

CONFIDENTIAL

EXAMINERS' REPORTS 2015

MATERIALS SCIENCE (MS)

MATERIALS, ECONOMICS & MANAGEMENT (MEM)

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REPORT ON PRELIMINARY EXAMINATION IN MATERIAL SCIENCE

Part I

A. STATISTICS

Category	Number			Percentage		
	2014/15	2013/14	2012/13	2014/15	2013/14	2012/13
Distinction	8	10	10	25	30	29
Pass	23	18	21	72	55	62
Fail	1	5	3	3	15	9

Marking of scripts

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

B. NEW EXAMINING METHODS AND PROCEDURES

This year, the course lecturers suggested questions, with supporting model answers. Model answers should be legible and where possible provided electronically. Clear model answers and clear distribution of marks are important for the examiners to know what the lecturer expects the students to know.

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.

MS1 and MS2, both, clearly suffer from candidates dropping certain topics. One of the examiners was made aware that students do not even attempt to prepare certain topics. Moreover, there is particular concern over the gap in marks between the crystallography classes and the actual performance of the students who attempt the crystallography questions. The examiners are concerned about the current evaluation of the crystallography classes. This has impact for FHS and Faculty should consider ways to address this. Adopting the model of the Maths paper might be a possibility to address part of the issue.

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

32 students were registered for the examination.

29 candidates passed all papers, without the necessity for compensation; 2 candidates were awarded a compensated pass (in MS2). Of the total of 31 successful candidates in June, 8 were awarded Distinctions, all with marks of 77% or more (rounded). While this year slightly fewer distinctions were awarded, most students passed and only 1 candidate failed.

The prize for the best overall performance in Prelims was awarded to Tom Fabes, of Trinity College. The prize for the best performance in 1st year Practicals was awarded to Rebecca Wang of Trinity College. Additional prizes for outstanding performance were awarded to Angus Braithwaite of Mansfield College and Kaiyi Chen, of St Catherine's College.

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

Where approved by the Proctors, 4 candidates were allowed (i) extra time on account of dyslexia / dyspraxia, and/or (ii) other special arrangements. These allowances seemed satisfactory.

Gender Issues:

Of the 32 candidates 15 were women and 17 men.

3 of the 8 distinctions were awarded to a woman.

In view of the small overall number of candidates, it is not sensible to draw conclusions from these data. The mean score for males was 70.7 and for females 72.3.

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

Five medical certificates were received and considered by the Moderators when reviewing the final results (all related to missed practicals or delayed submission of coursework); as all candidates had passed the Preliminary Examination, no further adjustment was necessary.

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████	████████	████	████████	████████████████

F. NAMES OF MEMBERS OF THE BOARD OF EXAMINERS

- Professor N. Grobert (Chair)
- Professor M.P. Moody
- Professor J.M. Sykes
- Professor J.H. Warner

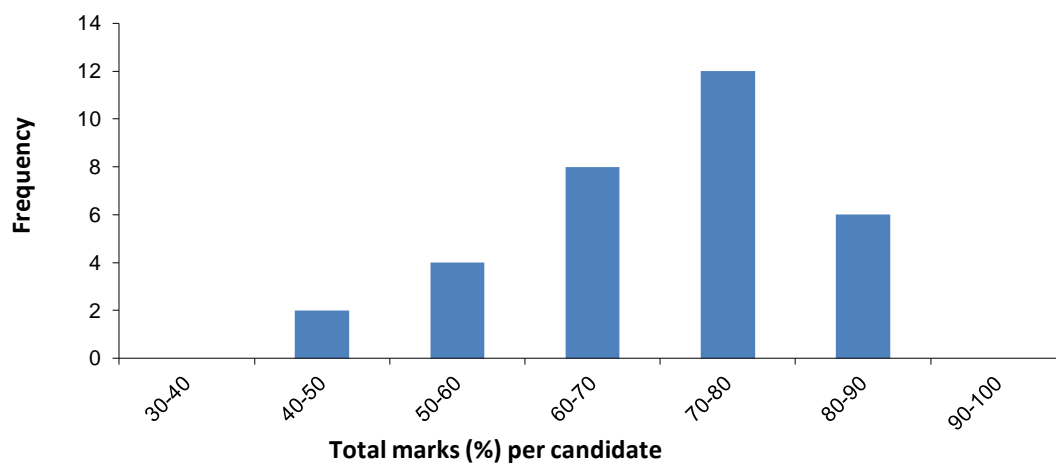
MS1 – Structure of Materials

Examiner: Professor Nicole Grobert
Candidates: 32
Mean mark: 69.81%
Maximum mark: 88%
Minimum mark: 42%

Detailed comments on the paper are as follows:

Question	No of Answers	Average Mark	Highest Mark	Lowest Mark
1	22	10.91	16	5
2	10	13.40	18	5
3	17	11.76	17	5
4	32	16.09	20	10
5	28	13.64	20	5
6	29	14.52	20	6
7	4	16.50	20	10
8	18	15.33	20	11

Prelims 2014/15 Materials Science 1



General comments:

1. Questions 1,2, and 3 were related to crystallography and were attempted by 22, 10, and 17 students respectively. Although the questions were not too complex surprisingly many students seemed to struggle with basic concepts including sketching the structure of simple molecules, such as water, ammonia. Some students mixed up symmetry operations with hybridisation orbitals. The majority overlooked several symmetry operations. Question 1d was the least popular.
2. Question 4 was the most popular question attempted by all students followed by Question 5 and 6. The least popular question was Question 7. Only four students chose this question. Interestingly, Question 7 had the highest average mark overall (16.50).

Summary:

While the average mark (69.81%) of MS1 was quite high, there is concern over candidates selecting questions strategically.

Again, as in previous years, a general preference for questions who involved explaining and describing as opposed to analytically solving or calculating could be observed. Crystallography questions did not score very well (especially Questions 1 and 3) and indicate a worrying lack of knowledge in the area by most of the students who chose to answer the questions in the exam.

A positive development was observed in the overall quality of the handwriting (except for a few candidates) and the better use of the workbooks. Although few students still forgot to indicate the questions on the cover page and used only one workbook for several questions not always clearly indicating the number of the question.

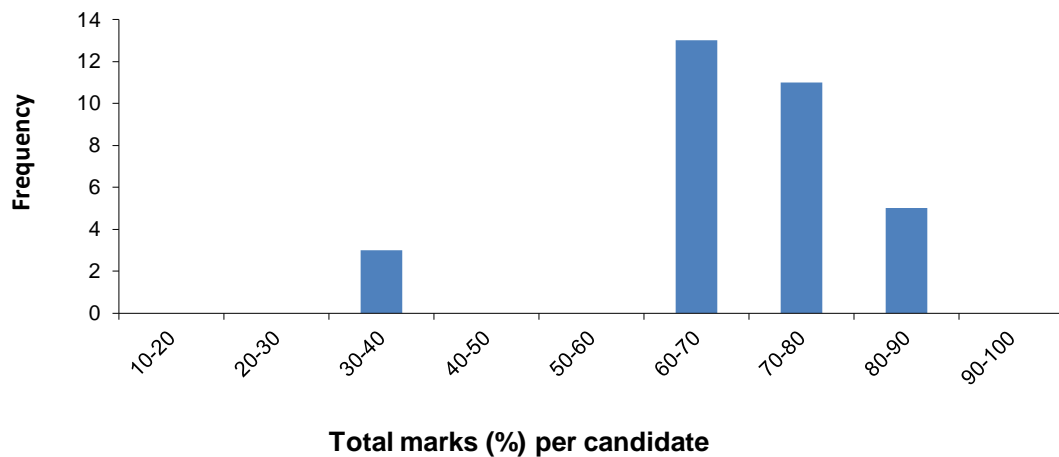
MS2 – Properties of Materials

Examiner(s): Professor Jamie Warner
Candidates: 32
Mean mark: 69.47%
Maximum mark: 90%
Minimum mark: 36%

Detailed comments on the paper are as follows:

Question	No of Answers	Average Mark	Highest Mark	Lowest Mark
1	32	13.88	20	4
2	21	9.14	16	2
3	14	14.00	20	5
4	31	13.23	16	4
5	30	15.17	19	2
6	3	16.00	20	11
7	0	0	0	0
8	29	16.48	20	7

Prelims 2014/15 Materials Science 2



General Comments

1. **Elasticity and Structure:** This was the most popular question with a decent average mark. The question required knowledge of shear force and bending moment diagrams. Most students completed parts of each component of the question.
2. **Elasticity and Structure:** This was chosen by a good number of students, but had a very low average mark of ~9. The question required knowledge Mohr's circle for strain and principal strains.
3. **Elasticity and Structure:** This was a popular question with a decent average mark. The question required comparing the yield stress behavior of FCC and BCC crystals for different temperatures and how dislocations propagate in these materials.
4. **Mechanical properties:** One of the most popular questions with a strong average mark. A question that required understanding of stress strain responses for BCC single crystal Vs polycrystalline material and work hardening.
5. **Mechanical Properties:** Another highly popular question. The question required an understanding of precipitation strengthened alloys.
6. **Electrical and Magnetic Properties:** An unpopular question, but those who answered it got high average marks for the question. The question explored the understanding of magnetic fields and electrical currents.
7. **Electrical and Magnetic Properties:** Also a very unpopular question. No one did this question.
8. **Kinetic Theory of Gases:** A popular question with a high average score. The question required deriving expression for flux and the mean free path, and then using the understanding of the kinetic theory of gas to calculate quantitative values for a balloon filled with gas.

