some of the written papers. Fortunately Professor Derby, who was the lead external on these papers, spotted this early on in the scrutiny process and the overall marks were corrected prior to the Final Decisions Meeting. I myself also found some errors which were swiftly corrected. These errors did not affect the Part II Examinations for which I had oversight, but I wish to note that it is essential that the Department of Materials puts in place a system to prevent a recurrence of this serious flaw in their 2008 processes.

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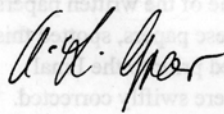
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I had good communication with the Chairman of Examiners in the Department of Materials and his administrative support. The role of External Examiner in Part II is different for each degree programme. In the Honour School of Natural Science (Materials Science) one of my main roles was to monitor the assessment of the Part II examination, which is achieved through a thesis written on a substantial research project. In the Honour Schools of Materials, Economics and Management (MEM) and of Engineering and Materials the Part II students are assessed on both written examinations and research/management projects. Many of the materials-science-based examinations taken at Part II level in these two Honour Schools are also taken by students sitting the Part I examination in Materials Science; I am satisfied that the materials elements of these examinations were appropriately assessed. In the case of the Materials Science and MEM degrees I also took an overview of the final classifications awarded. I am satisfied that the standards were appropriate for the M.Eng. degree and that the degree classifications awarded correctly reflected the performance of the students concerned.

One of my principal duties as the Part II External Examiner was to scrutinise the assessment of the Part II theses submitted by the Materials Science candidates and to participate in the associated *viva voce* examination held for each of these candidates. As part of this process I read all twelve theses. The standard of the cohort as a whole was very high and I was impressed by the care taken to arrive at an appropriate final project mark for each student, involving as it does an assessment of each thesis by two independent examiners, who also take into account the supervisor's comments and the student's own reflective account of the management of the substantial eight-month full-time project (included in the thesis), together with the viva at which all examiners are present and my own marks and comments on the dissertations and viva'.

Reading the Part II theses in the short space of time available between the submission deadline and the vivas is a demanding exercise and will become more so with the growth in numbers, to nearer 25-30 theses, expected in the next three years. Furthermore it is increasingly difficult for one person to have the necessary breadth of specialist knowledge to examine all possible topics offered as Part II theses. I am therefore pleased to note that the Department has acted on the suggestion made last year by Professor Derby & me, that from 2007/08 onwards the two External Examiners should be jointly responsible for oversight of both Part I and Part II.

Yours sincerely,



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

**RESPONSE TO EXAMINERS' REPORTS 2007**

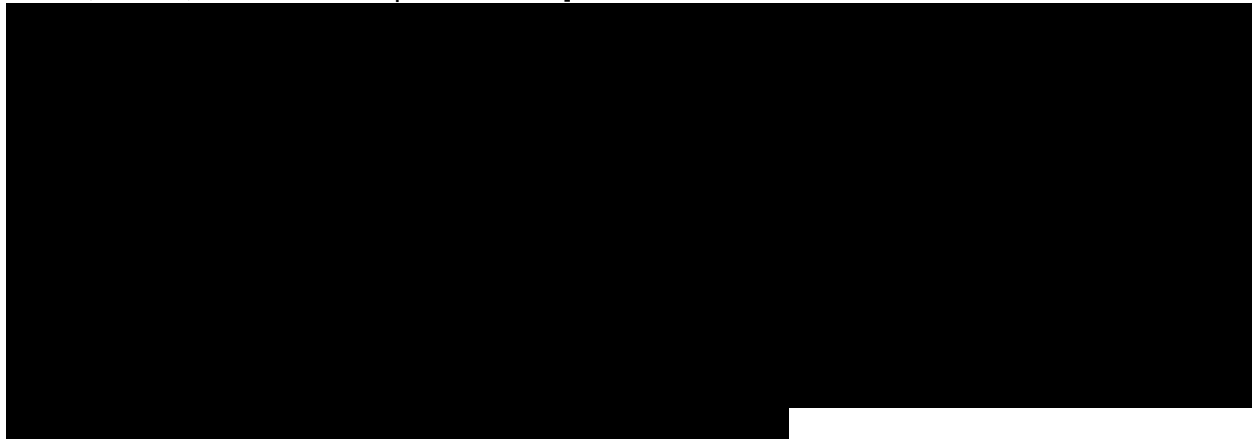
**Honour School of Materials Science (MS) Part I**

