

EXAMINERS' REPORTS 2009

[Abridged version for Ox-only website]

MATERIALS SCIENCE (MS)

MATERIALS, ECONOMICS & MANAGEMENT (MEM)

	Page
Internal Examiners' Reports	
Prelims	3
MS Part I	14
MS Part II	32
MEM Part I	35
MEM Part II	53
Examination Conventions 2008/09	
Prelims	73
MS	75
MEM	82
External Examiners' Reports	
MS & MEM, Part I & Part II (one report missing)	89
Department of Materials Academic Committee (DMAC) Report to MPLS Division	92
E(M)EM Standing Committee	
Reports from the External Examiners for the Economics & Management Components of MEM Part I & II	95
Minutes of the discussion of Examiners' Reports	100

REPORT ON THE PRELIMINARY EXAMINATION IN MATERIAL SCIENCE

Part I

A. STATISTICS

Category	Number			Percentage		
	2008/09	2007/08	2006/07	2008/09	2007/08	2006/07
Distinction	9	7	12	32	25	43
Pass	16	20	15	57	71	53
Fail	3*	1	1	11	4	4

(* One candidate passed the resit in September)

Marking of scripts

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

B. NEW EXAMINING METHODS AND PROCEDURES

None in this year

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

Pass Lists are no longer posted up on notice-boards, either in the Department or in Schools. Results spreadsheets are uploaded into the central admin. system and once they are ratified there they can be seen by individual students and tutors.

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.

25 candidates passed all papers, without the necessity for compensation. No candidates were awarded compensated passes. Of the total of 25 successful candidates in June, 9 achieved a marks average above 75 % and were awarded Distinctions. The Moderators chose to set the bar for a distinction at 75 % this year due to the large number of candidates (14) who achieved an average mark of 70 % or above.

All candidates passed the Mathematics and MS1 paper in June. Three candidates failed MS2 and two candidates failed MS3. One of the candidates who failed both MS2 and MS3 also failed to

satisfy the Examiners in the Practical work and was asked to sit a practical examination. The candidate withdrew after sitting one written resit paper, and so the practical exam was not needed. Two of the candidates resitting MS2 in September failed the examination by a clear margin, these two candidates subsequently failed overall. The third candidate passed MS2 with a good mark and thus passed the Preliminary examination.

The prize for the best overall performance in Prelims was awarded to [REDACTED], from Trinity College, with an impressive overall average of 89 %. The prize for the best performance in Practicals was also awarded to [REDACTED], from Trinity College. Additional prizes for outstanding performance were awarded to [REDACTED], from St. Catherine's College, and [REDACTED], from Mansfield College.

The examiners wish to voice their concerns about two matters:

Again, we are concerned at the lack of provision for special needs at Ewert house. This issue was also raised in the 2008 report.

A note from the Junior Proctor (dated 15th June) was received on 16th June, along with a copy of an undated Medical Certificate from the student's GP. The student passed all papers, and hence no action was necessary. However, the paperwork was received *after* all the exams had taken place, and on the same day as the final examiners' meeting.

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

1 candidate was notified to the Examiners as [REDACTED] and was given extra time. [REDACTED].

Gender Issues:

Of the 28 candidates 10 were women and 18 men.

5 of the 9 distinctions were awarded to women.

In view of the small overall number of candidates, it is not possible to draw statistically significant conclusions from these data.

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

All candidates took the same papers for the whole examination.

D. COMMENTS ON PAPERS AND INDIVIDUAL QUESTIONS

Attached.

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

F. NAMES OF MEMBERS OF THE BOARD OF EXAMINERS

Dr John Hutchison (Chairman)

Dr A.A. R. Watt

Dr S. Speller

Prof. G.D.W. Smith

Attachments: Examination Conventions 2008

Comments on Materials Science 1: Structure of Materials

Comments on Materials Science 2: Properties of Materials

Comments on Materials Science 3: Transforming Materials

Comments on Maths for Materials and Earth Scientists

MS1: Structure of Materials

Examiner: Dr JL Hutchison

Candidates: 28

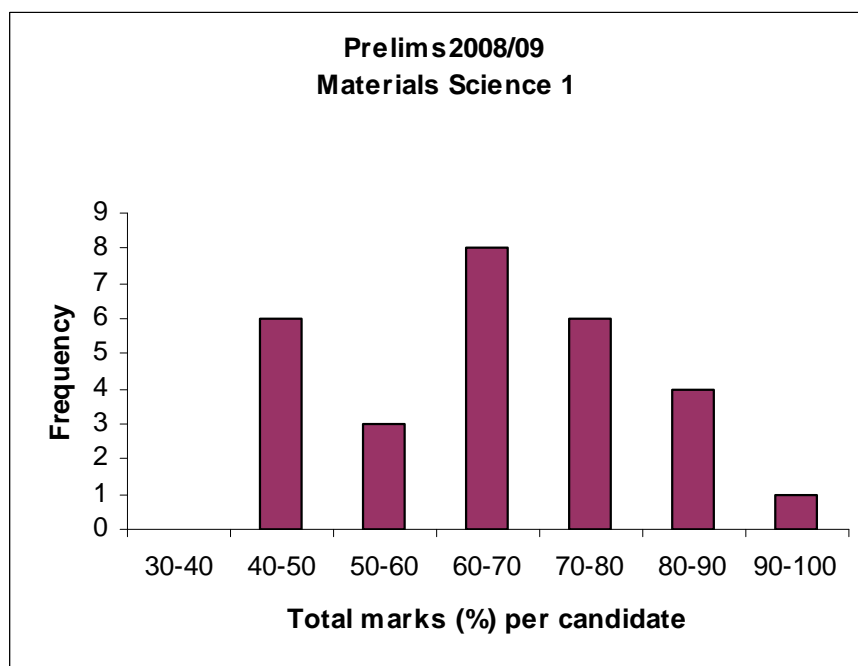
Mean mark: 65.9 %

Maximum mark: 91.5 %

Minimum mark: 44.5 %

All candidates passed this paper.

Question	No of answers	Average mark	Highest mark	Lowest mark
1	24	11.96	20	4
2	24	12.98	18	7
3	6	18.67	20	15
4	25	11.08	17.5	3
5	16	13.63	18	3
6	12	15.67	20	7
7	21	14.14	20	3
8	12	12.88	20	6



General Comments

1. A straightforward question on crystal symmetry, tackled by most (24) students. Average score 12 with surprisingly wide range of scores, from full (20) down to 4.
2. Question on types of bonding, to show how well the students understood the basic concepts of covalent, metallic & ionic bonding. Popular question, (24 attempts), with scores ranging from full marks down to 7. Average score: 13.
3. Electronic structure & bonding – Bohr atom model. Rather few attempts (6) but with a high average score (18.7). Those who attempted it showed good understanding.
4. Basic multi-part crystallography question. Popular (25 attempts) with mainly good scores. Average: 11, brought down by a few very low scores (3,5,6,7)
5. Polymer question, first part straight from course notes, 2nd part a calculation based on the “Rule of Mixtures” for fibre-reinforced composites. Fairly popular (16) with average score 13.6. again lowered by a few very low ones (3 of 3).
6. Diffusion question involving derivation of Fick’s first law. Then mainly qualitative descriptions of vacancies and their involvement in diffusion processes. Moderately popular (12 answers) with some top scores. Average: 15.7.
7. Question on alloys; the Hume-Rothery rules and their application in solid-solution curves for Cu-Zn and Cu-Ga. Followed by definitions of various terms used to describe binary alloys. Popular (21 attempts) with good average (14) This reflects some very high scores and a few very low ones.
8. Crystallography question based on Bravais lattices. Second main part based on X-ray diffraction from a single-phase powder sample. Moderately popular (12 answers) with mainly average scores, one top score of 20 and one of 6.

MS2: Properties of Materials

Examiner: Dr S Speller

Candidates: 28

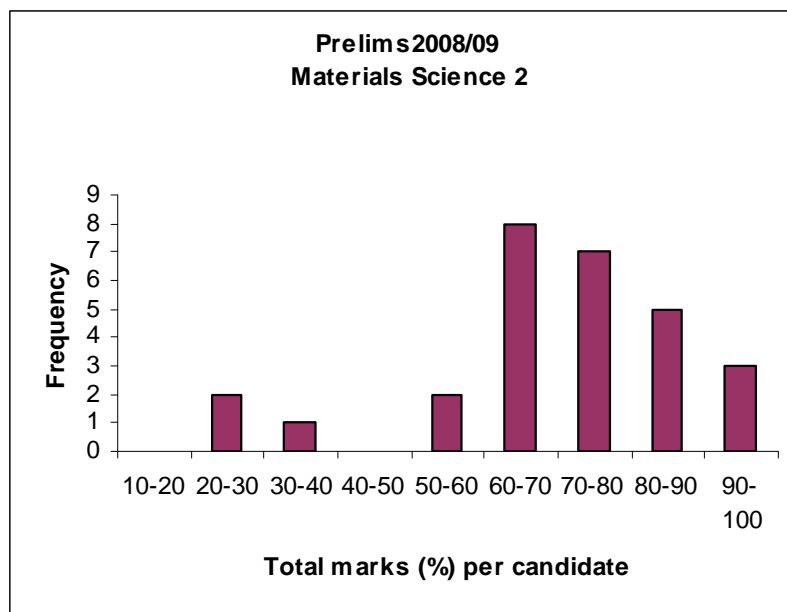
Mean mark: 70.4 %

Maximum mark: 95 %

Minimum mark: 23 %

3 candidates failed this paper.

Question	No of answers	Average mark	Highest mark	Lowest mark
1	8	13.13	20	0
2	28	14.96	20	7
3	20	16.15	20	5
4	24	12.83	19	2
5	26	13.08	19	5
6	28	14.07	20	3
7	4	12.50	19	9
8	2	16.50	17	16



General Comments

1. (8 attempts) This was a standard question on kinetic theory of gases culminating in a problem concerning effusion of gas molecules from a circular hole. Most students could derive the mean free path and calculate the mean speed of the molecules. However, the final part of the question was answered poorly, with some students assuming that the rate of effusion is constant
2. (28 attempts) This was a very popular question on Mohr's circle, answered by every student. Whilst most students could describe the difference between σ_{xy} and σ_{yy} , a significant number could not explain why some of the terms in the stress tensor are equal. The vast majority of students correctly sketched Mohr's circle for the two stress states given, but there was a fairly common misconception that the maximum shear stress would be at 45 degrees to the compression direction
3. (20 attempts) This question on three-point bending of a rectangular beam was answered very well. Most students accurately drew the bending moment diagram, but fewer correctly sketched the shear force diagram. The fracture toughness calculations were answered perfectly by about half the students, however a few did not use the expression for maximum yield stress derived in the first part of the question, instead assuming the bar was loaded in uniaxial tension.
4. (24 attempts) This question on the ductile-brittle transition in ferritic iron and the toughness of ceramic fibre/ceramic matrix composites was answered poorly in general. A surprising number of the students could not accurately define Young's Modulus, yield strength and fracture toughness. Explanations for the ductile-brittle transition in this material were good, but failure mechanisms resulting in toughness in the ceramic composite were not well understood
5. (26 attempts) A straight-forward question on the stress/strain curve of pure iron was answered by almost all students. A common error occurred in the estimate of Young's modulus because students used % strain in the calculation. Exactly the same comment was also noted in last year's examiners report (Q7, 2008). Definition of proof stress was not known by a considerable number of students. Reasons for stage I work hardening were not widely known, but the students were strong on stage II and cross-slip. Very few candidates highlighted the key differences between single-crystal and polycrystalline iron.
6. (28 attempts) Another standard question requiring the students to calculate the primary slip system. The students were obviously well trained for this type of question with most students obtaining the correct result, particularly those who calculated Schmid factors. Some of the students who chose to use the stereogram method drew it incorrectly or made an error with the position of the tensile axis, resulting in an incorrect result.
7. (4 attempts) This unpopular question on electrostatics was answered very well by one of the students. Gauss's law was well-understood by all candidates who attempted this question, but most had difficulty deriving an expression for capacitance of concentric spheres, and few had a good understanding of relative permittivity and polarisation
8. (2 attempts) The least popular question was actually a very straight-forward question on magnetic properties of materials. However both students who attempted it produced good answers, the main difficulty being definitions of B, H and M.

MS3: Transforming Materials

Examiner: Prof. GDW Smith

Candidates: 28

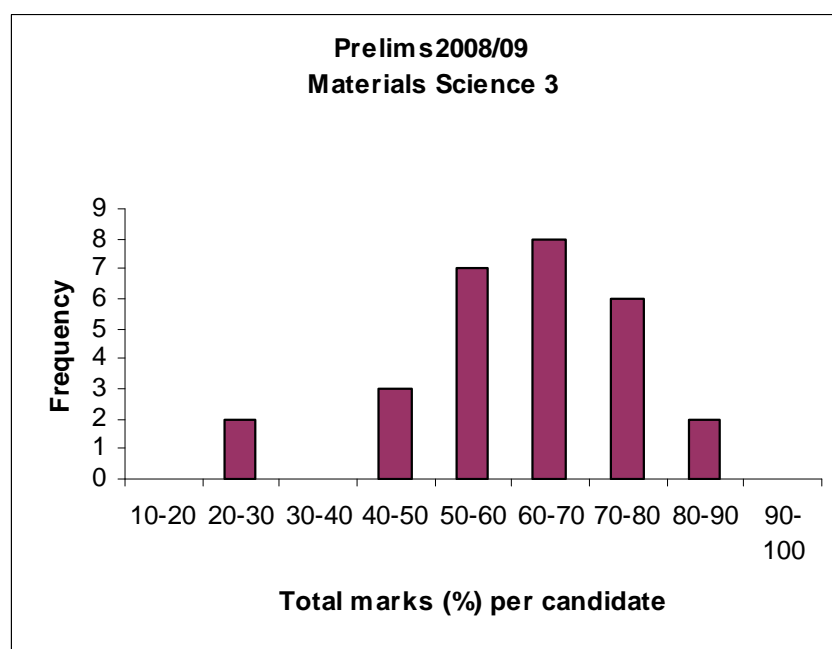
Mean mark: 61.4 %

Maximum mark: 87 %

Minimum mark: 22 %

Two candidates failed this paper.

Question	No of answers	Average mark	Highest mark	Lowest mark
1	10	11.4	14	6
2	21	12.0	16	6
3	28	13.2	19	0
4	24	14.2	18	4
5	15	10.1	16	0
6	22	12.6	19	2
7	10	9.8	19	7
8	10	11.9	19	5



General Comments

1. Manufacturing methods. Disappointing answers. Candidates lacked familiarity with basic processing techniques such as rolling, drawing and welding. Some thought that both railway lines and sewing needles were made by extrusion, and that car doors were cast.
2. Microstructure of materials. Good basic coverage of primary metallic microstructures. This year, candidates were mostly unfamiliar with the concept of constitutional supercooling (Part (iii) of the question). Compensating marks were awarded, as this topic had been removed from the lecture course (although not from the lecture synopsis!).
3. Iron-carbon phase diagram. A very popular question. The basics were well understood, but candidates had difficulty in working out how the invariant reaction temperatures and the positions of the phase boundaries were affected when the thermodynamically more stable graphite phase replaced cementite as the carbon-rich constituent.
4. Nucleation theory. Another popular question. Some problems with the calculation: candidates failed to convert molar heat of fusion into energy per unit volume of material. Also, the explanations given for the lack of superheating required to melt a metal were inadequate and imprecise.
5. Extraction metallurgy (Ellingham diagram). Disappointing answers. Almost all candidates failed to understand the basic principle of the construction of Ellingham diagrams, which involves the normalisation of all free energies of oxide formation to one mole of oxygen, rather than to one mole of the oxide involved. Also, there was widespread lack of understanding about the fundamental difference in conditions between an iron blast furnace (reducing) and a steelmaking process (oxidising)
6. Electrochemistry. A popular question, with some good answers. The main weakness was a widespread failure to explain clearly that EMF measurements provide a direct quantitative means for studying reversible thermodynamic processes.
7. Thermodynamics (vapour pressure measurements). Only one really good answer to an easy question. Candidates were not comfortable with handling the concept of thermodynamic activities, and almost all went about the calculation in the wrong order. The vapour pressure of the pure element needs to be calculated first, and then compared with the values measured for the series of alloys.
8. Polymer synthesis. Some good basic coverage of polymerisation methods, but several candidates struggled to calculate the RMS end-to-end distance of a polymer chain molecule in a melt.

Maths for Materials and Earth Scientists

Examiner: Dr AAR Watt

Candidates: 28

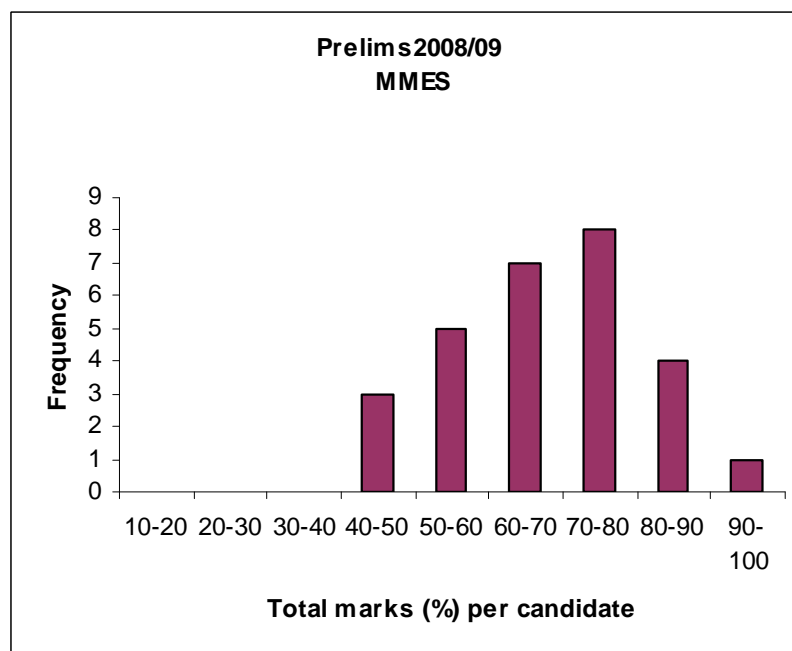
Mean mark: 67.8%

Maximum mark: 96.7%

Minimum mark: 42.2%

All candidates passed this exam.