General comment:

The mean mark is well positioned in regards to the distribution of high and low scores and the average mark. The mean mark has increased from last year's value of ~65.5%, but returns to a similar value reported two years ago, slightly higher than the expected value for a course. There is a clear separation between the popularity of questions. The two questions on the Electrical and Magnetic properties, questions 6 and 7, were very unpopular with only 3 attempts combined, and 0 attempts on question 7. This is a major concern and indications are that these questions are intentionally avoided so as to avoid any need to prepare for this lecture course. This MUST be addressed in future prelims for MS2 to have any reputation as an exam paper. Question 3 on the elasticity and structure was also unpopular compared to the other questions, similar to last year. Questions 1, 2, 4, 5, and 8 were clearly chosen by the majority of candidates.

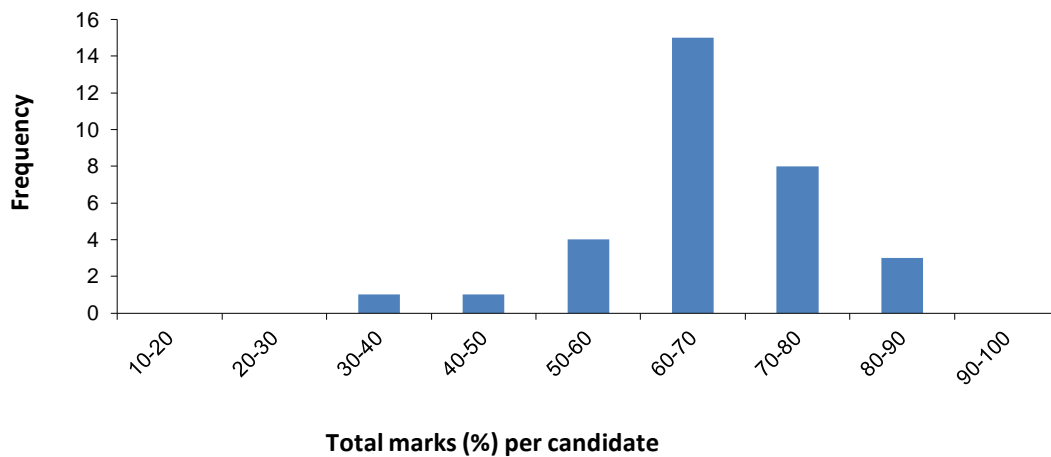
MS3 – Transforming Materials

Examiner(s): Professor John Sykes
Candidates: 32
Mean mark: 67.44%
Maximum mark: 89%
Minimum mark: 40%

Detailed comments on the paper are as follows:

Question	No of Answers	Average Mark	Highest Mark	Lowest Mark
1	27	13.11	19	7
2	27	15.22	19	11
3	22	13.18	19	4
4	21	13.81	20	10
5	5	12.40	18	7
6	9	13.11	17	6
7	23	11.87	16	4
8	26	13.85	18	7

Prelims 2014/15 Materials Science 3



Specific Comments

1. **Thermodynamics.** a)-c) Reaction enthalpy and application of Hess's law: straightforward with many good answers. d)-e) derivation of the Isochore from Gibbs-Helmholtz ; effect of T on K for exothermic reaction. Most popular (with que. 2) and good marks overall.
2. **Thermodynamics: phase equilibrium and solutions.** Derivation of Clausius-Clapeyron equation proved straightforward for most candidates. A number of candidates were confused about the variation of activity in non-ideal solutions; for instance drawing tangents at both ends of the ideal line.
3. **Reaction Kinetics.** Most candidates deduced reaction orders from initial rates successfully, but many struggled to identify units for the rate constant. The Arrhenius equation problem gave little problem, but candidates found the steady state approximation more difficult and few explained why it was appropriate.
4. **Electrochemistry.** Knowledge of the Pourbaix diagram was sketchy and most diagrams were incomplete or incorrect. Most candidates derived the Nernst equation and were able to calculate cell potential from the thermodynamic data provided.
5. **Polymer synthesis.** The least popular question. Most could identify step and chain growth and successfully gave mechanisms for free-radical polymerisation. Answers on molecular weight were not generally clear.
6. **Processing examples.** The manufacture and materials for the drinks can and plastic comb were familiar and the small number of answers were mostly correct (but limited to "thermoplastic" for the comb), investment casting of nickel superalloy for a turbine blade was generally well-described, but answers for manufacture of the crankshaft were less confident and not all identified cast iron as the preferred material; none specified the type of cast iron.
7. **Fe-C Phase Diagram and T-T-T diagram.** The question was attempted by 72% of the students but had the lowest average mark. Fe-C diagrams were mostly accurate, but a few had α and δ fields meeting for pure iron. Many drew T-T-T diagrams for eutectoid composition, or were uncertain about the shape of the $\alpha + \gamma$ field, or with the whole C-curve below the eutectoid temperature. Only a few were able to describe or sketch the microstructures for different cooling rates with any accuracy.
8. **Phase Rule and Phase Diagrams.** Definitions of P, C and F were often woolly, but most candidates gave the phase rule (and sometimes reduced phase rule) correctly, with some deriving the first. The phase diagram sketches were mostly accurate but many candidates identified two phase regions as having $F=2$ and lines as having $F=1$. Many successfully identified $F=0$ for melting of pure components, but not all. The free energy curves were mostly correct, but often crudely drawn. Some gave few temperatures and lost marks.

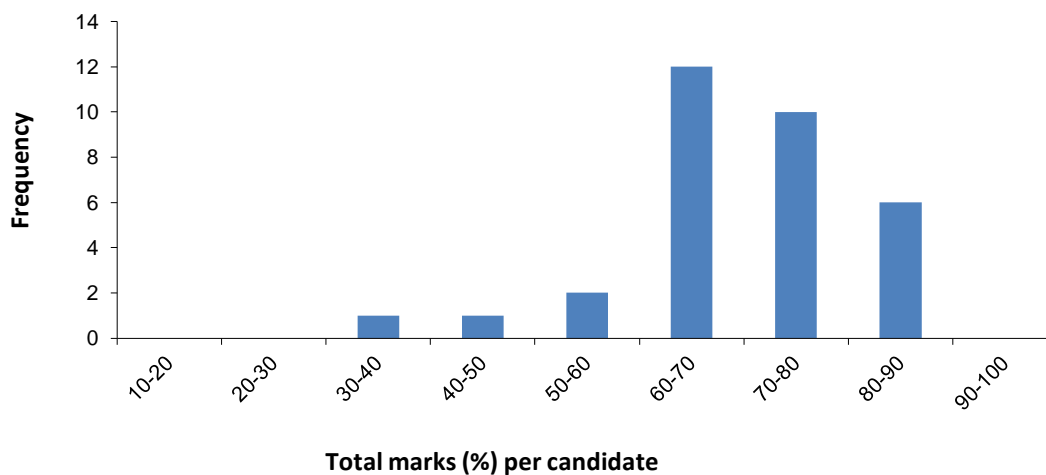
Mathematics for Materials Science

Examiner(s): Professor Michael Moody
Candidates: 32
Mean mark: 70.78%
Maximum mark: 88%
Minimum mark: 37%

Detailed comments on the paper are as follows:

Question	No of Answers	Average Mark	Highest Mark	Lowest Mark
1	32	6.72	8	4
2	32	6.84	8	4
3	32	7.66	8	5
4	32	5.00	7	2
5	30	3.87	8	1
6	31	6.55	8	3
7	30	5.77	7	3
8	31	6.06	8	3
9	26	4.38	8	1
10	28	5.61	8	1
11	24	20.04	24	11
12	32	20.22	25	4
13	6	14.83	25	4
14	23	20.04	25	9
15	19	14.68	22	5
16	23	13.13	23	4

Prelims 2014/15 Maths



Specific Comments

Question 1.

Generally well done. Few students recognised $n \cdot d \neq 0$ implied no intersection, which would have reduced the required effort. Many candidates did not clearly state why the equations they utilised or derived implied a specific result.