**Honour School of Natural Science: Materials Science (MS) Part 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**

**Honour School of Engineering & Materials - Materials elements only, main response will be made by the EMS Standing Committee**

Internal reports on all of the individual Materials papers were considered by the Department of Materials Academic Committee (DMAC). Reports were received from External Examiners for the Materials papers comprising Part I MS & MEM, for the Management papers taken by MEM and for some of the Economics papers taken by MEM (Ec1 and E3 only). The External Examiner's report for Part II MS is awaited from Professor Greer, as are the internal examiners reports for the Economics papers and Management papers: these reports will be considered by DMAC in due course, but will not now influence procedures for the 2007/08 examinations. Based on discussions at the time of the Examination Boards these missing reports are not expected to raise any major issues. [Note added, 6/12/07, all internal examiners' reports from Economics have now been received, as have reports from the SBS on all but paper M2 (Finance). Note added, 5/6/08, Prof Greer's report received].



**1. Summary of major points**

- (i) With the exception of two major flaws in our processes this year, as described in (ii) & (iii) below, overall the Examiners' reports are positive. In particular, comments from the External Examiners on the standard of our students are complimentary. It was encouraging that the trend seen in recent years of gradually decreasing need for scaling reached the ideal point this year, with no adjustment required in respect of either (i) papers/questions that might have been judged retrospectively to be too easy/difficult or (ii) marking schemes that might have been judged retrospectively to be too tough/generous. The Chairman of Examiners for 2007/08 is aware of the need

for continued vigilance on this matter of devising appropriate questions and marking schemes and the external and internal examiners will be briefed accordingly.

- (ii) Thanks to the vigilance of the Part I External a series of mistakes in the arithmetic of the internal examiners was corrected prior to the final classification meeting. The Faculty of Materials recognises that these errors are indefensible and has introduced a formal procedure designed to prevent a recurrence – this procedure is described below in our response to the Part I External Examiner.
- (iii) An experienced course lecturer, who was also an experienced examiner, gave misleading advice to the students regarding certain lecture material: the material was said to be non-examinable, but in fact a question on paper GP4 was set on this topic. An appropriate adjustment was made to the marks for GP4 and our procedures have been modified in order to prevent a recurrence – the modified procedure is described below in our response to the Part I External Examiner.
- (iv) Having reported in recent years that underperformance on Paper GP3 was a thing of the past it was disappointing that the average for this paper had reverted to being significantly lower than those for the other papers. However the internal & external examiners concluded that the paper was set and marked at an appropriate level and that scaling was not required.

## **2. Points for inclusion in Responses to the External Examiners**

### **Part I MS/MEM: Professor B. Derby**

We note with thanks Professor Derby's comment that the cohort of students as a whole performed very well in comparison with students at other universities that offer Materials based courses.

We are especially grateful for Prof Derby's vigilance when scrutinising mark sheets, which enabled us to correct serious errors in the marks for three of the six written papers before the final meeting of the Examiners. We understand that these errors were not however a result of transcription errors during the compilation of spreadsheets for the Examiners meetings, but entirely due to errors of arithmetic by individual examiners when adding up marks. We agree that 'this is an unacceptable level of error' and indeed would go further: no error of this kind is acceptable. In consultation with the incoming and outgoing Chairmen of Examiners we have introduced a new procedure in which, prior to agreeing jointly on a final mark for each question, the two examiners who blind mark each question on a script are each required to crosscheck (i) that the other has recorded marks for all parts of the question and (ii) that the other's arithmetic is correct. The marksheet will include a statement to the effect that by signing the sheet the examiners are confirming to the Chairman of Examiners that they have carried out this crosschecking. We will continue our current practice of requiring the second marker to check during his own marking process that the first marker has initialled each page of a script as confirmation that said first marker has examined the content of that page.