Question	No of answers	Average mark	Highest mark	Lowest mark
1	28	6.8	8	5
2	28	8.0	9	8
3	28	4.4	8	0
4	28	3.5	8	0
5	28	7.4	8	0
6	28	2.9	8	0
7	28	6.5	8	3
8	28	6.0	8	3
9	27	6.7	8	3
10	28	6.6	8	3
11	21	16.8	25	8
12	28	18.4	22	10
13	20	16.0	25	2
14	5	12.2	25	4
15	8	16.1	25	8
16	26	15.2	25	6



General Comments:

Most candidates made good attempts at all questions in this paper. Questions 4, 6 and 14 received poor answers and concerned the integration or differentiation of complex numbers. Students were most at ease with linear algebra in particular matrices (Questions 2 and 12) received the highest marks of the areas examined.

Overall comment:

Note on Prelims Resits: September 2009.

3 candidates were required to resit prelims papers. Their marks did not allow for compensation from the papers that they passed in June.

2 students had to take paper MS3 (Transforming Materials) – both failed a second time, [REDACTED]

3 had to take paper MS2; 1 withdrew, and one failed [REDACTED] The 3rd candidate passed [REDACTED]

Practical exam. For the first time in many years, one student's practical lab-work was so badly presented and written-up the examiners asked the student to do a practical exam in conjunction with the 2 re-sit written papers. His withdrawal after the first written resit (MS3) meant that this was not needed in the end.

J L Hutchison (Chairman of Examiners)

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

Part I

A. STATISTICS

(1) Numbers and percentages in each category

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

Category	Number			Percentage		
	2008/09	2007/08	2006/07	2008/09	2007/08	2006/07
Distinction	n/a	n/a	n/a	n/a	n/a	n/a
Pass	22	25	19	100	100	100
Fail	0	0	0	0	0	0

(2) If vivas are used

The Board of Examiners decided at the start of the examination process that Part I students would not be given vivas. Students were informed of this both by letter on 11th March 2009 and by e-mail on 23rd March 2009.

(3) Marking of scripts

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

B. NEW EXAMINING METHODS AND PROCEDURES

The structure of the Options courses was changed last year, and this affected the structure of the two Option papers. In place of 8 questions, one on each of the lecture courses, the papers were divided into 3 blocks each of which had 3 questions. Candidates were given a choice of 3 questions, 2 from one block and the third from one of the other 2 blocks. In principle, this allowed for questions to be set which tested knowledge more broadly across a block, but in practice the questions in that first year were limited to covering a single lecture course. In the current year, examiners set questions more broadly across a block, where it was suitable to do so. Students were informed that this would be the case both by letter on 11th March 2009 and by e-mail on 23rd March 2009.

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

(1) Last year, as a result of a student failing a Materials paper, the Faculty was asked to consider whether it was content that candidates achieve Honours without passing (or achieving Honours) on all of the papers. Faculty decided that it was content to continue with these current procedures. Looking at Part I Materials Science and MEM combined, this year 6 students together failed a total of 8 Materials General Papers and 3 Materials Option Papers, including 3 marks which were below 30%. All of these students gained marks of over 40% overall at Part I and therefore passed Part I with Honours. In addition, one student this year failed to achieve a mark of 40% in Practicals, though achieve more than 40% in the Coursework overall. The Examiners suggest that Faculty address this issue again in light of these results.

(2) To date, anonymity has not been maintained in the marking of any coursework, since this is submitted with the candidates' names. In some cases, such as the team design project, it would not be possible to maintain anonymity of the candidates, as the assessment involves an oral presentation to the markers. Last year, the Examiners recommended that mechanisms be put in place to ensure candidate anonymity wherever possible, such as for the business plan, and the characterisation and modelling modules. It was not practical to do this in the current year, but we recommend that this happens in the future.

(3) It has been noted by one of the external Examiners that some students benefitted from the procedures of using half-marks in the marking of the Materials papers, and most importantly, that these gains were random in nature. The convention used was to allow the use of half-marks in the marking of each section of a question, and to round up the total marks for each question determined by each marker. The average of the two markers marks would then be further rounded, if necessary, for each question. It is suggested that the average of the two markers marks should not be rounded, and that rounding only takes place when the aggregate mark for the paper is determined.

(4) The Examiners were perturbed to see that a number of candidates received scores of zero for individual Practical assignments, despite the students having carried out the Practical work assigned. It is thought, but not confirmed, that the students in question submitted their write-ups too late to the markers. We therefore suggest that procedures are put in place (i) to record the reason why a given mark of zero was awarded; and (ii) for markers to alert the Teaching Laboratory Organiser when a student has failed to get their Practical marked in the required timescale.

D. EXAMINATION CONVENTIONS

The previous year's Examination Conventions were included in the Course Handbook that was distributed to all candidates in hard-copy and was also made available on the Departmental website, to which candidates' attention was drawn by e-mail. The current year's Conventions (2009, attached) were put on the Departmental website and sent in hard-copy on 11th March 2009 and electronically on 23rd March 2009 to all candidates. The Examination Conventions were assessed by the Board of Examiners and the Department's Academic Committee.

Part II

A. GENERAL COMMENTS ON THE EXAMINATION

There were 22 candidates for the examination, and all were awarded Honours. The examination consisted of 6 written papers plus coursework that included a team design project, a business plan, industrial visit reports and practical work carried out during the 2nd year. No candidates opted to take the language option, which replaces the business plan. In addition, candidates completed further coursework in the 3rd year in the form of either a module on Materials Characterisation (15 candidates) or one on Materials Modelling (7 candidates). One candidate who withdrew from the Part I Examination last year returned this year to take only the written papers, and was not required to complete this additional coursework module.

Each written paper lasted 3 hours. For the General papers, candidates were required to answer 5 questions out of 8, as in previous years. For the Option papers, where candidates were offered 9 questions in 3 sections of 3 questions, candidates were required to answer 3 questions, 2 from one section and 1 from either of the remaining sections. Team design projects were marked by two Examiners, including the Chairman. Teams were marked as groups. The allocation of bonus or penalty marks is permitted under the Conventions, but was not used. The business plans were marked by an Assessor from the Said Business School and an Assessor appointed to represent the

Faculty of Materials, again with teams being marked as a group. Candidates' work on the two coursework modules were marked either by 2 Assessors (modelling) or 3 Assessors (characterisation). The marks were moderated by the Chairman to ensure equality between the two modules. Reports for each of the Industrial Visits were assessed as pass/fail by the Industrial Visits Organiser, appointed as Assessor.

The overall mean mark for Part I was near the middle of the 2(i) range. The mean marks of 4 of the 6 written papers in the examination were in the 2(i) band (60-70%) and so no scaling needed to be considered. The remaining 2 papers had mean marks of 56.7 and 58.0%. The Examiners, including the external Examiners, considered the need to scale these papers. However, we considered that the papers were set at an appropriate level and that the low mean marks obtained were a result of a small number of decidedly weak students pulling down the average: 4 students having together failed a total of 8 papers. Mean marks for the practical work were higher than for the papers, being in the 1st class band, but this is in line with the results from previous years.

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

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

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

mark (%)	Overall mark		Written Examinations		Coursework	
	Male	Female	Male	Female	Male	Female
40–50	1	1	1	1	-	-
50–60	-	2	2	4	-	-
60–70	8	5	9	3	4	-
70–80	4	1	1	1	9	9
80–90	-	-	-	-	-	-
Totals	13	9	13	9	13	9

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

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

D. COMMENTS ON PAPERS AND INDIVIDUAL QUESTIONS

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

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

No Medical Certificates were presented for assessment.

F. NAMES OF MEMBERS OF THE BOARD OF EXAMINERS

Dr. K.A.Q. O'Reilly (Chairman)	Dr. H.E. Assender
Prof. A. Cerezo	Dr. M.L. Jenkins
Dr. P.D. Nellist	Dr. A.J. Wilkinson
Prof. J. Binner (external)	Prof. A.L. Greer (external)

Attachments:

General Paper 1 – Structure and Transformations

Examiner: Prof. Alfred Cerezo

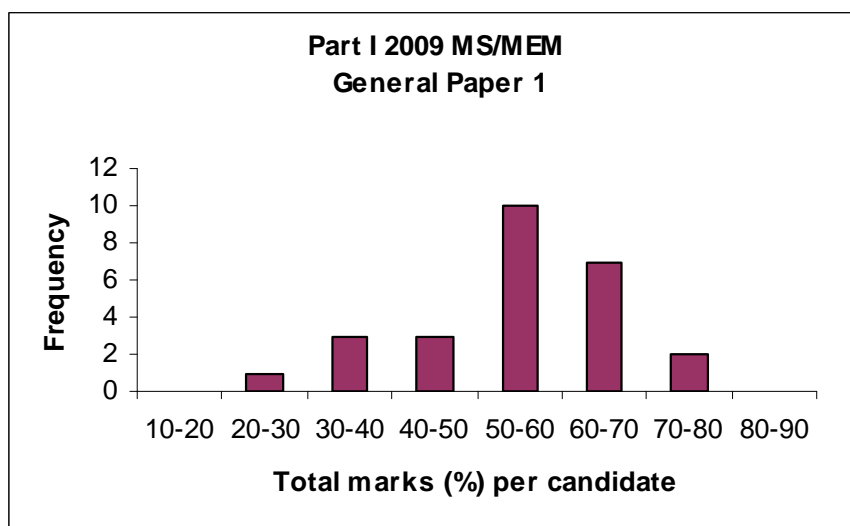
Candidates: 26 (22 MS / 4 MEM)

Mean mark: 55.6 %

Maximum mark: 77.0 %

Minimum mark: 26.0 %

Question	Topic	No of Answers	Average Mark	Highest Mark	Lowest mark
1	Corrosion	20	13.1	19	6
2	Surfaces and Interfaces	17	14.4	18	10
3	Phase transformations	20	8.0	13	2
4	Phase transformations	15	10.3	15	6
5	Powder processing	15	9.9	16	4
6	Ternary phase diagrams	19	11.7	18	2
7	Polymers	20	11.8	17	7
8	Diffusion	4	4.5	8	1



General Comments:

The average mark achieved by candidates on this paper was rather low, but this was mainly due to a tail in the mark distribution that went down to a minimum mark below 30%. The bulk of the distribution was very similar to other papers. It was also considered that the paper was no harder than in previous years, and that the marks achieved were a true reflection of the candidates' performance. Thus, no scaling was applied to the paper and the raw marks were allowed to stand.

1. Very popular question on inhibitors, on which candidates generally scored highly. Answers generally short on details, e.g. mechanisms of inhibition, but candidates were able to give basic types of inhibitor and how these were used.
2. Question on surface energy, generally answered well, although candidates did not show a clear understanding of principles. There was much discussion of "dangling bonds" rather than co-ordination, and Ostwald ripening mentioned in context of grain growth. High marks for simple derivation of Gibbs-Thomson effect raised overall marks.
3. Poorly answered question on heterogeneous nucleation, with most candidates not even able to construct the equation for change in free energy, often missing the volume term, even when they could handle the case of homogeneous nucleation.
4. Relatively standard bookwork question on coupled growth, which was rather poorly answered on the whole. Few candidates could remember that coupled growth has a linear growth law. Many talked about finer microstructures due to rapid nucleation rate, rather than optimum lamellar spacing, and some didn't seem to know what a TTT diagram was.
5. Descriptive bookwork question, which was not as popular as usual, and generally poorly answered. Candidates often described metal injection moulding as if the powder was injected directly, with no binder.
6. Despite this question being similar to an example given in the lectures, many candidates failed to identify that only one triangle exists in the ternary phase diagram in (c). However, a reasonable level of understanding was shown by most candidates.
7. Answers to this question were rather weak, generally due to lack of detail in discussing polymer solubility, or silly mistakes in calculating structural spacings, such as misquoting Bragg's Law. None of the candidates completed the final part correctly.
8. Surprisingly unpopular bookwork question on basic diffusion mechanisms, which appears to have been attempted by some of the more desperate candidates, resulting in very poor marks.

General Paper 2 – Electronic Properties of Materials

Examiner: Dr Peter Nellist

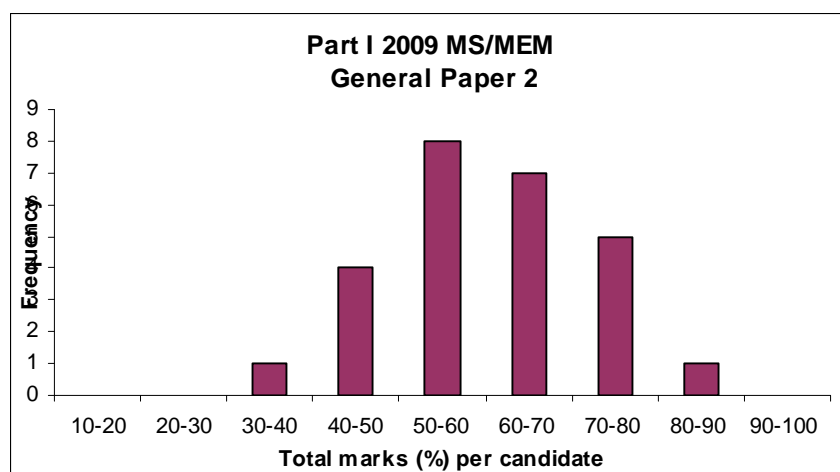
Candidates: 26 (22 MS / 4 MEM)

Mean mark: 61.4 %

Maximum mark: 83.0 %

Minimum mark: 39.0 %

Question	Topic	No of Answers	Average Mark	Highest Mark	Lowest mark
1	Magnetic properties	16	11.6	16	5
2	Tensors	19	13.6	16	9
3	Electronic structure	18	12.2	19	3
4	Quantum mechanics	9	10.1	18	3
5	Quantum mechanics	21	11.3	17	6
6	Statistical mechanics	19	10.8	19	2
7	Electrical and optical properties	3	15.0	17	13
8	Semiconductor materials	25	14.2	20	5



General Comments:

1. A discursive question concerning types of magnetism in materials. A well-structured question and the first two sections were often well answered. Not many candidates were able to give a convincing discussion of the exchange interaction in materials required in the later sections.
2. A question asking why electronic susceptibility takes the form of a second rank tensor, then a problem involving a rotation to a new coordinate basis. Although the initial explanation was often poorly given, most candidates were able to use Mohr's circle or equivalent to rotate the tensor. Many used the wrong angle by not reading the question carefully, and often the results of calculations were presented without units.
3. A well-structured question based on the free-electron model. The derivation of the Hall coefficient was clearly well known and using it to find a lattice constant was done well. The final part of the question regarding the Brillouin zones was more patchily answered, and many candidates only gave a 1D plot when a 2D plot was asked for.
4. A more discursive question on finding the electronic orbitals of hydrogen and the extension to many electron atoms. A rather unpopular question and generally poorly answered, though the final section on applying Hund's rules demonstrated a generally good understanding.
5. A popular, well-structured, question making use of a given wavefunction to find expectation values and hence demonstrate Heisenberg uncertainty. Many candidates struggled to form the correct integrals to calculate expectation values, and very few were then able to go on to demonstrate the uncertainty principle.
6. A well-structured question developing the Einstein expression for heat capacity. Candidates demonstrated that the concepts were understood, but struggled to develop the mathematic expressions. There was a tendency to jump to the given expressions without demonstrating the algebraic steps that got there.
7. A very unpopular question on the response of a material to AC fields, but those that attempted it did very well. Part (b) was probably too heavily weighted in the marking scheme given that the particular integral to the differential equation was given making this section straightforward.
8. A very popular question that was mostly bookwork. Obviously well understood and learnt by candidates, with the marks reflecting that.

General Paper 3 – Mechanical Properties

Examiner: Dr Angus Wilkinson

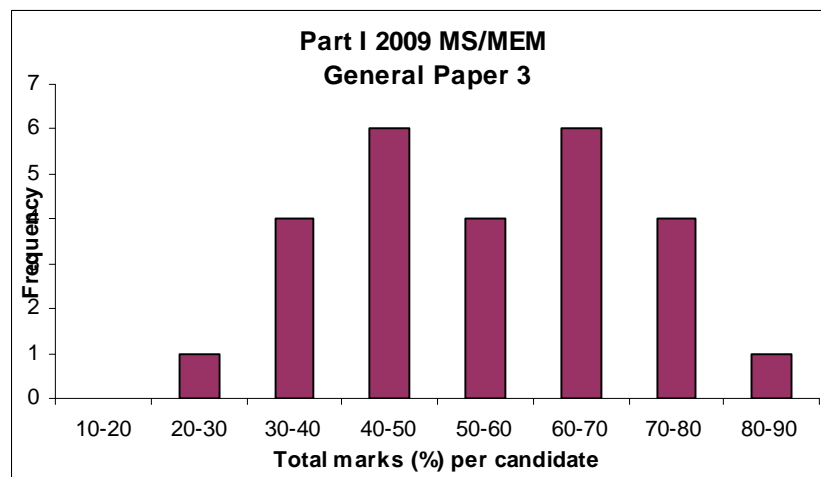
Candidates: 26 (22 MS, 4 MEM)

Mean mark: 56.3 %

Maximum mark: 86.0 %

Minimum mark: 26.0 %

Question	Topic	No of Answers	Average Mark	Highest Mark	Lowest mark
1	Microplasticity	18	9.9	18	5
2	Mechanical Properties Of Polymers	22	14.5	19	6
3	Fracture	12	7.3	15	1
4	Microplasticity	17	9.5	17	3
5	Macroplasticity	9	8.2	15	5
6	Elasticity Of Isotropic Materials	21	10.5	15	4
7	Creep And Superplasticity	13	11.8	18	5
8	Mechanical Properties Of Composites	18	15.1	20	3



General Comments:

1. Many weak answers describing ‘dislocations cutting solute atoms’. In part a(ii) many answers describe dislocation-precipitate interactions rather than dislocation-solute interactions.
2. Many very strong answers to this question. In (a) many answers were specific to metals rather than general to all categories of materials
3. Initial descriptive part (a) answered satisfactorily, though fewer candidates could describe striations in (b). Many struggled with setting up and solving equations required for part (c)
4. Descriptive part (a) generally yielded satisfactory answers. There was a much larger spread in quality of answers in part (b), where weaker students struggled with equations, despite this being a ‘standard’ problem.
5. Constant volume analysis for part (a) was done well. Answers to part (b) were much weaker. Many derived or stated the correct equations for Considere’s construction, though few correctly used it to analyse data provided. Very few understood the point in part (b) (ii).
6. Mathematical nature of elasticity has often led to few attempts at these questions so it was encouraging to see a large number of good answers. The most common flaw in answers was a failure to use the ‘product rule’ when differentiating in part (b)
7. In part (a) several answers incorrectly labelled the creep curve as creep rate (rather than creep strain) against time. Answers to part (c) were weaker, even though in many cases the required Bailey-Orowan had been correctly stated in answering part (b).
8. Derivation in parts (c) and (d) was answered extremely well by the vast majority (possibly learnt by rote by some). Descriptive parts in (a) and (b) were answered slightly less well.