Question 2.

Mostly done to a good standard. However on many occasions students failed to go on to complete the entire question. In 2(c) there were a number of instances where candidates correctly calculated α, β and γ , yet failed to go on and use this to give answers for x, y , and z as requested.

Question 3.

Answered very well. No issues.

Question 4.

Many students did not identify the vertical asymptote and $x = -1$, and very few identified the diagonal asymptote. Many candidates stated turning points were either maximum or minimum without explaining their logic.

Question 5.

Most students found Question 5 very challenging, however, a good number of students did very well. The majority of students knew to use the chain rule for differentiation, however most had trouble with at least one of the partial derivatives. One of these was particularly challenging.

Question 6.

There were two approaches for answering this question, and a fairly even split in their popularity. For the integration-by-parts approach, often small error with partial differentials led larger difficulties. For the alternative approach to re-write the equation in complex form, this approach was more straightforward and hence candidates who used this methodology tended to do slightly better.

Question 7.

This was a very challenging question – lots of algebra in a limited time. Most candidates knew the appropriate approach that should be taken. However, the amount of algebra under exam conditions proved too much, and although one student came very close, no candidate completely reached a correct final result.

Question 8.

Challenging but very fair question. Most candidates knew the correct expressions for the $\ln(x)$ and $\cos(x)$ terms, although some made some minor mistakes. In many instances issues arose from candidates not clearly setting out their work in an ordered fashion and hence seeming to become confused or making a trivial error at some point within their answer.

Question 9.

Many candidates had a lot of trouble with this question and simply did not know where to begin. Many did not even attempt to answer. However, a significant number of candidates did do very well. Most who knew how to frame the problem were able to complete the majority of the question. By no means unreasonable.

Question 10.

Quite a few candidates did very well with this question. Those who did poorly generally set up the initial expressions for I in terms of M and/or p incorrectly. Many candidates missed out on very straightforward marks by failing to simply comment on the limiting cases.

Part B

Question 11

In general done very well

A common mistake made in the first part of the question:

$$\begin{matrix} w+1 & 0 & 0 \\ 0 & w+1 & 0 \\ 0 & 0 & h+1 \end{matrix}$$

Rotation matrix for clockwise vs anti-clockwise was confused in most cases.

There are easier ways to calculate the rotation matrix rather than through determinant approach as attempted by most candidates.

Question 12

Attempted by all candidates, generally very well done, a significant amount of students achieved full marks.

Question 13

Least popular question in Part B. It is unclear why this was the case. Question was very reasonable – half of those that attempted scored higher than 70%. The questions drew upon fundamentals already explored in Part A and generally handled well by the candidates.

Question 14

This was a popular question. In general candidates understood the approach that needed to be taken well. However often answers were not well set out. Particularly since the question asks candidates to **show** a result, significantly more clarity was needed in guiding the marker step-by-step through the students' chain of logic to reach the required result.

Part B was answered very well.

Question 15

Like Question 9, also based around complex numbers, students had significant problems answering this question. In many instances candidates simply did not know where to start. Another disappointment was the fact that it was apparent that students could have done better in several instances if they had paid stricter attention to the result/answer that the question was specifically asking for.

Question 16.

Attempted by many. It was a challenging but reasonable question. Very few actually used the hint given in the question which greatly simplifies the required derivation. There were some questionable algebraic leaps by some to force the result

Parts b and c were very straightforward, but not even attempted by a significant number of candidates.

Examination Conventions 2014/15

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 Education Committee of the University and the Proctors who may offer advice or make recommendations to the moderators.

The Moderators in Trinity 2015 are: Prof. Nicole Grobert (Chair), Prof. Marina Galano, Prof. Michael Moody and Prof. Jamie Warner. 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 your college, who will, if the matter is deemed of importance, contact the Proctors. The Proctors in turn communicate with the Chairman of Prelims.

If there are believed to be mitigating circumstances, such as illness, which may have affected the candidate's progress with coursework or performance in a written exam these should be drawn to the attention of the candidate's college as soon as practicable. Candidates should complete the form entitled 'Factors affecting performance in examinations' and submit this to the college with appropriate supporting material. The Senior Tutor of the college will submit the application to the Registrar for forwarding to the Chairman of Prelims for consideration according to Part 13 of the 'Regulations for the Conduct of University Examinations' section of the Examination Regulations 2014.

(1) *Setting of papers*

Each of the five papers in Prelims, comprising the 3 Materials Science papers (MS1, MS2 & MS3), the Maths for Materials Science paper, and the Coursework Paper, are weighted equally towards the overall total for the Preliminary Examination. The Moderators set the papers, but are advised to consult the course lecturers. The course lecturers are required to provide draft questions and model answers if so requested by the Moderators. There are no external examiners for Prelims. The assessed work for the practicals and the crystallography classes together constitute the Coursework Paper.

(2) *Written 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 Science consists of two sections, candidates are required to answer all questions in Part A and 4 from Part B. The total marks available for this paper are 180; the mark achieved then being scaled by a factor of 0.555* such that the paper contributes a maximum of 100 marks to the Preliminary Examination.

(3) *Coursework paper*

The Coursework Paper comprises two elements of coursework: a set of eight reports of practical work as specified in the MS/MEM Prelims Handbook (normally each individual report within the set has been marked already as the laboratory course progresses); and a set of reports for crystallography (completed under the class schedule). The Examination Regulations stipulate a specific date for submission of the practical coursework. Rules governing late submission of the practical element of coursework and any consequent penalties are set out in the 'Late submission and non-submission of a thesis or other written exercise' clause of the 'Regulations for the Conduct of University Examinations' section of the Examination

* for the 2014-15 examinations the Nominating Committee comprised Prof Grovenor & Dr Taylor.

Regulations (Part 14, 'Late Submission, Non-submission, Non-appearance and Withdrawal from Examinations' in the 2014 Regulations).

Under the provisions permitted by the regulation, late submission of an element of coursework, as defined above, for the Preliminary Examination in Materials Science and Materials, Economics & Management will normally result in one of the following:

- (a) With permission from the Proctors under para 14.7 no penalty.
- (b) With permission from the Proctors under paras 14.9 and 14.10, 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 the circumstances and to any advice given in the Proctors' "Notes for the Guidance of Examiners and Chairmen of Examiners". The reduction may not take the mark below 40% of the maximum available for the piece of work.
- (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.
- (d) Where, without the permission of the Proctors under paras 14.9 and 14.10, work is proffered so late that it would be impractical to accept it for assessment a mark of zero shall be recorded and, as per the Special Regulations for the Preliminary Examination in Material Science and Materials, Economics & Management, normally the candidate will have failed the Examination as a whole.
- (e) Where no work is submitted a mark of zero shall be recorded and, as per the Special Regulations for the Preliminary Examination in Material Science and Materials, Economics & Management, normally the candidate will have failed the Examination as a whole.

Where an element of coursework is not submitted or is proffered so late that it would be impractical to accept it for assessment the Proctors may, exceptionally, under their general authority, and after (i) making due enquiries into the circumstances and (ii) consultation with the Chairman of the Moderators, permit the candidate to remain in the examination. In this case for the *element of coursework in question* (i) the Examiners will award a mark of zero and (ii) dispensation will be granted from the Regulation that requires a minimum mark of 40% if the candidate is not to fail the examination as a whole.

Elements of coursework comprising more than one individual piece of assessed coursework

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

The consequences of late submission of or failure to submit individual practical reports or individual pieces of Crystallography coursework are set out in the Prelims Handbook (sections 9.6 and 10 of the 2014/15 version) and are **separate** to the provisions described above.

(4) *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.

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. Excepting section A of the Maths paper, for which all questions are compulsory, if the cover slip is not completed then the examiners will mark the questions in numerical order by question number. If the candidate lists more than the prescribed number of questions then questions will be marked in the order listed until the prescribed number has been reached. 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 above will be awarded and (iii) the mark for the paper will still be calculated out of 100 for MS1, MS2 & MS3 and out of 180 for the Maths for Materials Science paper.

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

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

performance in the practical work and in the crystallography classes is defined in the MS/MEM Prelims Handbook.

(6) *Classification*

The pass/fail border is at 40%.

The Moderators may award a distinction to recognise especially strong overall performance. Normally (i) at their discretion, the moderators may specify a mark in the range 70% to 79% such that candidates with an overall mark greater than or equal to this specified mark are awarded a distinction and (ii) a distinction will be awarded to all candidates with an overall mark of 80% or greater.

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

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

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

(7) *Failure of one or more Papers*

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

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

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

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

The Moderators have the authority to use their discretion and consider each case on its merit. In such cases they will take into account a candidate's profile across all elements of assessment together with, subject to guidance from the Proctors where appropriate, any other factors they deem to be relevant.