In order to prevent misunderstandings between students, lecturers and examiners on what material is examinable the following policy will be adopted with effect from 2007/08:

The letter from the Chairman of Examiners to the candidates will state that, "The examinable material is defined broadly by the course synopses and includes all material covered in lectures and all material covered in course handouts of any type (including problems sheets issued by the lecturers). The only exceptions to this rule

are (i) if a course handout states in writing at the top of each relevant page that 'the material below is for background information only and is non-examinable' or (ii) exceptionally, if the appropriate Chairman of Examiners sends an e-mail to all students taking the course indicating that a specific part of the course is non-examinable."

The letter from the Chairman of Examiners to the course lecturers will include a copy of the above statement and will go on to state, "(i) the lecturer is required to ensure by the deadline for submission of suggested exam questions that the master copies of lectures notes and handouts held by the Deputy Administrator (Academic)'s office include the latest copy of any course handout which includes a statement indicating that it is non-examinable, (ii) other than confirming the statement in the Chairman's letter to candidates, lecturers **must not** discuss with candidates what material is or is not examinable, and (iii) if there is a need to inform the students that material is not examinable and has not been identified as such on handouts then the lecturer should liaise with the Chairman of Examiners for the year in which the examination will be held for that cohort of students and if approval is given **the Chairman** will inform the students by e-mail.

In future the Examiners will decide in advance of preparing model answers and marking schemes whether or not to use ½ marks when marking a particular paper and will apply this decision consistently to all questions on that paper.

**MEM, Management Papers: Dr M.I. Barrett**

We thank Dr Barrett for his helpful and positive comments.

**MEM, Economics Papers: Prof G. Lanot**

We thank Prof Lanot for his comments and anticipate that the Economics Faculty will provide a more detailed response via the E(M)EM Standing Committee.

### 3. Further Points

- (a) We have no major comments to make on trends in FHS statistics, noting that the proportions of first class and upper second class degrees awarded do not differ greatly from the MPLSD averages. The improvement compared to earlier years has been sustained. We concur with the explicit opinion of the Panel that conducted the recent EPSC review of the Department, namely that the tail of 2ii's and the occasional 3<sup>rd</sup> are a consequence of our resistance to grade inflation and not a negative reflection on the added value of our programme (*in its comments on the report of the review panel the MPLS Academic Committee appears to have misread this section of the Panel's report*). Noting the importance of considering averages over five or six years when dealing with small cohorts of students, we are pleased to report that 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 Part II Chairman's MS report states his opinion on the need for tougher penalties for late submission of coursework. DMAC notes that for 2006/07 and 2007/08 the level of penalty is constrained by the vested interest that these cohorts of students have in the Examination Regulations in force prior to the introduction of the Proctor's revision to the regulations on this matter in 2006. During 2007/08 we will debate this matter with a view to introducing tougher penalties in one year's time. In the same report the Chairman suggests a significant reduction in the current word-limit for Part II theses: this matter was

debated in detail during 2006/07, by DMAC and the Faculty of Materials (including the 2006/07 Examiners), resulting in the introduction of a revised Part II regulation. The regulation now incorporates a page limit, but also retains the 15,000 words limit. Given the extensive debate last year DMAC judges that the case to re-open this matter has not been made. The effectiveness of the new regulation on word and page limits will be reviewed in MT08.

- (c) In response to a hypothetical concern raised by MPLSD Academic Committee the Part II Chairman has reported specifically on the approach used by the Part II Examiners to provide as level a playing field as possible for all candidates, regardless of the 'project outcomes'. Candidates are aware from both the Part II handbook and the briefing during Part II Induction that it is not a requirement for a project to deliver positive or publishable results (although very often they do). "The examiners took care to ensure that what was being judged was a candidate's ability and the effort they put in to doing the project and writing it up, and that external factors outside a student's control did not affect the mark awarded. The supervisors' reports, the viva and the readings of the theses were used to judge this." In this respect it should be noted that the thesis includes the student's three project management reports and a reflective account of how the project progressed during the eight-month period – thus both the candidate and his/her supervisor have clear and independent opportunities to inform the Examiners of any problems encountered during the project.
- (d) Our new procedure of holding a meeting early in MT between the Chair of DMAC, the incoming and outgoing Chairmen of Examiners and the Academic Administrator who provides support for our examinations process was judged to be a success and will be continued. The primary purpose of the meeting is twofold: (i) to discuss matters arising from the Examiners' reports prior to drafting the present document for consideration by DMAC and (ii) to provide a handover briefing to the new Chairman/Chairmen of Examiners.