General Paper 4 – Engineering Applications of Materials

Examiner: Dr Mike Jenkins

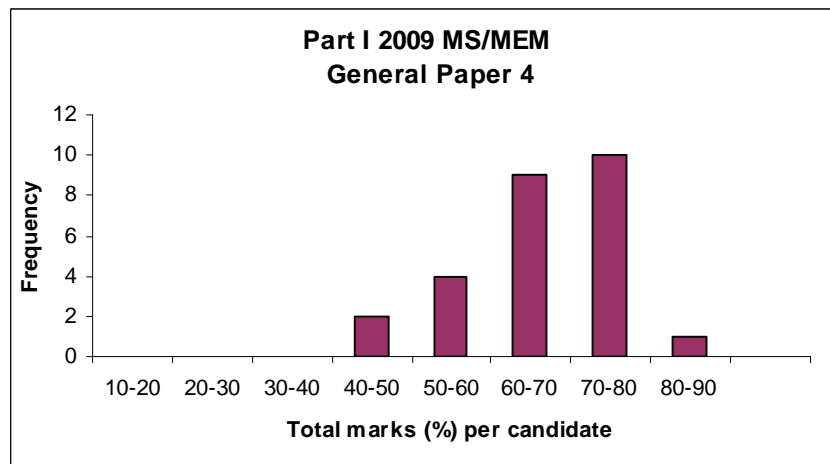
Candidates: 26 (22 MS, 4 MEM)

Mean mark: 66.1 %

Maximum mark: 81.0 %

Minimum mark: 42.0 %

Question	Topic	No of Answers	Average Mark	Highest Mark	Lowest mark
1	Characterisation Of Materials	19	10.0	15	3
2	Characterisation Of Materials	18	13.3	19	4
3	Semiconductor Devices	12	13.6	18	9
4	Engineering Alloys	22	15.0	20	6
5	Engineering Alloys	23	14.0	19	7
6	Ceramics And Glasses	15	12.4	16	6
7	Ceramics And Glasses	4	11.0	12	10
8	Engineering Applications Of Polymers	17	14.4	20	9



General Comments:

1. Very few candidates could explain clearly the principle of selected-area diffraction. Part (a)(i). None recognized that “missing” reflections in the pattern for $(h + k + l) = (4n + 2)$ (e.g. 200) implied that the crystal structure was diamond cubic, part (a)(iii). Few gave any sort of answer to part (b)(ii). Other parts of the question were answered rather better by most.
2. Part (a) of this question was answered well by many, although a number of candidates thought that the formula $s = p/M$ (s = specimen pixel size, p = display pixel size, M = magnification) was used to define M rather than s . A number of candidates gave good derivations of the formula required in (b) although this was not really needed. There were mixed answers to parts (c) and (d), including some very good answers.
3. Parts (a) and (b) were answered well by most candidates. In part (c) several candidates realized that Si-Ge alloys are sometimes employed in the base region of bipolar transistors because they have a smaller band-gap than Si. Only a few stated that this resulted in a larger barrier for majority carrier diffusion from base to emitter than vice-versa. No-one drew a band diagram to illustrate this or explained the reason why this could lead to faster devices.
4. The majority of answers to this straightforward question were good. No part of the question offered particular difficulty.
5. Answers to this question were rather mixed although there were several very good answers. In parts (a) – (c) most candidates knew the major alloying elements in the various alloy series, although surprisingly few knew that 5000 series alloys exhibit solid-solution strengthening, and in general are not heat treatable. Some candidates had a tendency to write all they knew about these alloys instead of addressing the particular question.
6. There was quite a bit of confusion about the difference between reaction sintering and liquid-phase sintering, with rather few candidates knowing much about the latter. However there were several good answers.
7. The few answers to this question were moderate in quality, and generally lacking in detail.
8. This question was answered well by a majority of candidates, but again there was a tendency for weaker candidates to write all they knew rather than address the question asked. In particular some candidates wrote extensively on the uses of the three classes of polymer listed in (a) but said little about their mechanical properties. Part (b) was well answered by most.

Materials Option Paper 1

Examiner: Dr Keyna O'Reilly

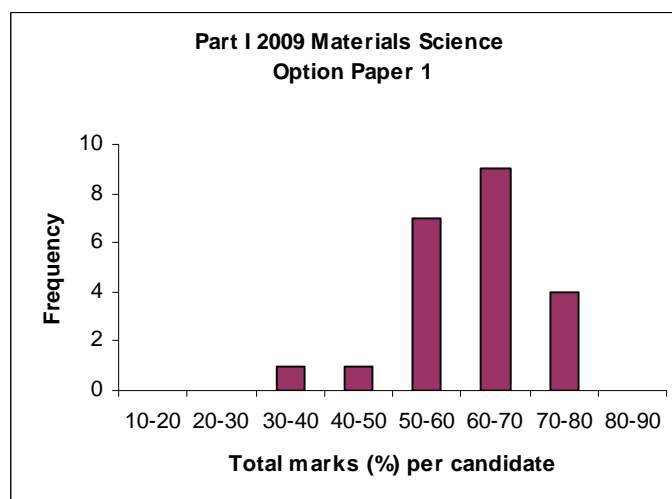
Candidates: 22 (MS)

Mean mark: 61.6 %

Maximum mark: 73.0 %

Minimum mark: 35.0 %

Qu	Topic	No of Answers	Average Mark	Max. Mark	Min. mark
1	Strength and Failure of Materials	1	19.0	19	19
2	Strength and Failure of Materials	6	18.0	23	13
3	Melt Processing	10	22.5	28	17
4	Functional Nanomaterials	11	21.0	25	14
5	Functional Nanomaterials	3	21.3	25	19
6	Electroceramics	9	18.3	26	4
7	Biomaterials and Natural Materials	9	21.1	27	17
8	Biomaterials and Natural Materials	8	18.8	23	13
9	Properties of Engineering Ceramics	9	20.2	27	14



General Comments:

1. A very unpopular question on fatigue cracks and fracture control schemes. Part (a) required description of fatigue crack growth in each of the three distinct regimes of the growth curve in order to achieve good marks. Parts (b) and (c) were rather briefly answered. The standard bookwork required for part (d) was rather poorly done.
2. Part (a) was answered reasonably well though few mentioned importance of melting point in limiting application of Zn alloys. In part (b) microstructures were reasonably well described but mechanistic link to ductility was less clearly described. In part (c) some answers suggested nitriding which is not compatible with stated composition. Answers to part (d) on NDT were generally sound.
3. A popular question on the problems arising from shrinkage during solidification of castings and the effects of fluid flow, which was generally well answered. Not all candidates were able to describe four distinct methods in part (b), and in part (c) the factors inducing the flow were generally well described, but there was insufficient discussion of the benefits and problems.
4. A very popular question on nanowires and nanotubes which was generally well answered. Many candidates answered the section on advantages and disadvantages rather briefly in part (a). In part (b), not all candidates could give five distinct properties. Part (c) was generally correctly answered, but part (d) was generally very briefly answered with very few candidates able to describe how the defects were investigated experimentally.
5. An unpopular question but well answered by the few that attempted it. Parts (a) and (b) were generally well answered, but part (c) concerning melting of nanoparticles was less well answered.
6. A popular question with a large range in marks; the mean mark was brought down by a couple of very weak answers. Parts (a) and (b) were mostly well answered. In part (c) there was generally very little attempt to identify a common theme of band bending at grain boundaries.
7. A very popular question on the materials used in hip and knee surgery which was generally well answered. However, very few candidates were able to accurately define the terms in part (a). The “hip” part was generally answered in more detail than the “knee” part; the fixation techniques and expected lifetime of the knee implant being only briefly referred to, if at all. More use of diagrams would have been appropriate.
8. A question on the use of polymers and ceramics for biomedical applications. Again, not all candidates could accurately define the terms in parts (a) and (c). In parts (b) and (d), where candidates lost significant marks it was generally for not answering all parts of the question or for not giving the required number of methods. Drug-delivery devices were particularly weakly answered, though some novel techniques may have been invented. The descriptive section of part (c) solicited very mixed answers with some candidates giving very little detail of the response over time.
9. In (a) most identified that cubic, tetragonal and monoclinic phases exist, and that a martensitic transformation occurs from tetragonal to monoclinic structures. Descriptions of compositions and microstructures for PSZ, TZP and ZTA were not well covered. The description of stable crack growth was

well described by most and many described the role of T^2 versus ρ_c plot.
Many candidates struggled to use the numerical data in part (c) correctly.

Overall Comments

The paper showed quite a good spread in the questions attempted, though Section A (metals and alloys) proved less popular, and Section B (functional and nanocomposite materials) more popular, than in previous years. Section A (metals and alloys) had 17 attempts, Section B (functional and nanocomposite materials) had 23 attempts, and Section C (non-metallic materials) had 26 attempts.

Materials Option Paper 2 / Materials Option Paper

Examiner: Dr Hazel Assender

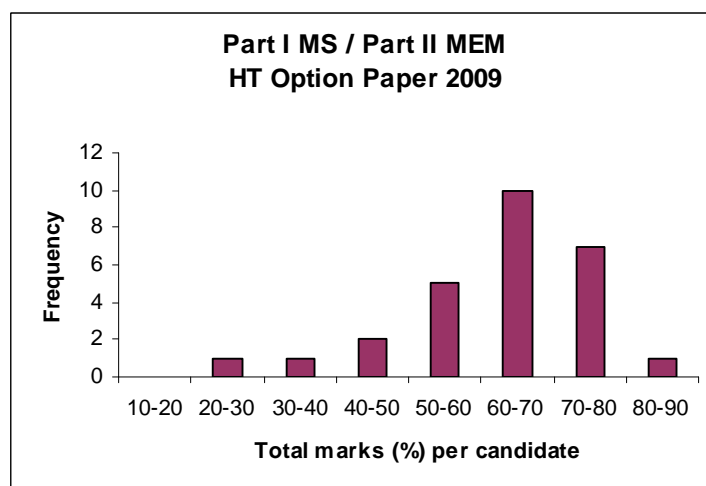
Candidates: 27 (22 MS / 5 MEM Part II)

Mean mark: 62.2 %

Maximum mark: 83.0 %

Minimum mark: 25.0 %

Question	Topic	No of Answers	Average Mark	Highest Mark	Lowest mark
1	Advanced engineering alloys and composites: Fe, Ti, Al & Ni alloys	9	20.2	27	11
2	Advanced engineering alloys and composites: spinodal decomposition	7	22.6	31	12
3	Manufacture with metals and alloys: coating technologies	13	24.1	29	17
4	Materials and devices for information technology: CMOS devices and bipolar transistors	11	20.2	27	7
5	Materials and devices for information technology: Si p-i-n photodiodes	5	15.6	23	3
6	Materials and devices for information technology: magnetic storage media	7	20.9	27	15
7	Advanced polymers: molecular motions and diffusion	13	17.7	26	3
8	Ceramics processing: sol-gel and aerogels	11	21.1	29	17
9	Advanced polymers: scattering studies and polyelectrolytes	5	18.4	20	16



General Comments:

1. *Advanced Engineering Alloys and Composites*
A two-part question. The first part (18 marks) required candidates to compare solid-state transformations in Fe and Ti alloys. Many candidates could give a good description of transformations but few could make a genuine comparison of the two alloy systems, so most answers did not reveal thinking on the part of the student, and tended to be a list of facts remembered from the lectures. The second part (15 marks) of the question went on to consider the compositions and heat treatments in Al and Ni which do not show solid-state transformations, and to compare with Fe and Ti. Again, a generally good ability to remember the salient features of the alloys, but there were few examples of thoughtful comparisons of the different systems.
2. *Advanced Engineering Alloys and Composites*
The first (10 mark) section was a comparison of spinodal decomposition with nucleation and growth generally quite well answered. Section b (17 marks) worked through the derivation of the composition fluctuation for spinodal decomposition using the Cahn-Hilliard theory. Many candidates were able to make some attempt at the derivations, but often appeared to be working from memory of the equations of the various steps and revealed a lack of understanding of the process – the final subsection considering the graph of R_{sp} vs λ was particularly poorly answered. The final section (6 marks) on how to distinguish spinodal decomposition from nucleation and growth was generally well answered.
3. *Manufacture with Metals and Alloys*
Question on coating technologies for various alloys. An apparently straightforward question that could be answered well by successful listing of key points from the lectures. A few candidates described surface modification processes in addition to specifically coating technologies, which was not solicited by the question. Some candidates became muddled about which coating technologies were appropriate for which alloy system, and in some cases described stainless rather than plain carbon steel.
4. *Materials and Devices for Information Technology*
Question focussed on CMOS devices and materials and processing choices for a bipolar transistor. The first (6 mark) section on the design rule gave rise to rather vague answers in many cases. Section b (4 marks) on the gate dielectric material in some cases suggested that candidates did not understand the gate leakage/capacitance issue. The final section (23 marks) considered the materials, manufacture and doping of a bipolar transistor. A significant number of candidates muddled a bipolar with an FE transistor in labelling the contacts and/or focussed on diffusion rather than ion implantation for the n+ region, which lead to difficulty in the final subsection when describing the dopant profiles which was generally poorly answered.
5. *Materials and Devices for Information Technology*
The question was on Si p-i-n photodiodes requiring a description of devices at different potentials on the IV curve. There were some good responses on devices, but often no good use of band diagrams. The final section on the sensitivity of the photodiode and PV efficiency was generally poorly answered.

6. *Materials and Devices for Information Technology*
Section (a) required a straightforward description of longitudinal thin film media. Most candidates could give a general description but only a few related it well to magnetic properties of the materials. Section (b) was on perpendicular media, and was slightly more problematic in relating to magnetic properties. The final section required use of the Stoner-Wohlfarth model to predict the MH behaviour in particulate magnetic media. The derivation was poorly described in many cases, again often relying on poor memory of the equations rather than physical understanding of the material.
7. *Advanced Polymers*
Question on free volume, and molecular motions including reptation. Basic section (3 marks) on nature of free volume often poorly answered. The section (7 marks) soliciting a description of molecular motions was often limited to a description of reptation. Most candidates (sections c and d, 10 marks) could identify how motions and T_g changed with temperature and molecular weight in general terms but were not specific in their answers. Many candidates could identify the change in behaviour at high molecular weight (section (e), 13 marks) with entanglement but few could derive the scaling behaviour.
8. *Ceramics Processing*
Section (a) (14 marks), which required a description of sol-gel processing, its advantages and application, was moderately well answered. Section (b) required a rather straightforward calculation of specific surface area of an aerogel and particle diameter on which some candidates could make little inroad, in many cases they did not understand what a specific surface area is.
9. *Advanced Polymers*
The first sections (a-d, 21 marks) on a comparison of light scattering, SAXS and SANS and their measurement of polymer dimensions revealed some knowledge of the area, though few candidates gave comprehensive answers. For the calculation of theta max, the candidates generally relied on a simple application of Bragg's Law. The final section (12 marks) compared linear conventional and polyelectrolyte polymers at various solution concentrations. Again, candidates made moderately good attempts at the descriptions, but were generally not able to discuss the scaling relations.

Overall Comments:

There was, perhaps, a better distribution of attempts to questions on the various sections of the course than in some years, the least popular questions soliciting five answers. Across the various subject blocks the attempts distribution is: block A, 29 answers, block B 23 answers, block C 29 answers perhaps reflecting a smaller number of candidates selecting block B as an option, but otherwise a reasonably even distribution across the subject areas.

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

Part I

A. STATISTICS

(1) Numbers and percentages in each category

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

Class	Number			Percentage (%)		
	2008/09	2007/08	2006/07	2008/09	2007/08	2006/07
I	11	5	5	45.8	26.3	41.7
II.I	10	11	4	41.7	57.9	33.3
II.II	3	3	2	12.5	15.8	16.7
III	0	0	1	0	0	8.3
Pass	0	0	0	0	0	0
Fail	0	0	0	0	0	0

(2) If vivas are used

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

(3) Marking of scripts

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

B. NEW EXAMINING METHODS AND PROCEDURES

(1) This year the Part II thesis was marked out of a possible 400 marks, where previously it had been marked out of 350 marks. This maintained a similar weighting for the Part II thesis to previous years following the introduction of an additional assessed element to the Part I Examination in 2007/08. All students, including returners, were marked under the new scheme.

(2) The marking guidelines for the marking of the Part II thesis were revised in conjunction with the Part II Co-ordinator and the Chair of Faculty, to remove any reference to work being of publishable quality.