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		
	2014/15	2013/14	2012/13	2014/15	2013/14	2012/13
Distinction	n/a	n/a	n/a	n/a	n/a	n/a
Pass	22*	26	21	79*	100	100
Fail	4*	0	0	14*	0	0

* the results for 2 further candidates were pending at the time of this report

(2) If vivas are used

As stated in the Examination Conventions, vivas are no longer used in the Part I 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

New procedures for dealing with mitigating circumstances, such as illness to a candidate, were introduced across the University as described in Part 13 of the 'Regulations for the Conduct of University Examinations' section of the Examination Regulations 2014. This change was captured in the Examination Conventions distributed to candidates.

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

The new procedures for dealing with 'Factors Affecting Performance' (FAPs) should be reconsidered. Our overall reaction is summarised by the following two points:

1. Mechanisms for ensuring consistency in responding to FAPs from year to year and between Examination Boards need to be established. Devolving decision making to the individual Examination Boards is likely to generate inconsistency in how mitigating circumstances are treated, which may in turn risk the University's reputation for fairness. A more centralised process at Divisional or University level would help achieve a consistent approach and be more in line with other institutions.
2. The wealth of experience in dealing with mitigating circumstances accumulated over many years within the Proctors Office is not available within the individual Examination Boards. Serious consideration should be given to returning FAPs to the Proctors Office and if necessary increasing the resource available there.

If however the mechanism for dealing with FAPs remains substantially in the form it was this year, then at least the policy regarding evidence should be improved:

3. Too much onus is placed on the candidate to provide evidence to support their statement. It is clear that in some circumstances the candidate may not be able to provide documented evidence or not be able to think clearly enough to identify what evidence to provide.
4. Examiners should be permitted to seek further corroborating evidence when assessing FAPs. The current procedures have moved the task of assessing FAPs to the examiners but they have no remit to seek helpful additional information in contrast to previous procedures which allowed the Proctors Office to make further investigation.

Furthermore, if the mechanism remains devolved then there is a further issue of timing to note:

5. FAP statements are currently passed to the Examiners if received ahead of the Examination Board but with no regard to the timing of the FAP Panel. This timing issue led to one FAP statement

being received after the FAP Panel had met and so could not be considered until the Examination Board itself.

A statement should be added to the Conventions concerning how Examiners will handle any failure to comply with instruction on choice of questions for the Option Papers.

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 were put on the Departmental website and sent electronically, along with other information in a letter from the Chair of Examiners to all candidates on 13 March 2015, and in hard copy for the start of Trinity term. The Examination Conventions were agreed by the Board of Examiners and the Department's Academic Committee.

Part II

A. GENERAL COMMENTS ON THE EXAMINATION

There were 28 candidates for the examination, and all were awarded Honours. The examination consisted of six 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. One candidate opted to take a supplementary subject; three candidates opted to take the Foreign Language Option. These replaced the business plan. In addition, candidates completed further coursework in the 3rd year in the form of either a module on Materials Characterisation (seven candidates) or one on Materials Modelling (twenty-one candidates). There were two candidates returning from withdrawals to sit the written papers. Neither was required to redo coursework already completed.

Each written paper lasted three hours. For the General Papers, candidates were required to answer five questions out of eight, as in previous years. For Options Paper 1, candidates were offered ten questions in five sections each containing two questions; candidates were required to answer four questions, one from each of three sections and one from any of the same three sections. For Options Paper 2, candidates were offered twelve questions in six sections each containing two questions; candidates were required to answer four questions, one from each of three sections and one from any of the same three sections.

Team design projects were marked by two Examiners, one of whom was the Chairman. Teams were marked as groups. The allocation of bonus or penalty marks is permitted under the Conventions. Bonus marks for strong performance were awarded to one student. Penalty marks were deducted from two students who had not engaged well with the projects, and associated uplifts in marks were made to compensate other members of the affected project teams.

The Business Plans, submitted in the second year, were marked by an Assessor from the Knowledge Exchange and Impact Team of Research Services 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 was marked by two Assessors. The Chair of Examiners further examined a number of representative scripts from both modules, but felt that no further moderation of marks was necessary.

Reports for each of the industrial visits were assessed by the Industrial Visits Organiser, appointed as an Assessor.

The overall mean mark for Part I was at the low end of the 2(i) band. All MS and MEM general papers and option papers results were considered. After extensive deliberation, and in accord with the Conventions, the examiners scaled paper GP2 by adding 2% points, and OP1 by adding 5% points to each candidate's overall mark for that paper. The other papers were not scaled. After scaling GP2, OP1 and OP2 were toward the middle of the 2(ii) band, GP1 and GP3 toward the top of the 2(ii) band, and GP4 at the bottom of the 2(i) band. All MS and MEM General Paper and Option Paper results were considered by the examiners and it was agreed that the papers were fair.

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

The performance of the male and female candidates was as follows:

Written Papers Averages – M 57.50%, F 58.87% (Overall 57.91%)

Coursework Averages – M 68.94%, F 71.84% (Overall 69.87%)

Overall Part I Averages – M 59.63%, F 62.11% (Overall 60.43%)

Insofar as can be judged from the small sample size, the performance of male and female candidates was not significantly different. This statement is based on the standard deviation of the written paper averages, which was $\pm 14.02\%$ points for the male candidates and $\pm 15.32\%$ points for the female candidates. Both male and female groups of candidates performed better in the coursework than in written examinations.

Where approved by the Proctors, candidates were allowed (i) extra time on account of dyslexia / dyspraxia, and/or (ii) other special arrangements. These allowances seemed satisfactory.

mark (%)	Overall mark		Written Examinations		Coursework	
	Male	Female	Male	Female	Male	Female
30-40		-	3	1		-
40-50	5	1	3	2	1	-
50-60	3	4	4	2	1	-
60-70	8	1	6	1	8	3
70-80	2	3	2	2	9	5
80-90	1	-	1	1	-	1
Totals	19	9	19	9	19	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

Three applications for consideration of Factors Affecting Performance were received. In each case these included medical certificates and concerned performance during the written papers, and in two cases (i & ii) for considerable periods before the written papers. Cases i and iii were considered to have had serious impact, while case ii was deemed to have generated only minor impact. The examiners considered each case carefully and a fair course of action was agreed. This was documented in FAP reports to be made available to examiners for part II.

F. NAMES OF MEMBERS OF THE BOARD OF EXAMINERS

Prof. A.J. Wilkinson (Chairman)	Prof. S.C. Benjamin
Prof. C.R.M. Grovenor	Prof. A.I. Kirkland
Prof. J.M. Smith	Prof. P.R. Wilshaw
Prof. M.G. Burke (external)	Prof. M.J. Reece (external)

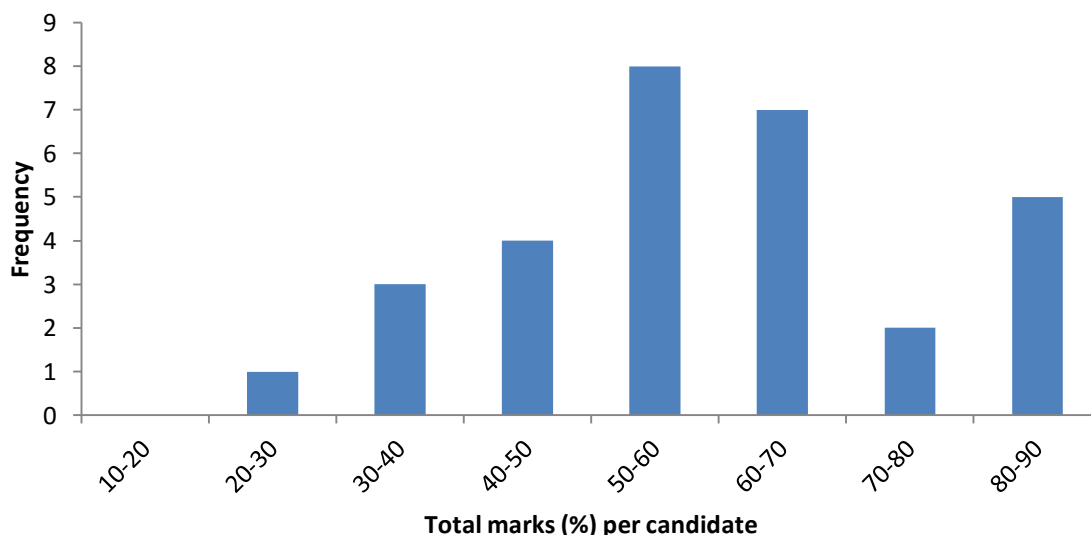
General Paper 1 – Structure and Transformations

Examiner: Professor Chris Grovenor
Candidates: 30 (28 MS / 2 MEM)
Mean mark: 59.20%
Maximum mark: 86%
Minimum mark: 29%

Detailed comments on the paper are as follows:

Question	No of Answers	Average Mark	Highest Mark	Lowest Mark	Topic
1	23	13.07	17.5	6.5	
2	20	11.73	17	6	
3	19	11.68	18	3	
4	15	8.37	17.5	2	
5	21	11.62	18.5	7	
6	20	12.58	19.5	5	
7	17	10.82	16.5	1.5	
8	14	14.61	19	3.5	

**Part I 2015 MS/MEM
General Paper 1**



General Comments:

With a paper average of 59.2%, many candidates were able to display a good understanding of this topic. Some of the scripts were of a very high standard indeed – 5 with an overall mark over 80% - but there were also some very poor scripts – 4 of them scoring below 40%. The poor performances were not concentrated in specific questions, but showed an inability to offer substantive information on any of 5 topics attempted. Where the questions strayed from the specific information in the lecture notes, only the

stronger candidates were able to score well, but there were at least a few excellent answers to each of the 8 questions.