#### **4. Examination Conventions**

We confirm that DMAC is satisfied that in revising our Examination Conventions we have considered the points in the EPSC notes of guidance on Examinations & Assessment, para 3.12, as consulted on the EPSC web-pages on 17<sup>th</sup> Oct 2007 (The notes appear to no longer carry a publication date). DMAC and the incoming Board of Examiners have jointly approved the updated conventions.

No major changes to the conventions have been made for 2007/08. There are 'housekeeping' changes resulting from (i) the introduction of the new Characterisation & Modelling modules and (ii) the decision that supervisors of team design projects will no longer act as Assessors.

A.O. Taylor, Chairman of DMAC, 8/11/07

## **External Examiner's Report**

### **MANAGEMENT PAPERS School of Engineering, Economics and Management School of Materials, Economics and Management**

**Meeting Date: June 28, 2007**

Dear Vice-Chancellor,

I have served as external examiner for the management components of the management components of the above schools during the academic year 2006-2007. Despite some changes in administrative support staff, overall, I have been happy with the quality of the processes by which these courses have been administered over the year. Prior to the examination period, I reviewed the examination papers, which reflected good coverage of the topics covered in the course and needed little modification.

My sample of examination papers across the different classification levels was quite extensive this year. The quality of the answers at the top end was as expected impressive and overall I had few queries of the grading which was fair and appropriate. I paid close attention to those scripts where there was a difference of five or more marks. Rigor was demonstrated throughout the marking process with second marking being conducted as needed across these papers. In the vast majority of cases I agreed with the finally agreed mark. Similar to last year, I was surprised at the relative frequency of spread between markers on the first reading of the scripts which were subsequently reconciled after a second reading. If it is not currently the practice, paper setters could help to address this situation by providing a high level guide of expected solutions. Of particular note, I was impressed with the quality of the projects at the top end. The reports reflected an excellent consultative process and good access to companies. Students displayed a mature use of the literature in developing valuable recommendations.

In sum, the management component of the FHS has been well administered. As was the case last year, the final meeting of the exam board was efficiently handled by the chair with adequate discussion ensuring a fair and equitable process in the final grading and classification of students on this program. As one would expect, student classifications reflected very high standards of the program.

The internal examiners and other committee members were helpful and hospitable which made it a pleasure to serve as external examiner of these programs for a second year.

Yours Truly,

Michael Barrett  
Senior Lecturer  
Judge Business School  
University of Cambridge

**PAPERS:**

Introductory Economics (part 1)

Economic Decision within The Firm ( part 2)

For each paper I was asked to confirm the marks for scripts of variable quality (9 scripts in each case). This was organised efficiently and in good time for the examination meeting.

I attended two separate examination meetings (one for Materials, Economics and Management and one for Engineering Economics Management) on 28/06/07.

(I) WHETHER THE ACADEMIC STANDARDS SET FOR ITS AWARDS, OR PART THEREOF, ARE APPROPRIATE;

AS far as the two modules I was dealing with are concerned the standards are 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;

the meetings were conducted efficiently and fairly. Students were treated equitably. Examiners were making sure that the decisions for final classification were consistent with decisions taken earlier for students in related programmes.

(III) THE STANDARDS OF STUDENT PERFORMANCE IN THE PROGRAMMES OR PARTS OF PROGRAMMES WHICH THEY HAVE BEEN APPOINTED TO EXAMINE; AND WHERE APPROPRIATE, THE COMPARABILITY OF THE STANDARDS AND STUDENT ACHIEVEMENTS WITH THOSE IN SOME OTHER HIGHER EDUCATION INSTITUTIONS;

Introductory Economics (part 1):

The performance of the students for this paper was comparable to the performance one would expect from students elsewhere following an economics degree at the end of their second year. Given that the students on MEM and EEM are not specialists in economics this signals a good performance.

Economic Decision within the Firm (part 2)

This course is taught at a relatively high level relative to course with a similar syllabus taught elsewhere as part of an economics degree. The students are of course relatively more advanced than the usual finalist in my own institution since they have already completed 3 years of undergraduate study.