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

The supervisor(s) of a particular project are asked to provide a report on the project. This report provides factual information regarding the progress of the project, support provided, problems encountered etc., and the opinion of the supervisor(s) as to the quality of the work. Despite the existing guidance in the Conventions, recent practice has been for a particular cohort of Examiners to decide whether or not they wish to see these reports, and if so, at what stage in the Examining process they are made available. Hence practice has varied from year to year. The Examiners suggest that Faculty should consider the content of these reports, and what use, if any, it wishes the Examiners to make of them. The Examination Conventions should be revised to make the situation more explicit, based on the decision of Faculty.

D. EXAMINATION CONVENTIONS

The previous year's Examination Conventions were included in the Course Handbook that was distributed to all candidates in hard-copy and was also made available on the Departmental website, to which candidates' attention was drawn by e-mail. The current year's Conventions (2009, attached) were put on the Departmental website and sent in hard-copy on 11th March 2009 and electronically on 23rd March 2009 to all candidates. The Examination Conventions were assessed by the Board of Examiners and the Department's Academic Committee.

Part II

A. GENERAL COMMENTS ON THE EXAMINATION

There were 24 candidates for the examination, and all were awarded Honours. The examination required the candidates to submit a thesis (maximum 15,000 words) on a research project carried out by candidates during the year, usually in the Department of Materials. Three research projects were carried out overseas, one in Princeton University, one in MIT and one in UCSB. The theses were marked by the Examiners, using pre-defined guidelines that aimed to make use of the full range of marks. Candidates were then given a 25 minute viva, during which they were asked detailed questions on their research work.

The theses were generally of a very high quality, and the candidates were able to explain their work well in the vivas. In some cases the vivas became short but in-depth scientific discussions with the candidates. The marks for the Part II examination ranged from 60% to 82%, with an overall mean mark almost in the 1st class range. The external Examiners played a crucial role in deciding the final marks for the candidates, and the Chairman would like to express her thanks to both of them for their hard work in marking so many Part II theses and contributing greatly to the vivas.

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

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

mark (%)	Overall mark		Part 2 Project		Part I Mark	
	Male	Female	Male	Female	Male	Female
40–50						
50–60	4	1			6	2
60–70	6	2	12	3	4	2
70–80	8	3	2	3	6	2
80–90			4		2	
Totals	18	6	18	6	18	6

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

All candidates took the same examination, producing a thesis and attending a viva. The statistics on the final marks for both Part I (2008) and Part II for these candidates is given above.

D. COMMENTS ON PAPERS AND INDIVIDUAL QUESTIONS

Not relevant for this examination.

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



F. NAMES OF MEMBERS OF THE BOARD OF EXAMINERS

Dr. K.A.Q. O'Reilly (Chairman)
 Dr. H.E. Assender
 Prof. A. Cerezo
 Dr. M.L. Jenkins
 Dr. P.D. Nellist
 Dr. A.J. Wilkinson
 Prof. J. Binner (external)
 Prof. A.L. Greer (external)

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

Part I

A. STATISTICS

(1) Numbers and percentages in each category

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

(2) If vivas are used

The Board of Examiners decided at the start of the examination process that Part I students would not be given vivas. Students were informed of this both by letter on 11th March 2009 and by e-mail on 23rd March 2009.

(3) Marking of scripts

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

B. NEW EXAMINING METHODS AND PROCEDURES

The Microeconomics paper was changed in format this year (a short answer question replaced one of the longer essays) to reflect the slightly modified course sat by the MEM candidates. A full report on the paper is given later in the Report.

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

(1) Last year, as a result of a student failing a Materials paper, the Faculty was asked to consider whether it was content that candidates achieve Honours without passing (or achieving Honours) on all of the papers. Faculty decided that it was content to continue with these current procedures. Looking at Part I Materials Science and MEM combined, this year 6 students together failed a total of 8 Materials General Papers and 3 Materials Option Papers (NB. MEM Part I do not take the Option Papers), including 3 marks which were below 30%. All of these students gained marks of over 40% overall at Part I and therefore passed Part I with Honours. In addition, one student this year failed to achieve a mark of 40% in Practicals, though achieve more than 40% in the Coursework overall. The Examiners suggest that Faculty address this issue again in light of these results.

(2) It has been noted by one of the external Examiners that some students benefitted from the procedures of using half-marks in the marking of the Materials papers, and most importantly, that these gains were random in nature. The convention used was to allow the use of half-marks in the marking of each section of a question, and to round up the total marks for each question determined by each marker. The average of the two markers marks would then be further rounded, if necessary, for each question. It is suggested that the average of the two

markers marks should not be rounded, and that rounding only takes place when the aggregate mark for the paper is determined.

(3) The Examiners were perturbed to see that a number of candidates received scores of zero for individual Practical assignments, despite the students having carried out the Practical work assigned. It is thought, but not confirmed, that the students in question submitted their write-ups too late to the markers. We therefore suggest that procedures are put in place (i) to record the reason why a given mark of zero was awarded; and (ii) for markers to alert the Teaching Laboratory Organiser when a student has failed to get their Practical marked in the required timescale.

D. EXAMINATION CONVENTIONS

The previous year's Examination Conventions were included in the Course Handbook that was distributed to all candidates in hard-copy and was also made available on the Departmental website, to which candidates' attention was drawn by e-mail. The current year's Conventions (2009, attached) were put on the Departmental website and sent in hard-copy on 11th March 2009 and electronically on 23rd March 2009 to all candidates. The Examination Conventions were assessed by the Board of Examiners and the Department's Academic Committee.

Part II

A. GENERAL COMMENTS ON THE EXAMINATION

There were 4 candidates for the examination. The examination consisted of 7 written papers plus coursework that included a team design project, industrial visit reports and practical work carried out during the 2nd and 3rd years. One of the written papers (Introductory Economics) is taken in the 2nd year.

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

The overall mean mark for Part I was at the low end of the 2(i) range. The mean marks (for all students taking these papers i.e. MS and MEM students combined) of 2 of the 4 written Materials General Papers in the examination were in the 2(i) band (60-70%) and so no scaling needed to be considered. The remaining 2 papers had mean marks of 55.6 and 56.3%. The Examiners, including the external Examiners, considered the need to scale these papers. However, we considered that the papers were set at an appropriate level and that the low mean marks obtained were a result of a small number of decidedly weak students pulling down the average: 6 students having together failed a total of 8 Materials General Papers. Mean marks for the practical work were higher than for the papers, being in the 2(i) class band, but this is in line with the results from previous years.

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

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

A non-serif font was again used for Materials examination papers, in order to make them comply with SENDA/ADA guidelines. No specific requests were received for enlarged copies. Candidates were allowed extra time on account of dyslexia/dyspraxia, where necessary, and the outcomes seemed satisfactory.

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

All candidates took the same papers for the whole examination.

D. COMMENTS ON PAPERS AND INDIVIDUAL QUESTIONS

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

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

(1) Numbers and percentages in each category

The Part I Examination in Materials Economics and Management is unclassified. No distinctions are awarded. There were 4 candidates for the examination, and all were awarded Honours.

Category	Number			Percentage		
	2008/09	2007/08	2006/07	2008/09	2007/08	2006/07
Distinction	n/a	n/a	n/a	n/a	n/a	n/a
Pass						
Fail						

(2) Breakdown of the results by gender

mark (%)	Overall mark		Written Examinations		Coursework	
	Male	Female	Male	Female	Male	Female
40–50	■	■	■	■	■	■
50–60	■	■	■	■	■	■
60–70	■	■	■	■	■	■
70–80	■	■	■	■	■	■
80–90	■	■	■	■	■	■
Totals	3	1	3	1	3	1

(3) Medical Certificates: none.

F. NAMES OF MEMBERS OF THE BOARD OF EXAMINERS

MEM:

Dr K A Q O'Reilly (Chair, Part I and Part II)

Dr H E Assender

Prof A Cerezo

Dr M L Jenkins

Dr P D Nellist

Dr A J Wilkinson

Prof Richard Whittington (Management)

Dr Dana Brown (Management)

Dr Paulo Quattrone (Management)

Mr Anthony Courakis (Economics)

Dr Howard Smith (Economics)

Prof Jon Binner (External)

Prof Lindsay Greer (External)

Prof Paul Cousins (External, Management)

Prof Gauthier Lanot (External, Economics)

Attachments:

General Paper 1 – Structure and Transformations

Examiner: Prof. Alfred Cerezo

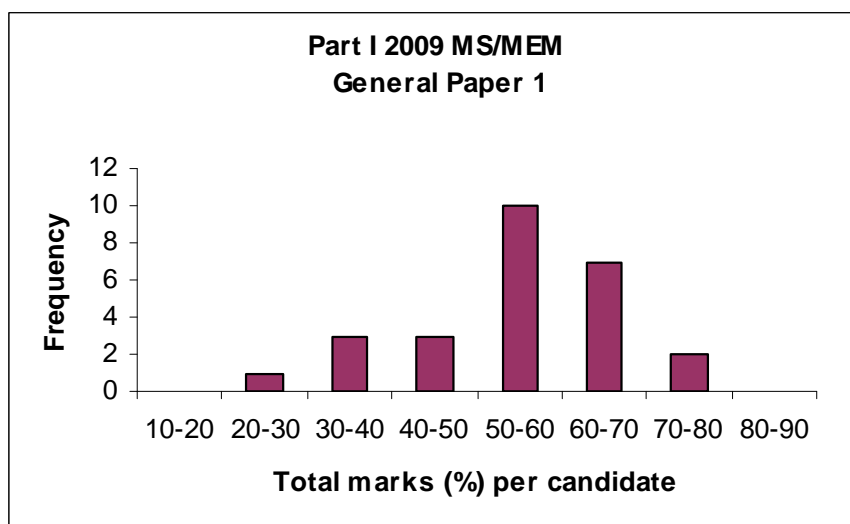
Candidates: 26 (22 MS / 4 MEM)

Mean mark: 55.6 %

Maximum mark: 77.0 %

Minimum mark: 26.0 %

Question	Topic	No of Answers	Average Mark	Highest Mark	Lowest mark
1	Corrosion	20	13.1	19	6
2	Surfaces and Interfaces	17	14.4	18	10
3	Phase transformations	20	8.0	13	2
4	Phase transformations	15	10.3	15	6
5	Powder processing	15	9.9	16	4
6	Ternary phase diagrams	19	11.7	18	2
7	Polymers	20	11.8	17	7
8	Diffusion	4	4.5	8	1



General Comments:

The average mark achieved by candidates on this paper was rather low, but this was mainly due to a tail in the mark distribution that went down to a minimum mark below 30%. The bulk of the distribution was very similar to other papers. It was also considered that the paper was no harder than in previous years, and that the marks achieved were a true reflection of the candidates' performance. Thus, no scaling was applied to the paper and the raw marks were allowed to stand.

1. Very popular question on inhibitors, on which candidates generally scored highly. Answers generally short on details, e.g. mechanisms of inhibition, but candidates were able to give basic types of inhibitor and how these were used.
2. Question on surface energy, generally answered well, although candidates did not show a clear understanding of principles. There was much discussion of "dangling bonds" rather than co-ordination, and Ostwald ripening mentioned in context of grain growth. High marks for simple derivation of Gibbs-Thomson effect raised overall marks.
3. Poorly answered question on heterogeneous nucleation, with most candidates not even able to construct the equation for change in free energy, often missing the volume term, even when they could handle the case of homogeneous nucleation.
4. Relatively standard bookwork question on coupled growth, which was rather poorly answered on the whole. Few candidates could remember that coupled growth has a linear growth law. Many talked about finer microstructures due to rapid nucleation rate, rather than optimum lamellar spacing, and some didn't seem to know what a TTT diagram was.
5. Descriptive bookwork question, which was not as popular as usual, and generally poorly answered. Candidates often described metal injection moulding as if the powder was injected directly, with no binder.
6. Despite this question being similar to an example given in the lectures, many candidates failed to identify that only one triangle exists in the ternary phase diagram in (c). However, a reasonable level of understanding was shown by most candidates.
7. Answers to this question were rather weak, generally due to lack of detail in discussing polymer solubility, or silly mistakes in calculating structural spacings, such as misquoting Bragg's Law. None of the candidates completed the final part correctly.
8. Surprisingly unpopular bookwork question on basic diffusion mechanisms, which appears to have been attempted by some of the more desperate candidates, resulting in very poor marks.

General Paper 2 – Electronic Properties of Materials

Examiner: Dr Peter Nellist

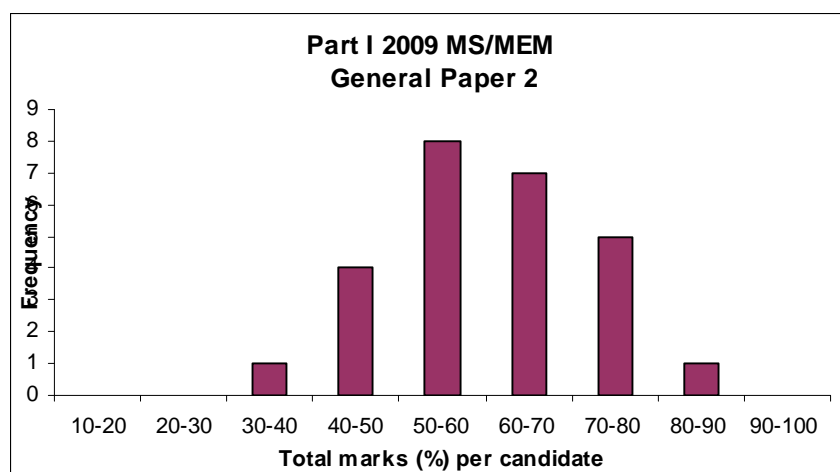
Candidates: 26 (22 MS / 4 MEM)

Mean mark: 61.4 %

Maximum mark: 83.0 %

Minimum mark: 39.0 %

Question	Topic	No of Answers	Average Mark	Highest Mark	Lowest mark
1	Magnetic properties	16	11.6	16	5
2	Tensors	19	13.6	16	9
3	Electronic structure	18	12.2	19	3
4	Quantum mechanics	9	10.1	18	3
5	Quantum mechanics	21	11.3	17	6
6	Statistical mechanics	19	10.8	19	2
7	Electrical and optical properties	3	15.0	17	13
8	Semiconductor materials	25	14.2	20	5



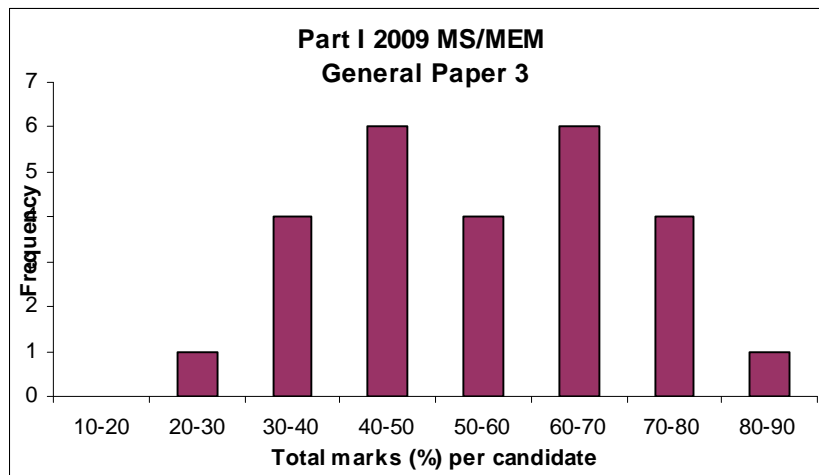
General Comments:

1. A discursive question concerning types of magnetism in materials. A well-structured question and the first two sections were often well answered. Not many candidates were able to give a convincing discussion of the exchange interaction in materials required in the later sections.
2. A question asking why electronic susceptibility takes the form of a second rank tensor, then a problem involving a rotation to a new coordinate basis. Although the initial explanation was often poorly given, most candidates were able to use Mohr's circle or equivalent to rotate the tensor. Many used the wrong angle by not reading the question carefully, and often the results of calculations were presented without units.
3. A well-structured question based on the free-electron model. The derivation of the Hall coefficient was clearly well known and using it to find a lattice constant was done well. The final part of the question regarding the Brillouin zones was more patchily answered, and many candidates only gave a 1D plot when a 2D plot was asked for.
4. A more discursive question on finding the electronic orbitals of hydrogen and the extension to many electron atoms. A rather unpopular question and generally poorly answered, though the final section on applying Hund's rules demonstrated a generally good understanding.
5. A popular, well-structured, question making use of a given wavefunction to find expectation values and hence demonstrate Heisenberg uncertainty. Many candidates struggled to form the correct integrals to calculate expectation values, and very few were then able to go on to demonstrate the uncertainty principle.
6. A well-structured question developing the Einstein expression for heat capacity. Candidates demonstrated that the concepts were understood, but struggled to develop the mathematic expressions. There was a tendency to jump to the given expressions without demonstrating the algebraic steps that got there.
7. A very unpopular question on the response of a material to AC fields, but those that attempted it did very well. Part (b) was probably too heavily weighted in the marking scheme given that the particular integral to the differential equation was given making this section straightforward.
8. A very popular question that was mostly bookwork. Obviously well understood and learnt by candidates, with the marks reflecting that.