Questions

1. A popular question on the corrosion of automotive radiator components, requiring the students to comment on the effect of materials choice, galvanic effects and the relative areas of tubes and fins. The final part was the construction of a simple Evans diagram. Many candidates were able to present a convincing narrative for the effect of galvanic couples, but the importance of the relative area of different parts of the radiation design was less well understood. The Evans diagram was completed by more than half of the candidates. A marks average of over 13 showed a generally good degree of understanding.
2. Another popular corrosion question, this time on cathodic protection. A slightly lower marks average was a result of (a) the candidates being able successfully to reproduce diagrams from the lecture notes but not give a clear explanation of the mechanisms of cathodic protection, and (b) a lack of understanding of how to use an impressed cathodic potential on an Evans diagram to calculate corrosion current densities. Surprisingly, 2 candidates expressed difficulty in using a graph with a logarithmic axis.
3. A very straightforward bookwork question on the structure of polystyrene and PMMA. Many candidates were able to show a good understanding of this material, although not all could identify the structural features responsible for the calorimetry peaks in part c, and there was some confusion in the relationship between molecular structure and melting temperature and T_g .
4. A standard and relatively unpopular powder processing question that required the derivation of a consolidation equation in part b. This question had by some margin the lowest average mark (8.37) because the candidates were (i) not able to answer part b, (ii) presented in part c a general description of densification mechanisms during sintering rather than concentrating on late stage processes as asked for, and (iii) did not know very much about additive manufacturing.
5. A popular question on phase transformations that combined notes on phenomena in casting and a much more open ended section on microstructure development in Al-Cu alloys at different temperatures. The factual casting parts in part a were done rather well by many candidates, but part b where the construction of a coherent argument was required was much less convincing in many scripts. Fewer than half the candidates were able to demonstrate that they understood the meaning of the solvus lines in the phase diagram, and that not all the metastable phases would form at the higher ageing temperature.
6. A question on surface energies that stuck closely to the material covered in the lectures. With an overall marks average of 12.6, many candidates showed good recall of the 2 equations required (particle coarsening and zero creep method), and could explain the logical steps in the arguments to derive these equations. However in many cases the mathematical notation (especially regarding partial derivatives) was poor.
7. Surprisingly few candidates attempted this question, and the marks average was low at 10.82. Part a required the derivation of the Avrami equation which is emphasised as a 'must know' part of the phase transformations course, and many candidates were able to produce convincing and full answers. However part b which required the interpretation of real experimental data on nucleation and growth rates of pearlite colonies at different temperatures was rather poorly done. Few candidates could interpret what a change by a factor of 10^6 in nucleation rate was likely to have on the microstructure for instance.
8. An unpopular ternary phase diagram question that was much easier than it looked. Those brave enough to attempt it mostly scored very highly (marks average 14.6) because the specific features that they were asked to identify in the diagram given were discussed extensively in the lecture course.

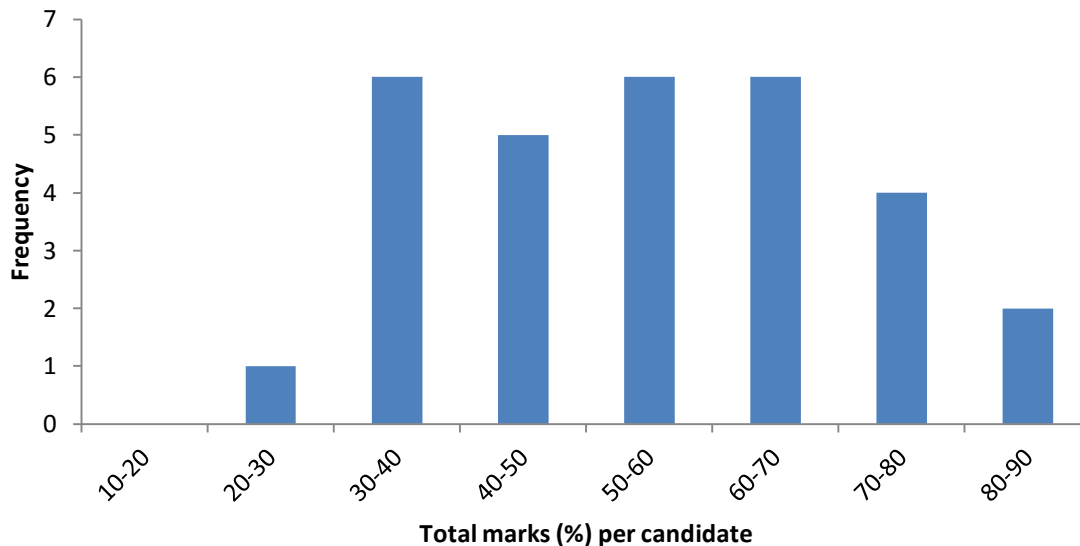
General Paper 2 – Electronic Properties of Materials

Examiner: Professor Peter Wilshaw
Candidates: 30 (28 MS / 2 MEM)
Mean mark: 55.67%
Maximum mark: 88%
Minimum mark: 26%

Detailed comments on the paper are as follows:

Question	No of Answers	Average Mark	Highest Mark	Lowest Mark	Topic
1	19	10.29	17	3	Tensors
2	8	9.75	17.5	2	Electronic Structure
3	26	9.27	18	2.5	Electronic Structure
4	22	10.91	16	4.5	Magnetism
5	20	12.08	20	2.5	Statistical Mechanics
6	29	10.50	17.5	4	Quantum Mechanics
7	19	12.47	19.5	4.5	Semiconductors
8	7	9.00	17.5	2.5	Electrical and Optical Properties

Part I 2015 MS/MEM General Paper 2



Questions:

Tensors. A generally well answered question. However, most candidates failed to realise that for the principal axes of the electrical and thermal conductivity necessarily to be parallel to each other they must also be parallel to the crystal axes. The answer then required the statement of the crystal systems for which the principal axes are parallel to the crystal axes. The part of the question where most marks were lost was that where Mohr's circle was to be used to find the shear strain in a block. Those who knew how to

use Mohr's circle got very high marks, those who didn't got close to zero.

- 1) Electronic Structure. A very unpopular question that was done badly by most candidates. It involved quite a lot of simple algebra which many candidates found difficult to perform accurately. The concepts behind the question were, however, rather straightforward.
- 2) Electronic Structure. The second most popular question perhaps because most candidates were able to produce very strong answers to the first two parts. Unfortunately the rest of the question proved much more challenging. It should be noted that significant number of marks were lost through sloppy algebra and calculations. It was surprising how few candidates realised that the integral of the density of states from zero to the Fermi energy is equal to the total number of electrons.
- 3) Magnetism. A popular question with very good answers concerning dia-, para- and ferromagnetism. The final part required evaluation of the Brillouin function in the case of a small argument. This required a substantial amount of simple algebra which many candidates failed to get out either because they gave up too early, made a careless mistake, or did not appreciate that the wording $\beta_J(gJ\mu_B JB/KT)$ where..... $\beta_J(x)$ is the Brillouin function meant that the argument of the Brillouin function for the purposes of this question was $gJ\mu_B JB/KT$.
- 4) Statistical Mechanics. There were some excellent answers to this question and some rather poor ones. The poor answers generally showed either a lack of knowledge of how to set up the solutions in the required way or, just as commonly, an inability to perform the required algebra accurately.
- 5) Quantum Mechanics. The most popular question on the paper though not especially well answered. It was surprising how many candidates were unable to give a clearly worded description of quantum mechanical tunnelling. Many candidates got confused regarding the wave function of the particle whilst in the step. If the term $(V-E)^{1/2}$ is used then expression for the wave function should contain $\exp(-Kx)$ whereas if $(E-V)^{1/2}$ is used then the expression should contain $\exp(iKx)$. Candidates did not appreciate that the mass of the electron in the expression for tunnelling probability is actually its *effective* mass and thus for a semiconductor with small effective mass the tunnelling probability through a barrier is much higher than through a similar barrier in a vacuum.
- 6) Semiconductors. A reasonably straightforward question. A full explanation of the rectifying nature of Schottky contacts was only given by a few candidates. Most simply stated that the barrier presented by the built-in voltage is smaller than the Schottky barrier and thus electron flow is easier from semiconductor to metal. A fuller answer includes consideration of electron flow in both directions and the fact that application of a bias alters the barrier in the semiconductor but makes no difference to the Schottky barrier height.
- 7) Electrical and Optical Properties. A very unpopular question although mostly it required explanation of straightforward conduction processes covered in lectures. Most candidates did not produce Arrhenius plots $\ln(\sigma T)$ vs $1/T$ as asked, but rather linear plots of σT vs T . The gradient of the former gives an activation energy as the question required.