(V) ISSUES WHICH SHOULD BE BROUGHT TO THE ATTENTION OF SUPERVISING COMMITTEES IN THE FACULTY/DEPARTMENT, DIVISION OR WIDER UNIVERSITY:

as this is my first year as external on these papers, my comments are lacking perspective and should be understood as a first reaction.

Introductory Economics (part 1):

I was not consulted on the structure of this paper.

I was not sent the marking guidelines for this paper.

The paper contains two parts. The first section contains five questions, three on microeconomics and two on macroeconomics. The students are expected to answer three questions out of the five with the added requirement that candidates must answer at least one microeconomic and one macroeconomic question. The second section proposes four essay questions of various level of generality out of which students must select one. Hence candidates are expected to answer four questions each carrying 25 marks.

I have several concerns concerning this paper:

- + why are macro-economics and micro-economics given unequal share of the questions?

- + the two macro-economics questions in part A overlapped (Question 4 and Question 5). Question 4 tests the candidates understanding of the LM part of the ISLM model, while Question 5 deals with the ISLM model in general. In general I would prefer distinct questions to test distinct aspect of the syllabus.

- + Section B essay questions covered several topics in microeconomics and macroeconomics. The questions allowed the candidates to show depth of knowledge in various areas of the syllabus. Given the scripts I saw I believe candidates preferred the essays on microeconomic themes. These questions were more focused than the macroeconomics ones. Candidates may have found the former easier to answer than the latter. In future, and if the paper retains its current form, it may be preferable if exam setters harmonised the “type” of questions so that both parts of the syllabus are equally attractive.

- + I feel that candidates may have spend more than a quarter of the examination on the essay question in part B. Setters may want to adjust the relative weight of part A and part B accordingly (66%/33% would seem natural)

Economic Decision within the Firm (part 2)

I was consulted when the paper was set.

The paper contains eight distinct questions. Candidates were expected to answer five questions. Overall, the questions are on the demanding side for non Operational Research specialists. Furthermore the questions are not organised in sub-questions which may lead to some uncertainty about the relative reward attached to each clause of the question. Whether this is a real issue is difficult for me to say. This may have been a factor for the performance of the weaker candidates. However, from the scripts I saw, I believe that few candidates have answered fully all the five questions they attempted. A slightly shorter exam (either through slightly shorter questions or with fewer questions) may provide the candidates with a better chance to do so.

**(VI) GOOD PRACTICE THAT SHOULD BE NOTED AND DISSEMINATED MORE WIDELY AS APPROPRIATE.**

Flowchart aid for the final classification of candidates (EEM exam meeting).

Gauthier Lanot

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Mathematical, Physical and Life Sciences (MPLS)	biological sciences, chemistry, computing, earth sciences, engineering, materials, mathematics, plant sciences, statistics, zoology	Dr. Nigel Berry <a href="mailto:nigel.berry@admin.ox.ac.uk">nigel.berry@admin.ox.ac.uk</a>
Social Sciences (SS)	anthropology, archaeology, area studies, economics, educational studies, environment, geography, human science, law, management, politics, social policy, sociology	Ms. Jane Dale <a href="mailto:jane.dale@admin.ox.ac.uk">jane.dale@admin.ox.ac.uk</a>

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## STANDING COMMITTEE FOR EEM AND RELATED STUDIES

### Part I – Unreserved

Unconfirmed minutes of the meeting held on Thursday 25 October 2007

**Present:** Dr Robert Field (Chair), Dr Owen Darbishire, Ms Alison Gestra, Prof. Godfrey Keller, Dr Will Moore, Prof. David Nowell, Dr Howard Smith, Prof. George Smith, Mr Melvin Chen (MEM student representative) and Ms Jodie Rabin (EEM student representative).

**In attendance:** Dr Jane Frew (Secretary), Ms Katherine Cumming, Ms. Caroline Pearce and Dr Ian Stone.

**On leave:** Dr Keyna O'Reilly.

## STANDING COMMITTEE FOR EEM AND RELATED STUDIES

### Part II – Reserved Minutes of the meeting held on 25 October 2007

#### 13. Examiners' Reports for 2007

##### 13.1 Internal Examiners' 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

The following points were raised in discussion of the reports:

- The Standing Committee was pleased to note that the distribution of candidates across classes for Part II EEM was similar to Engineering Science for the first time in many years.
- Whilst the Standing Committee considered a comparison of the performance of EEM and E&M candidates in M1 Introduction to Management it was agreed that when dealing with such small numbers it was difficult to draw any meaningful conclusions. Data from previous years would be sought to give a clearer picture of the relative performance of the two cohorts.