General Paper 3 – Mechanical Properties

Examiner: Dr Angus Wilkinson
Candidates: 26 (22 MS, 4 MEM)
Mean mark: 56.3 %
Maximum mark: 86.0 %
Minimum mark: 26.0 %

Question	Topic	No of Answers	Average Mark	Highest Mark	Lowest mark
1	Microplasticity	18	9.9	18	5
2	Mechanical Properties Of Polymers	22	14.5	19	6
3	Fracture	12	7.3	15	1
4	Microplasticity	17	9.5	17	3
5	Macroplasticity	9	8.2	15	5
6	Elasticity Of Isotropic Materials	21	10.5	15	4
7	Creep And Superplasticity	13	11.8	18	5
8	Mechanical Properties Of Composites	18	15.1	20	3



General Comments:

1. Many weak answers describing ‘dislocations cutting solute atoms’. In part a(ii) many answers describe dislocation-precipitate interactions rather than dislocation-solute interactions.
2. Many very strong answers to this question. In (a) many answers were specific to metals rather than general to all categories of materials
3. Initial descriptive part (a) answered satisfactorily, though fewer candidates could describe striations in (b). Many struggled with setting up and solving equations required for part (c)
4. Descriptive part (a) generally yielded satisfactory answers. There was a much larger spread in quality of answers in part (b), where weaker students struggled with equations, despite this being a ‘standard’ problem.
5. Constant volume analysis for part (a) was done well. Answers to part (b) were much weaker. Many derived or stated the correct equations for Considere’s construction, though few correctly used it to analyse data provided. Very few understood the point in part (b) (ii).
6. Mathematical nature of elasticity has often led to few attempts at these questions so it was encouraging to see a large number of good answers. The most common flaw in answers was a failure to use the ‘product rule’ when differentiating in part (b)
7. In part (a) several answers incorrectly labelled the creep curve as creep rate (rather than creep strain) against time. Answers to part (c) were weaker, even though in many cases the required Bailey-Orowan had been correctly stated in answering part (b).
8. Derivation in parts (c) and (d) was answered extremely well by the vast majority (possibly learnt by rote by some). Descriptive parts in (a) and (b) were answered slightly less well.

General Paper 4 – Engineering Applications of Materials

Examiner: Dr Mike Jenkins

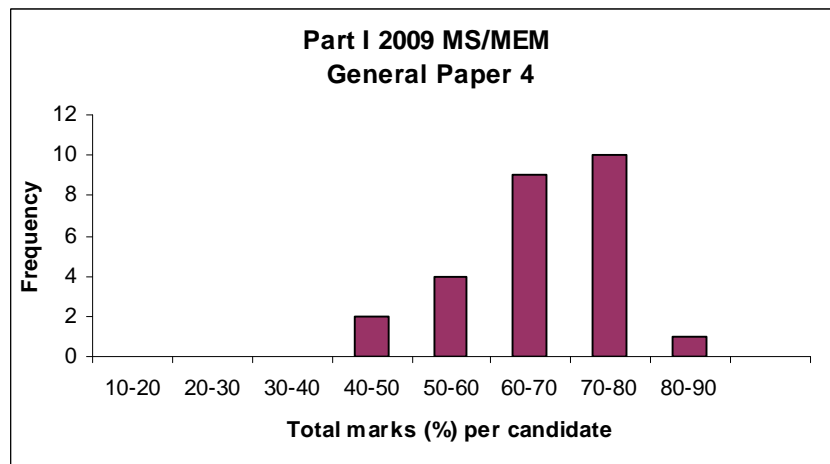
Candidates: 26 (22 MS, 4 MEM)

Mean mark: 66.1 %

Maximum mark: 81.0 %

Minimum mark: 42.0 %

Question	Topic	No of Answers	Average Mark	Highest Mark	Lowest mark
1	Characterisation Of Materials	19	10.0	15	3
2	Characterisation Of Materials	18	13.3	19	4
3	Semiconductor Devices	12	13.6	18	9
4	Engineering Alloys	22	15.0	20	6
5	Engineering Alloys	23	14.0	19	7
6	Ceramics And Glasses	15	12.4	16	6
7	Ceramics And Glasses	4	11.0	12	10
8	Engineering Applications Of Polymers	17	14.4	20	9



General Comments:

9. Very few candidates could explain clearly the principle of selected-area diffraction. Part (a)(i). None recognized that “missing” reflections in the pattern for $(h + k + l) = (4n + 2)$ (e.g. 200) implied that the crystal structure was diamond cubic, part (a)(iii). Few gave any sort of answer to part (b)(ii). Other parts of the question were answered rather better by most.
10. Part (a) of this question was answered well by many, although a number of candidates thought that the formula $s = p/M$ (s = specimen pixel size, p = display pixel size, M = magnification) was used to define M rather than s . A number of candidates gave good derivations of the formula required in (b) although this was not really needed. There were mixed answers to parts (c) and (d), including some very good answers.
11. Parts (a) and (b) were answered well by most candidates. In part (c) several candidates realized that Si-Ge alloys are sometimes employed in the base region of bipolar transistors because they have a smaller band-gap than Si. Only a few stated that this resulted in a larger barrier for majority carrier diffusion from base to emitter than vice-versa. No-one drew a band diagram to illustrate this or explained the reason why this could lead to faster devices.
12. The majority of answers to this straightforward question were good. No part of the question offered particular difficulty.
13. Answers to this question were rather mixed although there were several very good answers. In parts (a) – (c) most candidates knew the major alloying elements in the various alloy series, although surprisingly few knew that 5000 series alloys exhibit solid-solution strengthening, and in general are not heat treatable. Some candidates had a tendency to write all they knew about these alloys instead of addressing the particular question.
14. There was quite a bit of confusion about the difference between reaction sintering and liquid-phase sintering, with rather few candidates knowing much about the latter. However there were several good answers.
15. The few answers to this question were moderate in quality, and generally lacking in detail.
16. This question was answered well by a majority of candidates, but again there was a tendency for weaker candidates to write all they knew rather than address the question asked. In particular some candidates wrote extensively on the uses of the three classes of polymer listed in (a) but said little about their mechanical properties. Part (b) was well answered by most.

**Examiners Report for MEM 2009---Economics Papers.
Howard Smith**

Part I

Introductory Economics

Five (5) MEM candidates were entered for Introductory Economics, which they sit in 2008. The Introductory Economics scripts were double marked for EEM and MEM students. The paper is also taken as a Prelims exam by PPE and E&M students. A detailed report on this paper was produced by the Prelims Examiners for PPE in 2008, including comments on individual questions.

The means for the MEM (year 2008) candidates are compared with the E&M (year 2008) candidates below:

MEM candidates: Mean 61.0.

E&M candidates: Mean 62.8.

Microeconomics

MEM (5 candidates): Mean 64.6 E&M (85 candidates): Mean 61.7

Note that for *Microeconomics* the paper taken by MEM candidates was in the new format, while the paper taken by E&M (and PPE) candidates was in the old format. Although the formats were different, many of the individual questions were the same. There were no problems resulting from the new format, and performance was similar to performance by E&M students on the old format. However, the number of MEM students was small (five), which limits the extent to which conclusions can be drawn on the success of the new paper. A fuller assessment will be possible next year when the PPE and E&M students take the paper.

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5 scripts: all MEM

All: [REDACTED]

Part A proved to be very discriminating, with marks for individual questions ranging from [REDACTED], and a mean of 62% and standard deviation of ~20.

Considering answers to individual questions (and taking each candidate's average Part A mark as just one mark):

[REDACTED]

Part A: Short questions

- 1] Exchange economy
3 attempts, [REDACTED]
- 2] Externality
4 attempts [REDACTED]
- 3] Bi-matrix game
4 attempts, scoring [REDACTED]
The majority of candidates got (a) and (b) right, but found (c) more challenging (which it was).
- 4] Expected utility
3 attempts, scoring [REDACTED]
Two reasoned their way to the right answer, one didn't.
Nobody sketched the CDF as a step function, they commonly put a mark at the correct place in (p,w)-space, then simply joined the dots.
- 5] Agency cost
1 attempt

[REDACTED]

Part B: Long questions

- 6] see PPE Examiners' Report, Q1
- 7] see PPE Examiners' Report, Q2
- 8] see PPE Examiners' Report, Q5

9] Three attempts. [REDACTED]

10] see PPE Examiners' Report, Q6a

11] no takers

Godfrey Keller
Howard Smith

July 2009

Management Paper Reports for EMEM

Introduction to Management

CEAM 4316

Comments on answers to the Introduction to Management Paper

The comments below refer to all candidates (EM, EEM, MEM) who sat the paper. The paper comprised 12 questions with candidates required to answer to four. The paper included questions across the range of management disciplines covered by the Introduction to Management course.

Question 1 (answered by 26%) Average mark 63%

Although this was a standard question which appears in the examination almost every year, only 26% candidates attempted. The average mark was modest. There are many different ways by which creative accounting can be performed. Candidates should demonstrate such knowledge by nicely categorizing different ways of doing creative accounting. Only a few marked more than 70%.

Question 2 (Answered by 6%) (Average mark 56%)

This was a very specific question based on the Russian SPE, and only a few students attempted, and answers were weak in general. The case may be very specific but the underlying theme and examination points are clear. If students understood the basic workings of accounting and finance, the answers must have been relatively straight forward.

Question 3 (Answered by 8%) (Average mark 65%)

Although, only 8% students attempted, this is the most fundamental point of Finance which all students must have good understanding. Answers were generally good, classifying the factors into "time value of money," "Risk Aversion," and "Inflation".

Question 4 (Answered by 61%) (Average mark 61%)

This was a relatively popular question with the quality of the answers a little uneven. Most candidates were able to explore different definitions of the term 'culture' and draw upon relevant frameworks such as Schein's different levels of culture in answering the question. Some candidates were able discuss different perspective on the notion of culture, particularly views of culture as metaphor and or as a description of more tangible organizational characteristics. There were also some useful attempts to explore different culture typologies, There were, however, few attempts to debate the relationship between culture and organizational performance; in other words, fewer addressed how and why the strength of an organization's culture might impact on corporate outcomes. Candidates needed discuss the dangers of rigidity and 'group think' which might flow from a strong culture, offset by the sense of purpose, loyalty and focus which might also emerge from such a culture. Few if any students challenged the unitarist assumptions underpinning the notion of a single organizational culture and their implications for managing diversity and conflict.

Question 5 (Answered by 68%) (Average mark 58%)

This was a very popular question, answered by over two thirds of candidates but the candidates' performance was somewhat disappointing, the average mark being depressed somewhat by a few very poor answers. The typical candidate approach to this question was to explore different notions of power, drawing, in particular, upon French and Raven's conceptual framework on the sources of power and Pfeffer's and Dahl's definitions of power. There were very few attempts to distinguish power from authority, a particular form of power, to explore the different bases for authority, to unpack the notion of control especially the different forms it might take, and crucially to debate the link between authority and control. Better candidates were able to pick-up on the importance of considering the link between authority and **formal** control, pointing to Crozier's work on the importance between informal and formal authority.

Question 6 (Answered by 78%) (Average mark 60%)

This was the most popular question on the paper, answered by the overwhelming majority of candidates with performance on it again a little uneven. The common type of answer was to simply compare different conceptualizations of the notion of strategy, drawing a sharp contrast between Mintzberg's and Ansoff's views of strategy as respectively emergent and more deliberative. Better candidates provided a wide ranging discussion of strategy drawing upon Whittington typology of approaches. Candidates needed to concrete more heavily on whether, how and why flexibility might be built-into strategy, drawing on say the resource based view and notions of core and dynamic capabilities, and where the balance might lie in terms of the impact on organizational performance between flexibility and rigidity.

Question 7 (Answered by 36% (Average mark 58%))

This was not a popular question, answered by around a third of candidates, and this might reflect the difficulties in answering this question given the relatively low marks. In general candidates answered this question by providing a straight description of the Toyota Production System or Total Quality Management. These descriptions were broad and sometimes crude, but often displayed a basic understanding of these approaches. Where candidates fell down was in trying to apply the principles associated with these production methods to the running a hospital: attempts to deal with this issue were non-existent, tokenistic or very weakly developed.

Question 8 (Answered by 10%) (Average mark 63%)

This was a very unpopular question. This question gives students the opportunities to draw on the ideas in the readings and lectures about service management, and in particular the ideas of co-creation of service and the role of customers as participants in and not just passive recipients of the service encounter. Students may draw on the classic articles by Levitt, and Pine and Gilmore. But the question also allows the students to draw in material from other parts of the course, in particular relating to alienation, Taylorism and Bravermanian ideas of deskilling, and contrasting/counterpointing them with Ritzer's McDonaldisation hypothesis.

Question 9 (Answered 14%) (Average mark 66%)

This was not a popular question. Indeed it is noteworthy that all three marketing questions (9, 10, 11,) were answered by only a minority of students. However those who did answer this question performed relatively well. Most candidates showed a strong grasp of Maslow's hierarchy of need and were able to critique this framework

as a means of understanding consumer behavior. The bases of these critiques did however vary. Some candidates suggesting that other needs based theories of motivations theories, such as Herzberg's, along with process theories, for instance equity theory were more useful. Other suggested that Maslow was somewhat dated failing, for example to account for the search and construction identity as a major driver of consumer behavior. Both types of critique were legitimate, indeed a strong answers might have used both.

Question 10 (Answered 30%) (Average mark 63%)

Again this was not a popular question, answered by under a third of candidates. Candidate performance on this question was fairly strong. Candidates were able to discuss changes in approaches to marketing – the growth of branding, the rise of electronic channels, increased internationalization. They were less confident in exploring the implications of these developments for the skills and traits needed by marketers today. Few candidates distinguished between skills and traits, and those capabilities required by marketers were often presented in a generalized, broad brush form as knowledge of product markets and understanding of consumer behavior. Greater precision on the skills and traits needed and a more direct link to changes in marketing approaches was needed.

Question 11 (Answered by 29%) (Average mark 62%)

29% students answered this question. The candidates should address the notion of what is meant by 'conventional', and they may enumerate and critically assess the potential of new promotional channels in which advertising may be employed. Students may also discuss the move towards consumer-to-consumer promotion via such mechanisms as electronic word of mouth. The essay may be concluded that there are still roles (albeit residual) for conventional advertising.

Question 12 (Answered by 34%) (Average mark 64%)

This is a relatively standard question which often appears in the examination, but only 34% attempted. The answers may include legitimisation and codification of useful management knowledge; very many different specific kinds of management advice/techniques which come and go with the ebb; the use/effectiveness of consultancy advice is equivocal at best, with some evidence that it has clear negative impacts; Consultancy as an attempt to offset accountability (and liability) for decisions which turn out to be wrong; and Humour and satire about management consultancy (eg the institutionalisation of Dilbert) as a means of maintaining rhetorical distance while still employing consultants.

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

Part I

A. STATISTICS

(1) Numbers and percentages in each category

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

(2) If vivas are used

Vivas were not used for this Examination.

(3) Marking of scripts

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

B. NEW EXAMINING METHODS AND PROCEDURES

The structure of the Options courses was changed last year, and this affected the structure of the Materials Option Paper. In place of 8 questions, one on each of the lecture courses, the paper was divided into 3 blocks each of which had 3 questions. Candidates were given a choice of 3 questions, 2 from one block and the third from one of the other 2 blocks. In principle, this allowed for questions to be set which tested knowledge more broadly across a block, but in practice the questions in that first year were limited to covering a single lecture course. In the current year, examiners set questions more broadly across a block, where it was suitable to do so. Students were informed that this would be the case both by letter on 11th March 2009 and by e-mail on 23rd March 2009.

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

It has been noted by one of the external Examiners that some students benefitted from the procedures of using half-marks in the marking of the Materials papers, and most importantly, that these gains were random in nature. The convention used was to allow the use of half-marks in the marking of each section of a question, and to round up the total marks for each question determined by each marker. The average of the two markers marks would then be further rounded, if necessary, for each question. It is suggested that the average of the two markers marks should not be rounded, and that rounding only takes place when the aggregate mark for the paper is determined.

D. EXAMINATION CONVENTIONS

The previous year's Examination Conventions were included in the Course Handbook that was distributed to all candidates in hard-copy and was also made available on the Departmental website, to which candidates' attention was drawn by e-mail. The current

year's Conventions (2009, attached) were put on the Departmental website and sent in hard-copy on 11th March 2009 and electronically on 23rd March 2009 to all candidates. The Examination Conventions were assessed by the Board of Examiners and the Department's Academic Committee.

Part II

A. GENERAL COMMENTS ON THE EXAMINATION

There were 5 candidates for the examination. The examination consisted of 2 written papers, one being a compulsory Materials Option paper, and the other paper being selected from a range of Economics and Management options. For the Materials Option paper, which lasted 3 hours, candidates were offered 9 questions in 3 sections of 3 questions, and were required to answer 3 questions, 2 from one section and 1 from either of the remaining sections. In addition to the written papers, candidates are required to submit a report on a 24-week industrial placement, which has the weight of 2 written papers. The reports on these 24-week Management projects are marked by staff at the Said Business School. The overall mean marks for Part II and for Parts I and II combined were in the 2(i) range.

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

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

A non-serif font was used for Materials examination papers for the first time this year, in order to make them comply with SENDA/ADA guidelines. No specific requests were received for enlarged copies. Candidates were allowed extra time on account of dyslexia/dyspraxia, where necessary, and the outcomes seemed satisfactory.

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

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

D. COMMENTS ON PAPERS AND INDIVIDUAL QUESTIONS

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

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

(1) Numbers and percentages in each category

Candidates are given a mark on the basis of their performance in the Part II examination and then given a classification on the basis of their performance across Part I and Part II. There were 5 candidates for the examination, with [REDACTED].

Class	Number			Percentage (%)		
	2008/09	2007/08	2006/07	2007/08	2007/08	2006/07
I	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
II.I	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
II.II	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
III	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Pass	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Fail	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

(2) Breakdown of the results by gender

mark (%)	Overall mark		Part 2 Mark		Part 1 Mark	
	Male	Female	Male	Female	Male	Female
40–50	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
50–60	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
60–70	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
70–80	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
80–90	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Totals	3	2	3	2	3	2

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

All candidates sat the Materials Option paper, for which the mean mark (MS and MEM students combined) was 62.2%. In addition, one candidate sat the Econometrics paper, , achieving a mark of [REDACTED], and one candidate each sat the Finance and Marketing papers, with marks of [REDACTED] and [REDACTED], whilst two candidates sat the Accounting paper with an average of [REDACTED].

(4) Medical certificates: none.