General comments:

The paper produced a very wide spread of marks, with a few very high scores and several low ones, and a mean mark of 56% after scaling. All candidates attempted five questions. Seven candidates received marks of less than 40% after scaling and thus failed the paper. The most popular questions were on quantum mechanics and electronic structure, and the least popular were a different question on electronic structure and one on the electrical properties of materials. The better candidates showed good understanding in the questions they attempted, and were able to apply their knowledge and problem-solving skills to unfamiliar scenarios and extract quantitative answers. It was clear that those candidates scoring highly were comfortable with extended algebraic derivations and in many instances very high or even full marks were awarded for large sections of the questions. Perhaps the most obvious failing of the poorer candidates was their inability to perform the required algebra and mathematical manipulation, but they also showed poorer knowledge and understanding even of the material covered explicitly in the lectures or tutorial sheets.

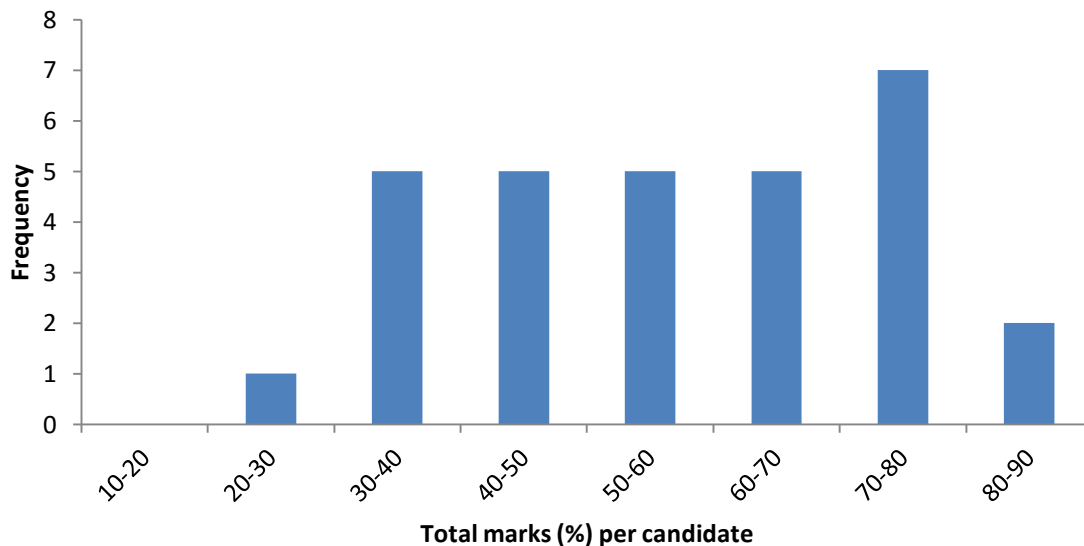
General Paper 3 – Mechanical Properties

Examiner: Professor Angus Wilkinson
Candidates: 30 (28 MS / 2 MEM)
Mean mark: 58.33%
Maximum mark: 84%
Minimum mark: 29%

Detailed comments on the paper are as follows:

Question	No of Answers	Average Mark	Highest Mark	Lowest Mark	Topic
1	14	11.32	19.5	3	
2	30	13.33	19.5	5	
3	5	8.40	14.5	4	
4	21	11.71	18.5	2.5	
5	24	12.77	18.5	4.5	
6	10	4.45	8.5	0	
7	24	11.27	20	3.5	
8	22	12.39	20	2	

Part I 2015 MS/MEM General Paper 3



General Comments:

The mean mark for the paper was 58.3% but the marks were spread over a rather broad distribution with the histogram above showing a peak at 70-80%. Approximately a third of the candidates demonstrated very good understanding of the subject and obtained first class marks; indeed two excellent scripts

achieving in excess of 80%. Half the candidates obtained marks in the range 40%-60% over which the distribution was very flat.

6 candidates scored below 40% with one of these even below 30%. The scripts for these candidates were very poor often exhibiting an inability to recall quite basic information and concepts that were central to the course and covered directly in the lecture notes.

Questions:

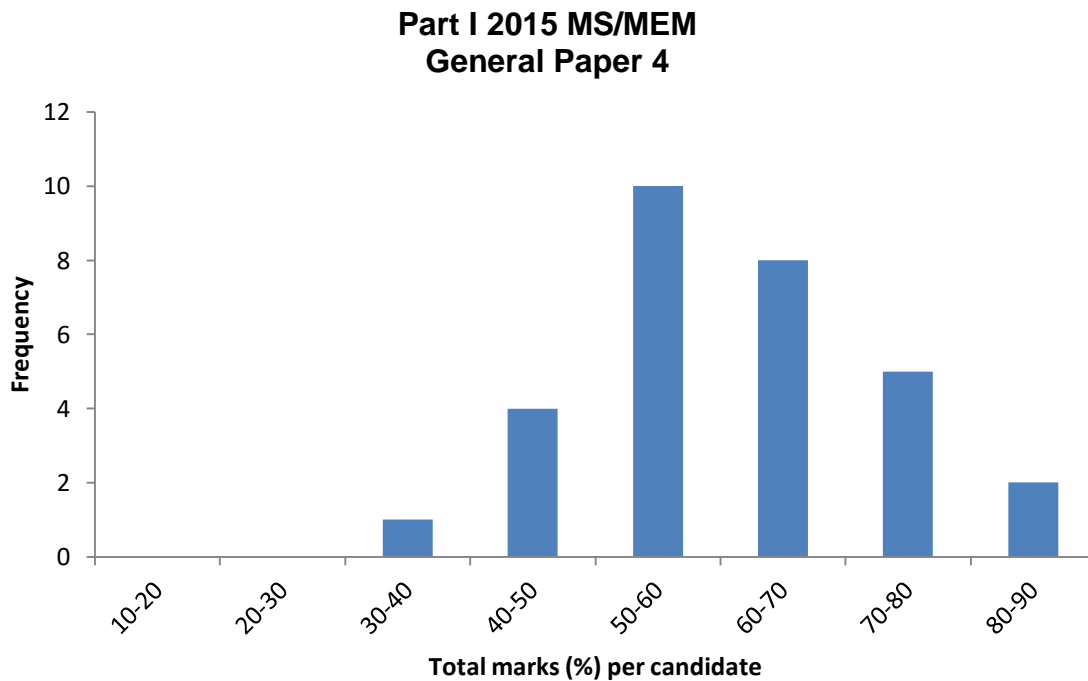
- 1) *Macroplasticity* question concerning yield criteria with a numerical assessment of two criteria for consistency with yielding under different stress states, and then a standard derivation for Considere's criterion. Mean mark close to paper average and number of attempts close to expectations. Two near perfect answers but also one extremely weak answer (3/20). Although most described Tresca and von Mises yield criteria some struggled to test them with data provided for yielding under differing stress states.
- 2) *Microplasticity* question with an initial part requiring description of dislocation-precipitate interactions, followed by discussion of two equations and numerical application of one of them. The question was answered by all candidates and with the highest mean mark of all questions on the paper. Several candidates demonstrated excellent understanding with 5 achieving marks in excess of 90%. Only 3 candidates scored less than 50%.
- 3) A more mathematical *Microplasticity* question concerning the analysis of a prismatic dislocation loop requiring knowledge of the Burgers circuit and Peach-Koehler force. This was a very unpopular question with only 5 of the 30 candidates answering it, possibly as a result of the mathematical nature of the question (though note Q7 was also mathematical but popular). The mean mark was low though one candidate did achieve a first class mark. The lack of ability to correctly write down a simple unit vector by the weaker candidates was disturbing.
- 4) *Mechanical Properties of Polymers* question about Maxwell and Voigt models for linear viscoelasticity requiring description of models and their responses to input load and extension variations but not requiring any mathematical or numerical analysis. Mean mark for question close to mean from paper and question attempted by slightly more than expected number of candidates. Nine candidates demonstrated very good understanding of the topic and obtained first class marks, however there were also very weak answers with four candidates scoring less than 25%. Basic understanding of the dashpot element was poor in the weaker answers.
- 5) Question on *Creep* requiring a description of void nucleation and microstructure design to inhibit it and then a numerical problem using the Larson-Miller approach. The question was reasonably popular and the mean mark was higher than the paper average. A large proportion of candidates showed good understanding of topic and achieved first class marks however there were two extremely weak answers scoring less than 25%. Most understood the role of grain boundaries in providing heterogeneous sites for void nucleation but fewer described the large barrier for homogeneous nucleation with grain interiors. The numerical aspect were mostly tackled well.
- 6) *Fracture* question with first half requiring identification and description of processes leading to three observed trends in fracture processes in steels, composites and Ti alloys, and a second half concerning analysis of strength versus grain size data for MgO. The question had by far the weakest performance of all on the paper with a mean mark of only 22.25%, no candidates achieving more than half marks and one script awarded a mark of zero. Many candidates incorrectly linked the strength data for the brittle ceramic MgO to the Hall-Petch effect in plasticity.
- 7) *Elasticity* question requiring a standard derivation of strain and stress fields for a spherical inclusion and then using this to analyse a He containing bubble in steel. The question was popular and had a mean mark close to the mean for the paper. Many scripts demonstrated good understanding with seven achieving first class marks and one outstanding effort obtaining full marks. As is often the case most problems were encountered with identifying and implementing boundary conditions.
- 8) Question on *Mechanical Properties of Composites* requiring a standard derivation of work done during fibre pull-out and discussion of how finite fibre length would alter fracture behaviour. The question was popular and the mean mark was above the mean for the paper. Many candidates showed very good understanding of the topic and gained first class marks with three scripts achieving 90% or more include full marks for one candidate. There were however two extremely weak scripts scoring only 10% and 15% and showing little understanding of the subject.