**OD**

- The examiners had identified the following points for consideration by the Faculty/Department and the MPLS Division.

*'In the longer term Faculty may wish to consider relaxing the timetable for publication of results from Engineering and Joint Schools, as the present system involves working patterns that may not always be possible.'*

The Standing Committee noted that some changes to working patterns within Engineering might be needed in the future which could impact on the timing of classification meeting for EEM Parts I and II. Whilst it would be up to the examiners to decide the detailed timetable for publication of results it was noted that the constraints upon the constituent subjects would inevitably vary.

*'A number of changes in regulations this year required some redrafting of examination conventions. It would be helpful if EPSC and/or Division could give early notice of*

changes, specifying whether it expected individual faculties to redraft conventions, or that standard working would be agreed at a divisional or higher level. In the latter case notice of when such wording would be available would allow timetabling of both agreement conventions within the Faculty and dissemination to candidates.'

'This year for the first time one of the external examiners visited the fourth year project exhibition and found it very valuable. However, some of the students who were exhibiting work were not present, and it would be helpful if there was a period of time during the exhibition when they were asked to be available.'

### **13.2 External Examiners' Reports**

The external examiners' reports were received. The Standing Committee was pleased to note the overall complimentary nature of the comments made by the external examiners. Specific points raised were as follows:

#### **Report from Dr Michael Barrett**

- The external examiner had sampled an extensive number of management papers across the different classifications and had expressed surprise at the relative frequency of spread between markers on the first reading of the scripts which were subsequently reconciled after a second reading. Mr Barrett had recommended that if it was not current practice, that paper setters could help to address this situation by providing a high level guide of expected solutions.

The Standing Committee noted that it was not current practice to provide model solutions to management questions. Furthermore, it not obvious that such an approach would help reduce the spread of marks. Indeed, the view was expressed that provision of such information would reduce the marking to a very mechanical process. The purpose of double-marking was to reconcile discrepancies.

#### **Report from Professor Gauthier Lanot**

- Introductory economics: the external examiner had considered that the performance of the E(M)EM candidates on this paper was comparable to the performance one would expect from students elsewhere following an economics degree at the end of their second year. Given that the E(M)EM candidates were not specialists in economics this signalled a good performance.

The external examiner had indicated that he had not been consulted on the structure of the paper and also had not been sent the marking guidelines for this paper. The Standing Committee noted that this paper was primarily for candidates taking Prelims in PPE and Economics & Management where there was no external examiner. In future, it would be sent to the external examiner for E(M)EM at the appropriate time.

The Standing Committee also noted that this had been the first year that the paper had been set in its new format and it was expected that next years' examiners would consider the constructive comments and concerns from the external examiner alongside this year's internal examiners' report.

- The external examiner had highlighted as good practice the flowchart aid for the final classification of candidates at the EEM classification meeting.

#### **Report from Professor Brian Derby**

- An unfortunate error of communication by one of the lecturers to the students had apparently led to the misunderstanding as to the examinable subject matter of one of the courses assessed in General Paper 4. To make allowance for this the examiners devised an equitable method by which the 4 questions with the highest mark were selected from the 5 answered by the candidates. Professor Derby had considered this to be a satisfactory solution that did not disadvantage the candidates.

The Standing Committee noted that the Faculty of Materials would be putting in place a policy from the 2007-2008 academic year to ensure that there were no future misunderstandings about what material was examinable.

- The external examiner had expressed serious concern about the procedures used by the examiners in ensuring that their individual marks and their agreed marks were both computed correctly and transferred correctly to the master spreadsheet used to compute each candidate's mark. This year Professor Derby had found an unacceptable level of error that might have seriously affected the outcome of the examinations for some candidates. In his report, the external examiner had considered it imperative that these procedures were reviewed and that appropriate mechanics of checking and assessment were put in place to ensure that this problem did not recur in the future.

The Standing Committee noted that the Faculty of Materials had recognised that these errors were indefensible and had introduced a formal procedure designed to prevent a recurrence.

JEF/RWF  
3.1.08