F. NAMES OF MEMBERS OF THE BOARD OF EXAMINERS

:

Dr K A Q O'Reilly (Chair, Part I and Part II)

Dr H E Assender

Prof A Cerezo

Dr M L Jenkins

Dr P D Nellist

Dr A J Wilkinson

Prof Richard Whittington (Management)

Dr Dana Brown (Management)

Dr Paulo Quattrone (Management)

Mr Anthony Courakis (Economics)

Dr Howard Smith (Economics)

Prof Jon Binner (External)

Prof Lindsay Greer (External)

Prof Paul Cousins (External, Management)

Prof Gauthier Lanot (External, Economics)

Attachments:

Comments on Materials Option Paper

Comments on Management papers

Comments on Economics paper

Examination Conventions 2009

Materials Option Paper 2 / Materials Option Paper

Examiner: Dr Hazel Assender

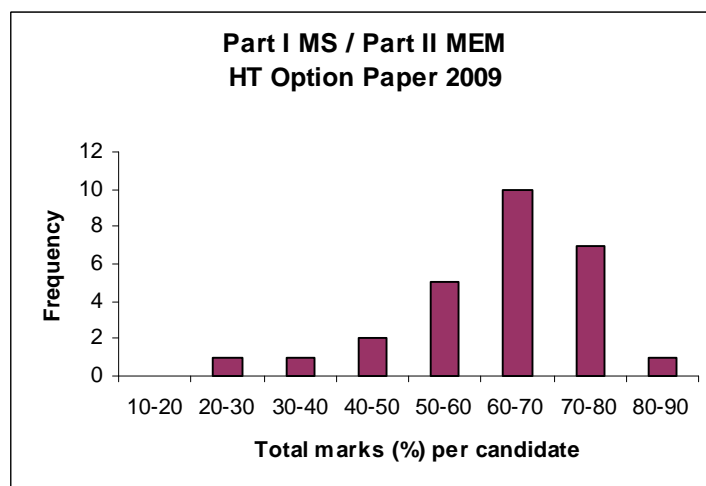
Candidates: 27 (22 MS / 5 MEM Part II)

Mean mark: 62.2 %

Maximum mark: 83.0 %

Minimum mark: 25.0 %

Question	Topic	No of Answers	Average Mark	Highest Mark	Lowest mark
1	Advanced engineering alloys and composites: Fe, Ti, Al & Ni alloys	9	20.2	27	11
2	Advanced engineering alloys and composites: spinodal decomposition	7	22.6	31	12
3	Manufacture with metals and alloys: coating technologies	13	24.1	29	17
4	Materials and devices for information technology: CMOS devices and bipolar transistors	11	20.2	27	7
5	Materials and devices for information technology: Si p-i-n photodiodes	5	15.6	23	3
6	Materials and devices for information technology: magnetic storage media	7	20.9	27	15
7	Advanced polymers: molecular motions and diffusion	13	17.7	26	3
8	Ceramics processing: sol-gel and aerogels	11	21.1	29	17
9	Advanced polymers: scattering studies and polyelectrolytes	5	18.4	20	16



General Comments:

1. *Advanced Engineering Alloys and Composites*
A two-part question. The first part (18 marks) required candidates to compare solid-state transformations in Fe and Ti alloys. Many candidates could give a good description of transformations but few could make a genuine comparison of the two alloy systems, so most answers did not reveal thinking on the part of the student, and tended to be a list of facts remembered from the lectures. The second part (15 marks) of the question went on to consider the compositions and heat treatments in Al and Ni which do not show solid-state transformations, and to compare with Fe and Ti. Again, a generally good ability to remember the salient features of the alloys, but there were few examples of thoughtful comparisons of the different systems.
2. *Advanced Engineering Alloys and Composites*
The first (10 mark) section was a comparison of spinodal decomposition with nucleation and growth generally quite well answered. Section b (17 marks) worked through the derivation of the composition fluctuation for spinodal decomposition using the Cahn-Hilliard theory. Many candidates were able to make some attempt at the derivations, but often appeared to be working from memory of the equations of the various steps and revealed a lack of understanding of the process – the final subsection considering the graph of R_{sp} vs λ was particularly poorly answered. The final section (6 marks) on how to distinguish spinodal decomposition from nucleation and growth was generally well answered.
3. *Manufacture with Metals and Alloys*
Question on coating technologies for various alloys. An apparently straightforward question that could be answered well by successful listing of key points from the lectures. A few candidates described surface modification processes in addition to specifically coating technologies, which was not solicited by the question. Some candidates became muddled about which coating technologies were appropriate for which alloy system, and in some cases described stainless rather than plain carbon steel.
4. *Materials and Devices for Information Technology*
Question focussed on CMOS devices and materials and processing choices for a bipolar transistor. The first (6 mark) section on the design rule gave rise to rather vague answers in many cases. Section b (4 marks) on the gate dielectric material in some cases suggested that candidates did not understand the gate leakage/capacitance issue. The final section (23 marks) considered the materials, manufacture and doping of a bipolar transistor. A significant number of candidates muddled a bipolar with an FE transistor in labelling the contacts and/or focussed on diffusion rather than ion implantation for the n+ region, which lead to difficulty in the final subsection when describing the dopant profiles which was generally poorly answered.
5. *Materials and Devices for Information Technology*
The question was on Si p-i-n photodiodes requiring a description of devices at different potentials on the IV curve. There were some good

responses on devices, but often no good use of band diagrams. The final section on the sensitivity of the photodiode and PV efficiency was generally poorly answered.

6. ***Materials and Devices for Information Technology***
Section (a) required a straightforward description of longitudinal thin film media. Most candidates could give a general description but only a few related it well to magnetic properties of the materials. Section (b) was on perpendicular media, and was slightly more problematic in relating to magnetic properties. The final section required use of the Stoner-Wohlfarth model to predict the MH behaviour in particulate magnetic media. The derivation was poorly described in many cases, again often relying on poor memory of the equations rather than physical understanding of the material.
7. ***Advanced Polymers***
Question on free volume, and molecular motions including reptation. Basic section (3 marks) on nature of free volume often poorly answered. The section (7 marks) soliciting a description of molecular motions was often limited to a description of reptation. Most candidates (sections c and d, 10 marks) could identify how motions and T_g changed with temperature and molecular weight in general terms but were not specific in their answers. Many candidates could identify the change in behaviour at high molecular weight (section (e), 13 marks) with entanglement but few could derive the scaling behaviour.
8. ***Ceramics Processing***
Section (a) (14 marks), which required a description of sol-gel processing, its advantages and application, was moderately well answered. Section (b) required a rather straightforward calculation of specific surface area of an aerogel and particle diameter on which some candidates could make little inroad, in many cases they did not understand what a specific surface area is.
9. ***Advanced Polymers***
The first sections (a-d, 21 marks) on a comparison of light scattering, SAXS and SANS and their measurement of polymer dimensions revealed some knowledge of the area, though few candidates gave comprehensive answers. For the calculation of theta max, the candidates generally relied on a simple application of Bragg's Law. The final section (12 marks) compared linear conventional and polyelectrolyte polymers at various solution concentrations. Again, candidates made moderately good attempts at the descriptions, but were generally not able to discuss the scaling relations.

Overall Comments:

There was, perhaps, a better distribution of attempts to questions on the various sections of the course than in some years, the least popular questions soliciting five answers. Across the various subject blocks the attempts distribution is: block A, 29 answers, block B 23 answers, block C 29 answers perhaps reflecting a smaller number of candidates selecting block B as an option, but otherwise a reasonably even distribution across the subject areas.

**Examiners Report for MEM 2009---Economics Papers.
Howard Smith**

Part II

Four economics papers are available to MEM Part II candidates.

Three of these (Macroeconomics, Economic Decisions within the Firm, and Statistical Methods) had no candidates. Econometrics is taken in larger numbers by PPE and E&M students, and full reports on these papers can be found in the Examiners Report for PPE. However, for this paper the mean for the MEM candidate are compared with the E&M candidates below: (Please note the MEM candidates take Microeconomics (a PPE and E&M paper) in their Part I examination).

Econometrics (*note as numbers are less than 5, this number may need to be deleted before publication)

MEM (1 candidate): [REDACTED]

E&M (17 candidates): Mean 62.8

Part II
DEAM 0371
DEEB 2245
DMMB 2245

Accounting 2009

Subject Report

General Comments:

All compulsory Questions: 100%.

There were in all five questions: two essay questions forming Section A and three technical/calculative type questions forming Section B:

Section A Essay Questions

Question 1 comprised of questions on the issues connected with international accounting regulation such as IFRS. It also had an internal option question on issue of environmental and sustainability accounting. Both the questions required critical understanding of the issues governing the present international financial reporting regulation.

Question 2 comprised of questions on the conceptual knowledge of variance analysis. There was internal option question on balanced scorecard. Candidates' knowledge on the relevance of modern management accounting practices was aimed to be tested on these issues.

Section B Calculative type

Questions 3 was set on financial accounting topics spread into three sub-parts (a), (b) and (c)

Questions 4 and 5 were set on management accounting topics such as cash budget and ABC costing.

Marks were relatively widely and evenly spread. Those candidates who carefully and rightly sorted out the numerical questions (Questions from 3 to 5) achieved Distinction relatively easily, whereas those who made few mistakes in basic calculations resulted in slightly lesser marks. Overall, there were relatively commendable answers with most candidates exhibiting very good knowledge of financial accounting regulatory framework and management accounting concepts.

Comments on answers to individual questions:

Section A- Essay questions

Question 1 (a) Accounting Regulation - IASs/IFRSs

This was a very popular question. Most answers were well-structured around the issue of fair value accounting and some of the accounting scandals such as Enron. Candidates focused their answers around financial reporting regulation giving relevant examples and to some extent, were able to provide with a critical evaluation of standardization of accounting through IASs/IFRSs. However, there were a few generally excellent and thought provoking answers which fetched high marks.

Question 1 (b) Environmental and sustainability accounting

This was an internal option question. Though a few candidates attempted this option, those who attempted it got high marks since their answers were highly structured in a logical and argumentative style. Candidates' discussed their essay with very good examples giving the significance of sustainability accounting and evaluating its regulation through financial reporting.

Question 2 (a) Variance analysis

More than half candidates attempted this question. Most essays explained the importance of variance analysis by giving relatively good examples. However, some candidates' answers explained the importance by of the concept of management by exception and logically highlighting the overall benefits of variance analysis for effective operational control and evaluating managerial performance.

Question 2 (b) Balanced scorecard

This was a popular question since it tested the conceptual knowledge of a balanced scorecard used by corporate entities. Most answers discussed the methodology of a BSC in the context of organizational performance evaluation. Though most candidates' answers discussed the BSC as a strategy issue, however, a few answers could very well explain the relevant problems that are actually associated by introducing a balanced scorecard and their impacts.

Section B- Technical questions

Question 3 (a) Ratio Analysis

The question tested the candidates' ability to compute certain ratios and provide some useful comment related with the financial position of the entity in question. Most answers were correct and only a few candidates were found struggling in using an appropriate formula to compute the ratio and provide a critical comment on the computations.

Question 3 (b) Consolidation accounts (Goodwill computation and minority interests calculation)

Most answers were correct as it related to using appropriate figures from the information which students could do very quickly using their technical skills and expertise. However, a few were careless and mistakes in computing the two figures.

Question 3 (c) Double-entry system

This question was very popular and tested the practical knowledge of account writing through double-entry system. Most computations were correct but majority of candidates could not produce the journal entry correctly and made mistakes.

Question 4. Cash Budget

Although this question appeared after a gap of few years, it did not surprise the candidates since the topic was well-covered through lectures and practice questions. Most candidates were able to arrive at the full cash budget. However, a few candidates struggled in computing the receipts or the

payment section correctly which eventually resulted into producing an incorrect answer. However, reasonable marks were distributed wherever candidates have exhibited logical steps at the appropriate workings.

Question 5 Activity Based Costing (ABC)

This was a student favourite question which was aimed to test their computational skills on the concepts of absorption and activity based costing. Part (a) of the question required the computation of the product unit costs under the two systems and most candidates could answer this very well. Part (b) of the question required the candidates to provide a comparative analysis by contrasting the two systems. However, majority of the answers presented the simple comparison but very few candidates could actually analyze their comparative difference and give a logical answer to it.

Finance Paper, FHS E&M 2009

Report:

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

As expected easier more conventional questions were the most popular with students. Of the questions included in Section A the most popular was question 8, chosen by 55% of the students followed by questions 3 and 7 (chosen by 45% and 38% of the students respectively). The less popular ones were questions 6, 4 and 5 (chosen by 4%, 7% and 7% of the students respectively). Of the questions included in Section B 80% of the students chose to answer question 10 and 24% question 9.

Overall I am pleased with the performance of students (18% of those that sit the exam scored 70 or more). I think, however, that the exam will work much better with “four” questions to choose from rather than with “ten”. In its current format it creates incentives for students to gamble on the topics they prepare. This not only has a detrimental effect on students’ preparation (acquired knowledge) but it also unnecessarily introduces a degree of randomness in the final grade (and making exam preparation and grading more time consuming).

DEAM 0376

Marketing 2009

Subject report

Comments on answers to individual questions:

Question 1 (24 answers).

A popular question amongst candidates. Most answers made use of the tutorial discussion on the 'Long Tail' and niche marketing in developing their answers and offset this with discussion of evidence on web search behaviour by online consumers. The evidence in this area changes very quickly, but not many had taken the time to update the knowledge gained from the tutorial reading. Very few answers really addressed the brand choice or other marketing consequences arising from consumers' information search strategies.

Question 2 (9 answers).

The relatively few candidates to select this question answered it imaginatively and well. They dared to go beyond the established literature and speculated, albeit in a scholarly manner, about the risks and opportunities arising out of social networking activities. The best answers assembled the evidence gathered into a coherent and well-structured analysis of the literature alongside anecdotal experience.

Question 3 (13 answers).

Most candidates chose the more straightforward option (b), since this allowed them to rehearse some of the findings from ethnographic studies discussed in three different tutorial topics. The better answers sought to integrate the findings from these three different approaches, but only limited conclusions were drawn. It would have been interesting to have seen some more detailed methodological critique of ethnography used in this way and its relevance and usefulness to marketers. Those selecting option (a) found it difficult to go beyond the arguments rehearsed by McSweeney and Wallerstein in their critique of Hofstede – and indeed showed a relatively limited understanding of Hofstede's own work and claims for it. Relying upon the lecture slides alone was insufficient.

Question 4 (16 answers).

This was generally well answered, building as it did upon the tutorial essay offered to candidates. Better answers made full use of the extensive range of literature and examples to which they had been exposed on the course and provided focused and integrated analyses of the issues raised. Poorer answers were very selective in their use of the literature and, in some cases,

misattributed concepts. Very few answers dealt properly with the extension of brand communities online and the resulting consequences for marketing.

Question 5 (35 answers).

This was the second most popular question but, as is often the case for a topic perceived to be straightforward, too many answers proved to be of the 'everything I know about loyalty schemes' mould, or focused too much on concepts and frameworks of customer loyalty rather than giving equal weight to a discussion of customer satisfaction and the link between the two. Oliver was the salient literature source here; it was surprising how few made it the centre of their discussion. Better answers noted that the evidence suggests that as consumers become more loyal, satisfaction can become a less important consideration.

Question 6 (4 answers).

This question was generally poorly answered. Candidates were certainly familiar with the four or five competing models of brand equity introduced in the tutorial discussion. Some had difficulty relating these to the categorical distinction posed in the question. Answering this question well would have required candidates to have a better understanding of the methodology and design of the various equity instruments discussed than was apparent.

Question 7 (37 answers).

This was the most popular question to be addressed, but not the most successfully answered. Passion and enthusiasm for the topic were no substitute for a proper understanding of what the question meant by the 'contradiction in society' resulting from consumer enmity towards big brands, in respect of fair trade marketing. (It can be argued that the success of fair trade is the result of precisely the same processes that produce the iconic brands to which so many consumers are opposed. The question was therefore seeking to prompt a discussion of whether the means justified the ends.) As a result, most answers dealt with the basic issues raised by Berlan and Dolan rather than the more nuanced irony of Fair Trade 'myth-making'.

Question 8 (2 answers).

There were too few answers here to allow meaningful comment.

Question 9 (9 answers).

Most candidates were fully cognisant of the IHIP typology of service characteristics. The better candidates went on to critique the concept, but were not always able to fully articulate the weaknesses or the alternatives. There were some good answers relating the discussion to some of the innovation literature. Few candidates answered the second part of the question, dealing with the implications for brand extension strategies.

Question 10 (21 answers).

This was a surprisingly popular question, given its potential difficulty. It was important for candidates not only to be aware of the salient parts of the literature on consumption and socialisation in relation to identity, but to tackle this question in a dispassionate manner. Most answers demonstrated familiarity with the issues raised in the tutorial topic, in particular the way that advertising appears to work cognitively at particular ages, but a few did engage in interesting and stimulating discussion of cultures of consumption.

Question 11 (7 answers).

The few answers to this question were particularly good ones. In general, candidates avoided writing everything they know about how advertising might work. Instead, they showed a good general awareness of the channel shift occurring in the promotional mix and were able to give good examples to support their arguments. The best answers recognized that the evidence is not yet clear as to whether such activity changes the rules of how advertising might work.

Question 12 (19 answers).

Too many candidates spent their time discussing definitions of global brands. Coca-Cola and McDonalds were inevitably pressed into service, despite requests to the contrary in revision lectures and extensive discussions of more nuanced transnational marketing practices by these, and other, firms. Good answers made the link with the literature on trans-national advertising to support their arguments. However, too many used this question as their final choice and, it seemed, many ran out of time in answering it.

General Comments:

Responses to this year's paper were arguably more varied and drew upon a wider range of literature, ideas, frameworks and examples than in many previous years. It was gratifying to be able to award a suitably representative proportion of high grades as a result. The distribution of answers reflected a focus by candidates revising upon the tutorial topics covered in the course, but choosing questions on this basis did not always guarantee a high scoring answer. Whilst fewer candidates than in previous years engaged in an unstructured 'flow of consciousness' in their answers, a more careful reading of the question to recognise the requirement to give equal weight in both structure and content to both parts of a question, would be welcome.