General Paper 4 – Engineering Applications of Materials

Examiner: Professor Angus Kirkland
Candidates: 30 (28 MS / 2 MEM)
Mean mark: 60.90%
Maximum mark: 84%
Minimum mark: 39%

Detailed comments on the paper are as follows:

Question	No of Answers	Average Mark	Highest Mark	Lowest Mark	Topic
1	24	13.19	16.5	9	Polymers
2	18	12.64	18	5	Microstructural characterisation
3	19	12.66	17.5	7	Ceramics and glasses
4	25	14.62	19	9	Ceramics and glasses
5	20	11.53	19	5	Microstructural characterisation
6	11	10.27	18	6	Engineering Alloys
7	21	9.40	16.5	5.5	Engineering Alloys
8	12	10.67	15.5	6	Semiconductor Devices



General Comments:

Overall the standard of the answers for this paper was high with the exception of Q7.

Question 1: Polymers

A very popular question this year, which was generally well answered. Parts (a) and (b) concerned the properties of polymers and most candidates scored well on these parts. Parts (c) and (d) were related to recycling of polymers and many candidates failed to provide the five clear reasons required in part (d) with suitable explanations.

Question 2: Microstructural characterisation

The first two parts of this question required a simple explanation of the origin of magnification in an atom probe with a straightforward calculation of magnification for a given geometry. These were generally well answered. Part (c) required the candidates to simply state the Maxwell conditions for a perfect lens and most candidates were able to remember these. The final two parts of the question related to resolution with an aberrated lens in an SEM. Few candidates were able to derive the required formula needed to estimate the angular acceptance of the optimum aperture. Overall, however the mean mark for this question was high.

Question 3: Ceramics and glasses

Parts (a) and (b) concerned components in inorganic glasses and their effects on physical properties. Most candidates were able to identify the three components and explain their effects. Parts (c) and (d) concerned colour in soda lime glasses. These parts were less well answered with many candidates giving incorrect (unknown) oxidation states and coordination geometries for the two transition metal dopants.

Question 4: Ceramics and glasses

A very popular question with a very high mean mark. All parts of the question related to powder processing and almost all candidates were able to recall the processes, mechanisms and effects required. Marks were lost in a few cases by candidates not providing sufficient detail, particularly in part (b)(i).

Question 5: Microstructural characterisation

A question that was done very well by some candidates but very poorly by others leading to a wide mark distribution. The first part required the candidates to draw an Ewald Sphere construction for high energy electrons and most were able to recall this and to explain the presence of many simultaneous reflections in an electron diffraction pattern. Parts (b) and (c) were not generally well answered with a disappointing number of candidates being unable to index the diffraction pattern provided and to carry out a simple calculation of a lattice parameter. Almost no candidates sketched the EDP for InAs correctly.

Question 6: Engineering Alloys

An unpopular question with a low mean mark. The first part of the question concerned metal extraction and most candidates were able to identify which of the metals given would be extracted electrochemically or by pyrometallurgy. The remaining parts of the question concerned the blast furnace. Disappointingly very few candidates demonstrated any real understanding of the essential thermodynamics and few correctly

identified the direct and indirect reduction reactions. Almost no candidates correctly described the chemistry relevant to sulphur removal.

Question 7: Engineering Alloys

A popular question but one done very poorly with a consequently low mean mark. The descriptions of Ti-6Al-4V lacked detail and no candidates were able to correctly calculate a figure of merit for deflection-limited beams. The latter parts of the question on hcp metals and the deformation of Ti lacked detail and few candidates correctly identified the hcp slip planes and their effects on deformation response.

Question 8: Semiconductor Devices

Another unpopular question with a low mean mark. The first part of the question required the candidates to describe the operation of a MOSFET. Answers to this part generally lacked detail and structure. No candidates made any real progress with the second part of the question on MESFETS and their use for high speed operation.

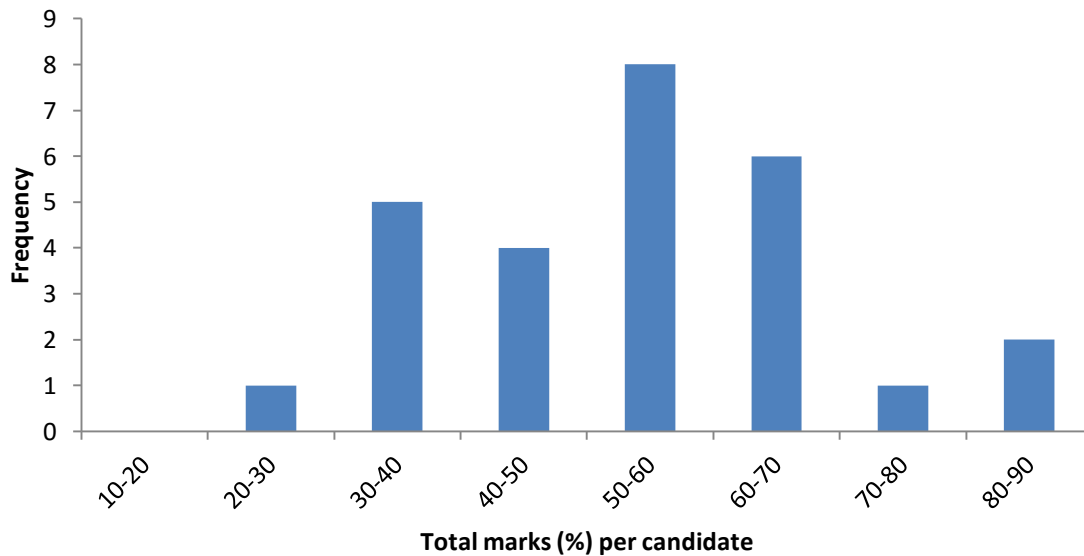
Materials Options Paper 1

Examiner: Professor Jason Smith
Candidates: 28 (MS)
Mean mark: 55.46%
Maximum mark: 94%
Minimum mark: 24%

Detailed comments on the paper are as follows:

Question	No of Answers	Average Mark	Highest Mark	Lowest Mark	Topic
1	17	12.00	22	3	Strength & Failure of Materials
2	14	10.07	21	3	Strength & Failure of Materials
3	5	13.90	20.5	9.5	Nanomaterials
4	0	n/a	0	0	Nanomaterials
5	4	9.75	14	4	Prediction of Materials Properties
6	14	14.00	22	7	Prediction of Materials Properties
7	12	12.17	22	4	Materials and Devices for Optics & Optoelectronics
8	7	16.00	23	7	Materials and Devices for Optics & Optoelectronics
9	21	14.14	23.5	3.5	Engineering Ceramics: Synthesis & Properties
10	17	11.79	19	6	Engineering Ceramics: Synthesis & Properties

**Part I 2015 MS
Option Paper 1**



Detailed Comments

The paper produced a wide distribution of marks, with a few candidates doing extremely well and others very poorly. In general questions which required understanding in addition to knowledge caused greatest difficulty, as has been noted on other papers. In some cases answers failed to go substantially beyond second year work. This was particularly noted in the Strength and Failure of Materials and Engineering Ceramics questions, the most popular of the options courses for this paper and where topical overlap with second year work is strongest. Nanomaterials questions were particularly unpopular and elicited only five answer attempts.