Strategic Management - DEAM 0375

All questions were answered. The most commonly answered questions were 1, 3, 5 and 6, and the least popular questions 2, 10, 11 and 12.

General Comments

The general standard of answers was very high reflecting a good, sometimes excellent standard of knowledge of the relevant literature and an ability to put it to use on answering questions. In some cases candidates had clearly and commendably explored beyond the reading list not just in providing topical examples but also exploring more recent journal publications.

As in previous years candidates who made greater use of the literature received more marks, but those who used the literature to support reasoned argument and critical comment in answering questions received more marks than those who just described the relevant literature. Some candidates made good use of brief examples from a variety of topical sources and in some cases related comments to the current exceptional business environment that has developed over the past year, even in questions which did not specifically relate to that issue.

Exam technique clearly remained an issue for a few candidates where effort was unevenly spread across their answers, usually with a strong but lengthy first answer, followed by a considerably shorter final answer. Candidates are reminded that answers are marked individually and as exceptionally high marks are never exceptionally easy to obtain, undue concentration on one answer is very unlikely to produce as good overall marks as an even spread of effort and time will.

The following comments might be made about the specific questions:

1. Can Alliances replace acquisitions if acquisitions prove difficult or impossible?

This proved one of the most popular questions. Candidates should have been able to outline the key differences between Alliances and Acquisitions dealing in particular with issues such as Control Trust and Integration. Examples of alliances and acquisitions were used by many. Some candidates did mention the more conventional possibility that acquisitions might replace alliances.

2. How might the current economic and business environment affect business and corporate strategies?

Candidates should have been able to draw on most of the course material in answering this question. Perhaps because of this relatively few candidates attempted the question. For those who did it provided a good opportunity to display the breadth of their knowledge.

3. What barriers are there to achieving strategic change?

This question was also one of the most popular. However, whilst the conventional material was mentioned by most, some candidates also discussed how the barriers might be overcome as well as what events might lead to strategic change being necessary. Some indeed used this to relate the question to the current turbulent business and economic environment. The mention of barriers also enabled some candidates to involve discussion of Institutional Theory in their answers.

4. If “Diversified firms which lack focus decline”, how far can a dominant logic extend?

Though not one of the most popular questions many candidates did attempt this question. Good answers included discussion both of the effects of diversification on firm performance and of Prahalad and Bettis’ concept of the dominant logic that managers might employ and be limited by. These could be combined with a more general discussion of the optimum levels of diversification a firm might adopt.

5. To what extent will a technology based firm always be better off as an innovative technology leader?

This question was unusually popular for a technology strategy related question. Most answers managed to include Teece’s discussion of whether innovators or followers will reap the benefits of innovation. Other “Strategic” means of appropriation as outlined by Levin and Klevorick in particular might also have been mentioned. Less commonly mentioned were the possible benefits of followership derived from the real option value of delayed investments.

6. “The resource based view has dominated strategy for too long”. Discuss

As might be expected, and rightly so, this question focused on the resource based view, was one of the most popular. Good answers to this, of which there were many, displayed a knowledge of not just what was written but when it was written. This might seem obvious but emphasizes that when studying a particular field, understanding the development of writing in the field is an important part of understanding the field itself.

7. “Strategic Management is not necessarily the weaker but the more ambitious field compared with Economics”. Discuss.

This was one of the less popular questions. The view of some economists, perhaps along with Lord Kelvin’s dicta that “when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind” might have been characterized as implying that qualitative work is somehow of lesser value than quantitative. The virtual absence of articles without econometric analysis from journals such as Strategic Management Journal might therefore have been used as evidence of a colonization of the field of strategic management by purely quantitative economic analysis. Nonetheless some candidates did discuss the differences in assumptions and methods of analysis of the two fields and the advantages and disadvantages of each. The definition of “ambition” was also discussed by some and needed to be

even if not just in terms of both generalizability and the detail or richness of analysis possible.

8. “Industry Structure Analysis is not enough” Discuss.

Somewhat surprisingly this question about one of the key models in strategic management was not attempted by many. The difficulty may have been that the question required not so much a description of Industry Structure Analysis and Porter’s 5 forces analysis as a critical analysis of what it takes account of and what it does not which is less straightforward than the simple description that some offered.

9. How might international strategy differ from global or local strategy?

This is a question, again not attempted by many, that required firstly a definition of terms and then ideally a discussion of Bartlett & Ghoshal’s various organizational forms for coping with international business. The reference to “global or local” more obviously invited, and most candidates in turn provided, a discussion of the balance to be struck between tailoring goods and services to suit all markets or only a particular market or sub-market (as illustrated by Douglas & Wind and Levitt’s articles).

10. Definitional problems abound in the field of strategic management but in that context what should definitions of “Strategy” itself involve?

This was attempted by very few candidates. Chandler’s definition of strategy was mentioned by most though not necessarily with a discussion of why it provides a good definition. Definitions in discussing international business can notably vary widely and need pinning down before any debate about them proceeds. The focus of this question however is not just on the international area but on the start of the course where the nature of strategy – its deliberate or emergent nature and its possible objectives - were pursued. Whittington’s grid might be a useful framework to discuss here but this should have involved at least some mention of the authors populating it.

11. To what extent can portfolio matrices accommodate the Resource Based View?

Very few candidates answered this question which requires an overview of the main types of portfolio grid and the timing of their development relative to other concepts in strategic management. A distinction needed to be drawn between those grids which predate and postdate the RBV and earlier ISA of Porter. A key point is obviously understanding the various grids’ underlying rationales such as the BCG grid’s dependence on experience curve based strategy and comparing these with the underlying assumptions of the RBV and earlier ISA of Porter.

12. How relevant are strategic planning or financial control styles to managing a multinational firm?

Almost no candidates answered this question. As with question 2 this may have been due to a good answer requiring knowledge of a combination of features, discussing on the one hand the structure of international firms and on the other hand post acquisition management. However, these are linked in the course and Haspeslagh and Jemison’s discussion of integration and post

acquisition management might have been mentioned as might Goold and Campbell's distinction between the control and financial styles mentioned in the question.

Conclusion

As in every year, it almost goes without saying, but nonetheless bears repetition, that candidates who did better generally used more references to the literature, more relevant examples and most importantly displayed a higher quality of argument aimed at providing good answers to the questions set (rather than any other albeit related past essay questions or general discussions). Candidates who received lowest marks showed little evidence of using course concepts to develop their answers beyond the level of the Introduction to Management course.

There was a tendency for candidates to avoid questions which obviously addressed multiple sections of the syllabus. This in turn suggests that candidates should note that answers which display a broad knowledge of the syllabus and do not treat questions and answers as confined to particular sections of the course will inevitably produce better answers and better marks than those which confine themselves to a narrow view of the component parts of the syllabus.

Examination Conventions 2008/09
Common Preliminary Examination
Materials Science and Materials, Economics & Management

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

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

(1) *Setting of papers*

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

(2) *Paper Format*

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

(3) *Marking of papers*

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

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

First year practicals are assessed regularly by senior demonstrators in the teaching laboratory. The work done for crystallography classes is assessed by the Crystallography Class Organiser. 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

* for 2008-09 the Nominating Committee comprises Dr Czernuszka (Chair), Professor Grovenor and Dr Taylor.

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

$(4 \times 40 + 2 \times 4)$ 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 2008/09

Final Honours School

Materials Science

1. INTRODUCTION

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

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

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

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

Late Submission of or Failure to Submit Coursework

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

* for 2008-09 the Nominating Committee comprises Dr Czernuszka (Chair), Professor Grovenor and Dr Taylor.

Examinations' section of the Examination Regulations (pp45-46 of the 2006, 2007 & 2008 Regulations).

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

- (a) With permission from the Proctors under clause (1) of para 16.8, page 45, no penalty.
- (b) With permission from the Proctors under clauses (3) + (4) of para 16.8, for the first day or part of the first day that the work is late a penalty of a reduction in the mark for the coursework in question of up to 10% of the maximum mark available for the piece of work, and for each subsequent day or part of a day that the work is late a further penalty of up to 5% of the maximum mark available for the piece of work; the exact penalty to be set by the Examiners with due consideration given to any advice given in the Proctors' "Notes for the Guidance of Examiners and Chairmen of Examiners".
- (c) Where the candidate is not permitted by the Proctors to remain in the examination he or she will be deemed to have failed the examination as a whole.

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

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

2. PART I

(1) Setting of papers

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

(2) Paper Format

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

are often divided into sections, with the approximate marks for each section indicated on the question paper.

(3) *Marking of papers*

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

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

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

The rubric on each paper indicates a prescribed number of answers required (e.g. "candidates are required to submit answers to no more than five questions").

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

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

- a. 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.
- b. 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.
- c. The mean mark and the distribution of marks, both taken over all written papers, are considered, again with the help of the external examiners, in order to ascertain whether these overall marks are a fair reflection of the performance of the candidates as measured against the

class descriptors. If not, the overall marks are adjusted. Normally this is achieved by adding/subtracting the same fixed number of marks to/from each candidate's overall score.

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

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

(5) *Marking Industrial Visits*

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

(6) *Marking Engineering and Society Essays*

The business plan for "Entrepreneurship and new ventures" is double marked, blind, by two assessors; last year one assessor was from the Said Business School and one 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 9th week Trinity Term, unless informed otherwise by the Chair of Examiners.

3. PART II

The Part II thesis is allocated 400 marks, one third 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 4th 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 Iii Honours 60 – 69	The candidate shows good or very good problem-solving skills, and good or very good knowledge of much of the material over a wide range of topics.
Class Iii Honours 50 – 59	The candidate shows basic problem-solving skills and adequate knowledge of most of the material.
Class III Honours 40 - 49	The candidate shows reasonable understanding of at least part of the basic material and some problem solving skills. Although there may be a few good answers, the majority of answers will contain errors in calculations and/or show incomplete understanding of the topics.
Pass 30 - 39	The candidate shows some limited grasp of basic material over a restricted range of topics, but with large gaps in understanding. There need not be any good quality answers, but there will be indications of

some competence.

Fail
0 - 29 The candidate shows inadequate grasp of the basic material. The work is likely to show major misunderstanding and confusion, and/or inaccurate calculations; the answers to most of the questions attempted are likely to be fragmentary only.

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

Part I:

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

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

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

Part II:

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

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

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

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

Annex: Summary of marks to be awarded for different components of the MS Final Examination in 2009 (For Part I and Part II students who embarked on the FHS respectively in 2007/08 and 2006/07)

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

Examination Conventions 2008/09

Final Honours School

Materials, Economics and Management

1. INTRODUCTION

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

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

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

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

Late Submission of or Failure to Submit Coursework

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

* for 2008-09 the Nominating Committee comprises Dr Czernuszka (Chair), Professor Grovenor and Dr Taylor.

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

- (d) With permission from the Proctors under clause (1) of para 16.8, page 45, no penalty.
- (e) With permission from the Proctors under clauses (3) + (4) of para 16.8, for the first day or part of the first day that the work is late a penalty of a reduction in the mark for the coursework in question of up to 10% of the maximum mark available for the piece of work, and for each subsequent day or part of a day that the work is late a further penalty of up to 5% of the maximum mark available for the piece of work; the exact penalty to be set by the Examiners with due consideration given to any advice given in the Proctors' "Notes for the Guidance of Examiners and Chairmen of Examiners".
- (f) Where the candidate is not permitted by the Proctors to remain in the examination he or she will be deemed to have failed the examination as a whole.

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

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

2. PARTS I & II

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

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

Candidates for Part I (3rd year)

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

Candidates for Part II (4th year)

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

(1) *Setting of papers*

Part I Materials General Papers 1 – 4 are set by the 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. If the cover slip is not completed then the examiners will mark the first five questions in numerical order by question number. The examiners will NOT mark questions in excess of the prescribed number. If fewer questions than the prescribed number are attempted, (i) each missing attempt will be assigned a mark of zero, (ii) for those questions that are attempted **no** marks beyond the maximum per question indicated under section 2(2) above will be awarded and (iii) the mark for the paper will still be calculated out of 100.

As the total number of students sitting some papers is small, it is not unusual for mean marks to vary from paper to paper, or year to year. It is not therefore normal practice to adjust marks to fit any particular distribution. However, where marks for papers are unusually high or low, the examiners may, having reviewed the difficulty of the paper

set or other circumstances, decide with the agreement of the external examiner to adjust all marks for those papers. For the Materials papers such adjustment is referred to as ‘scaling’ and the normal procedure will be as follows:

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

Economics and Management Papers

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

(4) Marking of Practicals for Part I

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

(5) Marking Industrial Visits

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

(6) Marking the Team Design Projects

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

(7) Part I and II vivas

The Examiners have the right to call students to a Part I viva after the Part I Examinations and/or a Part II viva after the Part II 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 (i) Part I candidates must see that they are available until the end of 9th week, unless informed otherwise by the Chair of Examiners and (ii) Part II candidates must see that they are available until the end of 10th week, unless informed otherwise by the Chair of Examiners.

(8) *Marking the 4th 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 Iii Honours 60 – 69	The candidate shows good or very good problem-solving skills, and good or very good knowledge of much of the material over a wide range of topics.
Class 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 show major misunderstanding and confusion, and/or inaccurate calculations; the answers to most of the questions attempted are likely to be fragmentary only.

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

Part I:

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

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

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

Part II:

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

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

Fail – The examiners consider that the candidate's overall performance is not worthy of an M.Eng. *and* that the performance in Part II is not worthy of a Pass. The

candidate is excluded from the class list but is nevertheless awarded an unclassified B.A. (Hons) on the basis of Part I performance.

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

Annex: Summary of marks awarded for different components of the Final Examination in MEM (For Part I and Part II students who embarked on the FHS respectively in 2007/08 and 2006/07)

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

Materials External Examiners' Report (Prof Greer)

NO REPORT FROM Prof GREER

Materials External Examiners' Report (Prof J. Binner)

Department of Materials, Oxford University Part I and Part II

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

I found the standards set by the examiners appropriate, though see (v) below (part (b)) for one recommendation.

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

From my observation, the assessment process was rigorous and all students were treated equitably – where two students required different treatment because of previous issues meaning that they needed to graduate under older rules this was drawn fully to the attention of all the Examiners and explained in detail. Subject to my comment under (v) below (part (a)), I believe that the examinations process has been conducted fairly.

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

The majority of the students whom I met were clearly hard working, capable individuals that will be a real credit to your university. Some students are clearly more capable than others but all displayed an ability in keeping with the result of the examination process. The provision of a viva to all final year students is an excellent approach since it gives every student the opportunity to demonstrate their ability to the examiners and, in particular, the External Examiners who have not met them before. Whilst taking two full days, it was also something that I rather enjoyed!

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

For the Part I students, the examinations that were set, the answers that were provided by the students and the marking of those answers were entirely comparable with the standards and achievements of students in the other higher education institutions with which I am familiar, this includes my own university obviously (Loughborough) as well as others with which I am familiar, e.g. Nottingham, Surrey, Manchester, Sheffield, etc. The best students are every bit as good as the best students elsewhere – only there are rather more of them at Oxford – and the weaker students are also broadly comparable. The system that I observed at Oxford is slightly more demanding in that there is no opportunity for resit examinations, (rightly) putting more pressure on the students to pass first time. Having said this, I do have one concern which is outlined in (v) below (part (a)). It is more difficult for me to make direct comparisons for the Part II students. Our Part II students at Loughborough follow a different path; their individual project is in their 3rd year and their group project in their 4th year. At Oxford, this is reversed allowing the students to really 'go to town' on their individual project. Clearly some students have very much risen to the challenge and some excellent work has been done. I believe, therefore, that the marks awarded are entirely appropriate.

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

There are two issues that I believe need to be addressed by the Department.

a) In Part I, every question is marked, blind, by two markers and, provided that their marks do not differ by much then they are simply averaged. This is perfectly acceptable EXCEPT that where the average leads to a half mark this is always rounded upwards. So if one examiner gives 15/20 and the other 16/20 then a mark of 16 will be recorded; similarly if the marks are 16/20 and 13/20 then the mark recorded will be 15/20. This means that there is a possible 0.5 mark per question and with 26 questions in total to be attempted across six papers a student could theoretically gain an extra 13 marks. Whilst this might be considered small out of a total of 800 across all exams and coursework elements, it is both entirely random in nature as to who benefits and by how many and also can result in a student being 'artificially' near a boundary when a case might be made for them to be considered for a higher degree. In the recent exams, one student with a final mark of 59.6% (hence very close to the 2i border of 60% - albeit we are still only at the end of Part I here) actually had only 58.7% when the rounding issues were removed. It does not seem difficult to consider half marks for individual questions and only round up the marks for each paper as a whole.

b) Also in Part I, there is no requirement to pass any specific number of exams, only the year as a whole. Whilst exams constitute 600 out of 800 marks available to the candidates, by obtaining a very high coursework element mark it is possible for them to fail a disturbingly high number of exams and still get through the year. One candidate failed no less than 4 of his/her exams (with 3 marks in the 30s but one mark of 25%) but still passed as a result of a good coursework mark. A simple calculations shows that a mark of 75% on the coursework (150 / 200), which whilst demanding has been demonstrated to be entirely achievable, would mean that only 170 / 600, or an average of just 28.3%, was required across the 6 exams to achieve 320 / 800 or 40% overall. This cannot be right since it suggests that the required knowledge level would not have been achieved. Some minimum performance level in exams is recommended though I will stop short of making any specific recommendation.

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

Subject to the two comments in (v) above, I believe that the whole process is performed in an exemplary manner and I particularly appreciated the chance to meet all of the Part II students and be present at an interview conducted in some depth. I would particularly like to commend Dr Keyna O'Reilly who oversaw the process in a most professional manner and Laura Jones who ensured that everything that I needed was provided promptly.

Jon Binner
Head of Department and Professor of Ceramic Materials
Loughborough University

12th July 2009

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

RESPONSE TO EXAMINERS' REPORTS 2009

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

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

Following a preparatory meeting between the Chair of DMAC and the incoming & outgoing Chairs of FHS Examiners, the External Examiners' reports, the FHS Chairperson's report and internal reports on all of the individual Materials papers were considered by the Department of Materials Academic Committee (DMAC). A report is awaited from one of the External Examiners for Materials components: this delayed report will be considered by DMAC in due course, but will not now influence procedures for the 2009/10 examinations. Based on discussions at the time of the Examination Boards the missing report is not expected to raise any major issues.

1. Summary of major points

(i) See 2b below

(ii) The 2008/09 Examiners have proposed that where practicable we move towards anonymous marking of coursework. At present the candidate's name is known to the markers for all elements of coursework. Provided it is not detrimental to another aspect of the assessment process, DMAC takes the view that such anonymity is desirable where practicable. It is clear that Team Design Projects, Practical Reports and Part II projects cannot be anonymous because the assessment involves respectively a presentation, oral marking sessions and a viva. Following discussion with the Lead Senior Demonstrator for the Characterisation module, on reflection the incoming & outgoing Chairs of Examiners have concluded that the benefits of anonymous marking for the Characterisation module option would be outweighed by the difficulty this would introduce in identifying any students who presented results obtained by others. We are of the view that the Modelling module option should be treated identically. At present the assessment of the Industrial Visit reports includes an opportunity for re-submission of an unsatisfactory report and a termly update for the Part I students on how many of the four reports due over two years are yet to be submitted. Noting in particular the pass/fail nature of this assessment, DMAC has concluded that the significant amount of additional administration that would be needed outweighs any notional benefit of anonymising these Industrial Visit Reports. One of the assessors for the Business Plan is usually the Tutor for this course element and with only four to six team reports each year this marking could not in practice be genuinely anonymous (although the reports could be anonymous to the second assessor). Given its conclusion that all other elements of coursework either cannot or should not be anonymous DMAC concludes that the status quo (that is, none of the Materials Coursework being anonymous) should stand, and notes that this is consistent with the decision taken in 2008/09 by the Faculty of Materials.

(iii) The Examiners have suggested that the MS Part II Conventions be more explicit on the content and use made by the examiners of the Supervisor's Report. The 2009/10 Chairman is looking into this and revised conventions will be considered by DMAC no later than its week 3 meeting of HT.

2. Points for inclusion in Responses to the External Examiners

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

We thank Prof Binner for his constructive and positive report. On the two specific points he raises:

- (a) The Examiners for 2009/10 will modify the instructions on rounding to eliminate the random effect.
- (b) The Department's Academic Committee was also concerned to find a candidate achieving honours despite a substantial number of failed written papers and will propose to the Faculty of Materials a change in our Examination Conventions to include a 'minimum number of written papers at $\geq 40\%$ rule'. DMAC suggests that this minimum be set at half of the written papers and notes that there has been initial discussion at the E(M)EM Standing Committee on whether the award of the MEM degree should require a minimum of a pass in each of the Economics papers. However students who have already embarked on the Final Honours School have a vested interest in the current Conventions so any change can be introduced at the earliest for the 2011/12 Part I FHS exams.

MS & MEM Parts I & II: Professor L. Greer

Report awaited

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

We thank Prof Cousins for his input and his positive comments. The suggestion that marking guides be provided as a matter of course is a matter for the E(M)EM Standing Committee and the SBS to respond to, but we note that provision of model answers is standard practice for the Materials Papers.

MEM Parts I & II, Economics Papers: Prof G. Lanot

We thank Prof Lanot for his comments, to which the E(M)EM Standing Committee and the Economics Faculty will reply as appropriate. On the point he raises regarding the longer micro- and macro-economics papers for the E(M)EM candidates, the Materials Examiners and Academic Committee are satisfied that the extra length is reasonable in relation to the other papers taken by the MEM cohort, but are open to discussion at the Standing Committee on the content of the courses and the possibility that a wider choice of topics/questions be provided.

3. Further Points

- (a) We have no major comments to make on trends in FHS statistics. Noting the importance of considering averages over five or six years when dealing with small cohorts of students we observe that the proportions of first class and upper second class degrees awarded do not differ greatly from the MPLSD averages. In Materials there continues to be no significant gender gap in the proportions of male and female candidates who gain first class degrees.
- (b) The Chairman of Examiners has suggested a number of minor improvements in procedure and these will all be acted on. One in particular is that the Lead SD for the Characterisation Module will in future provide a short report for the Examiners and Assessors on the availability of particular instruments during the 2-week module and of any other pertinent factors in assessing how appropriate was the choice of characterisation techniques made for a particular sample set.

4. Examination Conventions

We confirm that DMAC is satisfied that in revising our Examination Conventions we have considered the points in the EdC notes of guidance on Examinations & Assessment, para 3.12, as consulted on the EdC web-pages on 16th November 2009. DMAC and the incoming Board of Examiners have jointly approved the updated conventions.

A.O. Taylor, Chairman of DMAC, 24/11/09

Management External Examiner's Report (Prof PD Cousins)



Paul D Cousins
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Ms Jane Dale
University of Oxford
Social Sciences, Examination Office

20th July, 2007.

Dear Ms Dale,

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

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

During the examination process this year I raised two issues and I believe that these have already been addressed by the School:

1. The examination papers were sent to me (with the exception of accounting and finance) without marking guidelines. It is good practice to provide a marking guide for each question. This allows the academic to think about his/her expectations from the question as well as giving the External a guide to what sorts of answers are expected. I raised this issue with Professor Whittington and he kindly asked members of staff to provide me with an overview for each

question on their paper. These were provided and I was able to review the papers. I would like to suggest that this should become standard procedure.

2. I was sent a selection of reports for the Engineering and Management students to review – however I was not sent the remarks from the internal examiners – this made it difficult to judge the reports. I have asked that in future that the internal comments be sent with the reports to allow me to understand the thought processes of the internal examiners.

In summary, I am confirm that the marking was fair and reasonable and of a high standard. I am confident that the degrees awarded are in line with procedures at other institutions. I would like to thank Professor Whittington for his help in responding to my queries in a timely and professional manner.

Kind Regards

Professor Paul Cousins

Economics External Examiner's Report (Prof G Lanot)

PAPERS:

Introductory Economics (part 1)
Economic Decision within The Firm (part 2)
Microeconomics (part 2) }
Macroeconomics (part 2) } This year only

For each paper I was asked to confirm/moderate the marks for scripts of variable quality. This was organised efficiently. I met with some of the economics examiners and we were then able to discuss the various papers in some details before the examination meetings.

I attended two separate examination meetings (one for Materials, Economics and Management and one for Engineering Economics Management) on 02/07/09.

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

For the modules I was dealing with the standards are appropriate.

I was made aware of one fact concerning the Microeconomics and Macroeconomics paper which I feel needs to be addressed. I understand that although the EEM and MEM students sit the same Microeconomics and Macroeconomics paper as their colleagues taking Economics in other programmes, they are expected to complete more questions and they sit a longer exam than their peers. In effect this means that the demands on their Microeconomic and Macroeconomic knowledge is more thoroughly tested (they have to answer more question over the same syllabus) than it is for the economics specialists.

I can not really comment on the reasons for this differential treatment since they are outside of my responsibility. If this situation is to be permanent (i.e. if it is not possible to offer a tailored economics course) I wonder whether the syllabus of both courses could be amended to include material which is more to the interest of the MEM and EEM students and one or more questions to be drawn from this particular part of the syllabus. On the microeconomics side I think possibly the syllabus could focus on the economics of the firm (an introduction to managerial economics and industrial organisation...); more focus on the macro investment and innovation behaviour on the Macroeconomic side. Ultimately (and without considering the issue of resources), given the quantitative skills of EEM and MEM students I would have thought that it would be possible to design and deliver an interesting economics course for this public specifically mixing theoretical insight with empirical results.

(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;

As they were over the last two year, the meetings were conducted efficiently and fairly. Students were treated equitably. In particular the boards of 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;

Since, as far as I am aware, the syllabus covered by the first two courses has not changed and the structure of the examination papers is broadly the same, my comments here repeat my comments from last year.

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.

Economic Decision within the Firm (part 2)

This course is taught at a relatively high level relative to a 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. This year the performance in this course was very good (large proportion of students obtained first class marks).

Microeconomics and Macroeconomics

Only a small number of students (5 and 2 respectively) sat the papers. The standard shown was good and in line with expectation from high quality students.

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

Introductory Economics (part 1):

I was consulted on the structure of this paper and my comments were taken into account.

The paper contains two parts. The first section contains six questions, three on microeconomics and three on macroeconomics. The students are expected to answer three questions out of the six 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.

This year the exam paper is balanced in term of coverage: microeconomic and macroeconomic questions have an equal share.

The questions were distinct.

Economic Decision within the Firm (part 2)

I was consulted when the paper was set.

The comments I made the last two years concerning this paper apply again this year. This is a good exam paper which is tightly marked according to the guidelines I was given when I reviewed the paper.

Microeconomics and Macroeconomics

I was consulted on these papers and I did comment on their content and structure.

Relative to the equivalent past examination papers I was allowed to look at, the current macroeconomics paper is “poorer” for the loss of the applied questions. If anything I thought that these applied questions made the examination paper stand out and would no doubt elicit a more individual specific set of answers from the students (as opposed to “textbookish” answers). I understand that this kind of question is now part of another examination paper which the EEM and MEM students do not take.

For the Microeconomics and Macroeconomics papers in general, I am not convinced that the division between the two parts of the exam paper is such a good one. The examination setters are attempting to assess the students in two different ways. The first part, deals potentially with more technical issues, while the questions in the second section are more general in nature. In the case of the Macro paper (see my earlier comments to the examination setters) I think more focused questions in the first part are possibly required and set in a fashion which makes clear that only a succinct answer (i.e. which would not require more than 15 minutes of work) is required. The risk is that without a clear distinction between the type of questions in each part, students will provide lengthy answers to focused questions and short answers to the more general questions (the number of students sitting the exam was too small to judge whether this could be a substantial problem). This in end will make the marking more difficult.

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

The examination meetings were again very efficiently organised and chaired.

Gauthier Lanot Professor of Economics

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

Part II – Reserved Minutes of the meeting held on 29 October 2009

9.2 Minute 12.1 Internal Examiners' Reports

At the last meeting it had been agreed that with regard to papers M1 and Ec1, the performance of EEM candidates in relation to Economics and Management candidates should be considered at the next meeting of the Standing Committee alongside the examiners' reports for 2009. It was now agreed that the discussion should be deferred until Hilary Term.

RWF

10. Internal and External Examiners' Reports for 2009

10.1 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 44% of the EEM cohort had achieved first class honours. However, it was also noted that the percentage achieving upper second class or lower second class honours should have been recorded as 36% and 16% respectively; the report would be corrected to reflect these figures.
- JEF**
- A6E and A7E: it was noted that the weighting of these two papers (the mark for which combined to give the weight of one paper) had been altered to reflect more accurately the amount of work in each element. EEM candidates did roughly two thirds of the amount of practical work undertaken by candidates in Engineering Science and they submitted one assignment for A7E whereas Engineering Science candidates submitted three for the equivalent paper. The examiners therefore had decided to combine the two elements with a weighting of 2/3 for the practical work A6E and 1/3 for the assignment (A6E).
 - Introductory Economics: it was noted that the EEM candidates had achieved a mean of 65 in this paper which was identical to the mean achieved by E&M candidates.
 - Part II Economics Options: it was noted that the mean marks achieved by EEM candidates in Econometrics, Statistical Methods and Macroeconomics had been higher than those for E&M candidates.
 - Finance Paper: the final paragraph of the examiner's report read as follows:
'Overall I am pleased with the performance of students (18% of those that sit the exam scored 70 or more). I think, however, that the exam will work much better with "four" questions to choose from rather than with "ten". In its current format it creates incentives for students to gamble on the topics they prepare. This not only has a detrimental effect on students' preparation (acquired knowledge) but it also unnecessarily introduces a degree of randomness in the final grade (and making exam preparation and grading more time consuming).'

Whilst acknowledging that a rubric which required candidates to answer only three questions out of ten was generous, the Standing Committee expressed concern at the suggestion that the choice be cut so drastically to three out of four questions. It was agreed that three questions out of seven would be more appropriate.

- In the Chairman's report for Engineering Science Finals the following two comments were noted by the Standing Committee:

'Concerns were raised that the simplified decision tree introduced in 2008 resulted in candidates receiving an honours pass at part I even with no honours marks in their written papers. This seems inappropriate, and at the very least the examiners etc. should consider the specification of a "minimum kit" in order to achieve an honours pass at part I.'

The Standing Committee noted that the Faculty of Engineering Science would need to approve this 'minimum kit' for both the old and new courses by the end of Michaelmas Term. These decisions would then inform the draft examination conventions for EEM which would be presented to the Standing Committee at the Hilary Term meeting. A particular issue for the EEM conventions would be to consider whether candidates should be required to achieve honours in both M1 and Ec1 in order to be considered worthy of Honours in Part I (or Parts A and B in the new course) and therefore able to proceed to Part II (or Part C in the new course) Members agreed that the discussion on that occasion would be assisted by having data on how many students achieved below 40 on these papers, and also how many students achieved below 30.

'The marking scheme introduced for practical work in engineering in recent years has resulted in very high mean practical marks (a mean of about 86), which skews the overall results. This seems inappropriate and a re-normalisation process should be considered.'

The Standing Committee noted that there were plans to scale the practical marks in Engineering.

- In the Chairman's report for MEM Part I it had been noted that one of the external examiners had considered that some students had benefited from the procedures of using half-marks in the marking of Materials papers, and most importantly, that these gains had been random in nature. The convention used had been to allow the use of half-marks in the marking of each section of a question, and to round up the total marks for each question determined by each marker. The average of the two markers' marks had then been further rounded, if necessary, for each question. It had been suggested that in future, the average of the two marks should not be rounded, and that rounding would only take place when the aggregate mark for the paper had been determined.
- The Microeconomics paper taken by the MEM candidates had been in the new format, whilst the paper taken by E&M (and PPE) candidates had been in the old format. There had been no problems resulting from the new format and the performance of the 5 MEM candidates had been similar to the performance by E&M candidates in the old format.

10.2 External Examiners' Reports

The external examiners' reports were received from:

- Engineering: Professor Collings and Professor Hanzo
- Materials: Professor Binner
- Economics: Professor Lanot
- Management: Professor Cousins

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 Professor Lanot

- Professor Lanot had asked why E(M)EM students had sat a longer exam in Macroeconomics and Microeconomics, and were therefore tested more thoroughly than PPE and E&M students. He had suggested that additional material specifically designed for E(M)EM students might be included in the course.

The Standing Committee noted that in fact the position of E(M)EM students was not the same; although they followed the same lecture courses, they spent a full term of tutorial work on each of these papers, whereas PPE and E&M students had only two-thirds of a term. (For PPE and E&M students the papers therefore had only a two-thirds weight in finals.) Furthermore, these papers were in most cases optional for E(M)EM students, while for PPE and E&M they were core courses which were prerequisite for options later in the course. The Economics Undergraduate Studies Committee (USC) had taken the view that it would not be appropriate to change the courses at this stage, since they had only been running for one year, but their suitability for E(M)EM students should be kept under review.

- The external examiner had also questioned the division of the examination papers for Macroeconomics and Microeconomics into two sections with different types of questions. This structure had been used for the first time this year.

The Examiners were grateful for his comments and suggestions on the design of the questions in the draft examination papers; his further suggestions on making a clear distinction between the two types of question on the macro paper would be helpful in setting next year's exams.

- A further comment in the Report related to the loss of the applied questions that were used in previous years from the Macroeconomics paper.

The Standing Committee noted that the decision to remove the applied sections had been taken in response to a widespread view amongst tutors that there was more material in the course than students could reasonably be expected to cover in the time available, and that there was an irreducible core of theoretical material to be covered in a paper at this level. The new course would be kept under review, but the USC wished to wait until a larger number of students had been examined, in 2010, before returning to this issue.

Report from Professor Cousins

The external examiner had commented that whilst he had been sent a selection of reports for the Engineering and Management students to review, he had not been sent the remarks from the internal examiners which had made it difficult to judge the reports. He asked that in future that the internal comments be sent with the reports to allow him to understand the thought processes of the internal examiners.

The Business School would ensure that this matter was addressed in the 2010 examinations.

JS (SBS)

11. Marking of MEM and EEM Management Project Reports

A ■■■ student had made a complaint to the Proctors about the marking of the final year management project. As a consequence, feedback had been received from the Senior Proctor (Professor Martin Williams) for consideration in the marking of both MEM and EEM management projects. The key points were as follows:

- The role of the management supervisor in the assessment process needed to be clarified. At the moment their suggested mark was provided as advice to the two examiners, who then independently assessed the project. The final mark was then achieved through moderation of the two examiners' "independent" marks. Whilst there was no objection to supervisors having an input into the process, but the way it was done at present raised two concerns:
 - Since their comments and suggested mark clearly did influence the final mark awarded, they should be made a formal part of the exam process by being appointed as Assessors.
 - The practice of making the supervisor's mark known to the two Examiners *before* they decided their marks clearly called into question the independence of those marks. The supervisor's mark should be introduced at the stage of agreeing the final mark. (It may nevertheless be appropriate for the examiners to see the supervisor's comments explaining how much help the student was given etc.)
- At the moment, the supervisor completed a pro forma assessment sheet but the two Examiners did not. It was suggested that there would be greater confidence in the process if the Examiners were required to complete a simple form which at least required them to note down the main strengths and weaknesses of the work as a justification for their mark. (This was common practice for assessment of theses and dissertations.)
- The marking process should be explained in the Exam Conventions. At the moment no explanation at all was given in the MEM conventions, putting them out of step with those for Engineering Science, EEM and Materials Science.

The Standing Committee agreed that the current approach was not acceptable and required attention. Amended guidance would need to be incorporated in the examination conventions for 2010. A possible model would be the approach taken for the marking of Executive MBA projects.

JS (SBS)