The raw mean mark of 50.46% led to an addition of 5.0 marks to each paper to bring the mean within the range specified in the regulations.

1. A fairly popular question on cyclic stress-strain properties that was done well by a few candidates and poorly by others. Part (a), describing what is shown on the cyclic stress strain curve was answered well by most, and almost all candidates could draw the s-shaped curve for a copper single crystal deformed in single slip. In Part (b) most candidates were able to discuss the appearance of veins of edge dislocations in dipole configurations, and regular ladder structures as peak stress saturates, although some were a bit shaky on the parts of the curve in which these features appeared. Few gave quantitative information regarding dislocation densities or the size and separation of the veins. Part (c) tested the candidates' understanding of the stability of screw dislocations to cross-slip. It elicited a range of responses and separating the stronger from the weaker candidates. Part (d) was new material but a relatively small extension of part c, requiring candidates to predict the consequence of thermal activation of the cross-slip process. Only a couple of good answers were produced.
2. A moderately popular question on Strength & Failure of Materials done rather poorly by most candidates. Part (a) involved analysis of a micrograph of a fracture surface and fracture toughness values for a steel sample, comparing the data with what would be expected for purely brittle fracture. Few students wrote down the correct expression for brittle fracture toughness, although many recognised that the value given was higher than would be expected in this scenario. The process by which the high fracture toughness was likely to be achieved (small brittle carbides in the crack tip plastic zone that require a large work-hardened zone to be formed before cracks can propagate) was not generally well explained, and although many answers contained reasonable sketches most candidates' understanding of the process was sketchy. In Part (b) most students knew the compositions of the two Al alloys featured, but translation of this information to the operating strengthening mechanisms was patchy. Few answers used Considere's construction effectively to show how moderate work hardening rates could give rise to a good combination of strain at necking and flow stress. Part (c) concerned surface hardening treatments for components, requiring a knowledge of the available methods with and understanding of their appropriateness to different components. Some good answers were provided to this section and the correct answers of carburisation and nitriding for the two components featured were picked up by most.
3. An unpopular question on carbon nanomaterials with only 5 attempts. The candidates who had clearly revised this course did well and were able to answer all parts of the question including the interpretation of the NMR spectra and the derivation of Eulers Rule. The remaining candidates seemed to use this question as a weak fifth answer and made little progress beyond the very general introductory part (a).
4. A question on fabrication process steps for a sensor made of 2D material which no candidates chose to answer.
5. A less popular question on the theoretical description of the dielectric properties of materials, done poorly by most candidates who attempted it. Part (a) required a very basic understanding of the relationship between the dielectric function and the propagation of light through a material (which is second year work) but was answered somewhat poorly by most candidates. Parts (b-f) involved using the Kramers Kronig relation to evaluate the real part of the dielectric function given a simple function of the imaginary part. It tested the candidates' ability to apply the mathematical relationship given in the question to extract information that could be related back to material properties. A couple of candidates handled the maths well but others slipped up and produced meaningless results.
6. A popular question on the modelling of Be^{2+} ions using the time independent Schrödinger equation, generally well done. Candidates were able to identify the meaning of the different terms in the equation and thereby to apply it correctly to the ion in question, then apply the independent electron approximation to work out the ground state wave function. Calculations of the total electron energy and the electron density were generally good with a couple of small slips. Most candidates could sketch the radial probability function, although some did this from memory and omitted quantitative information

present in the equations. The final part of the question, to work out the average distance of the electrons from the nucleus, was done well by a few.

7. A moderately popular question on optical waveguides and fibres which produced a couple of good answers and several less good responses with many students scoring around half marks. Most candidates showed some familiarity with the concepts in the question (discrete modes of waveguiding, dispersion, single mode versus multimode fibres, photonic crystal fibres) but were unable to demonstrate the understanding required to give clear answers, and were short on quantitative detail.
8. A less popular question on optical gain which was done quite well, attracting the highest average mark on the paper. Part (a) was done well, with candidates being able to derive the gain threshold equation and explain why at least three electronic energy levels are needed. Part (b) also attracted some good answers, with candidates describing semiconductor optical amplifiers and fibre amplifiers reasonably well. Part (c), on the difference between an optical amplifier and a laser, was less well done in general with only a couple of good answers.
9. A very popular question on Engineering Ceramics that was generally very well answered. Almost all candidates were able to reproduce the processing routes for SiC components required in part (a). The more analytic parts of the question, (b) and (c), were less well done with a number of candidates failing to derive the expression required for the thermal shock parameter R_1 in part (b) and missing some of the assumptions needed to establish the rapid thermal quenching properties in part (c).
10. Another popular Engineering Ceramics question with generally good answers. Almost all candidates were able to sketch the microstructures of Al_2O_3 required in (a) and to provide solutions for full densification. More candidates struggled with part (b). The derivation of the load factor for 3-point bending required in (b)(i) was often incomplete and a number of candidates did not attempt (b)(ii), a quantitative estimate of median strength of discs in biaxial flexure based on data given.

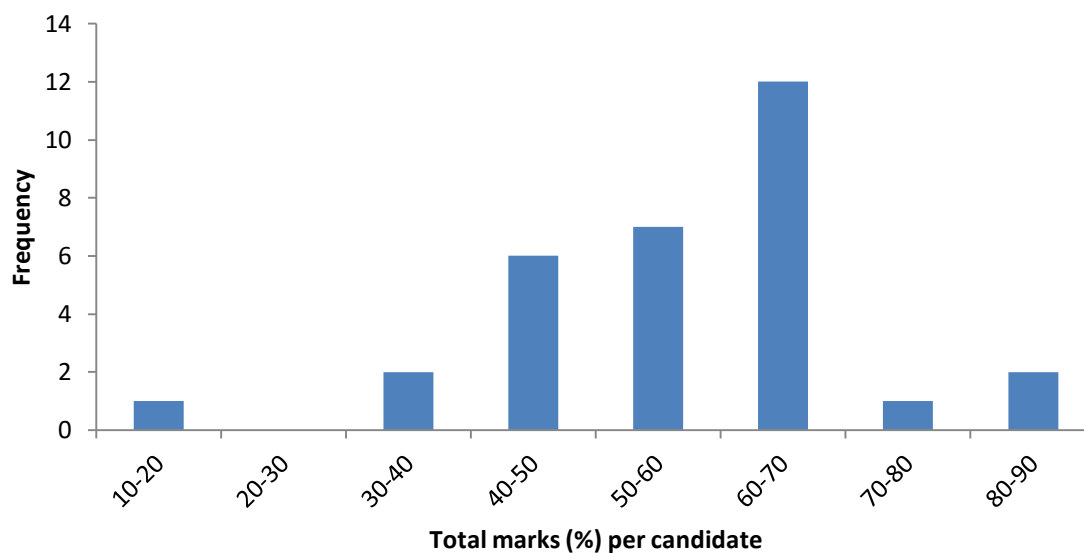
Materials Options Paper 2

Examiner: Professor Simon Benjamin
Candidates: 31 (28 MS / 3 MEM)
Mean mark: 57.23%
Maximum mark: 83%
Minimum mark: 15%

Detailed comments on the paper are as follows:

Question	No of Answers	Average Mark	Highest Mark	Lowest Mark	Topic
1	13	14.00	25	6.5	
2	16	17.41	23	5	
3	10	7.40	13	2.5	
4	9	11.39	23.5	0	
5	7	12.64	20	8.5	
6	14	17.79	20.5	11.5	
7	13	13.69	21.5	6	
8	4	13.00	21	8	
9	14	16.25	22	9	
10	9	14.67	21	10.5	
11	5	14.30	19.5	6	
12	9	14.39	24.5	5.5	

**2015 Part I MS/Part II MEM
Option Paper 2**



General Comments

The mean mark for the paper was 57.2% but the marks were spread over a broad distribution from 83% to 15%. The histogram above shows a peak at 60-70%. Only 3 of the 31 candidates obtained first class marks in excess of 70%, though the high mark of 83% is excellent. At the lower end it has to be noted that 3 candidates failed to achieve 40% with the low mark of 15% corresponding to an extremely weak performance (this candidate only provided answers to 3 rather than 4 questions).

Questions:

1. A fairly straightforward question that tested the candidates' general understanding of X-ray and neutron scattering techniques. The question was essentially book work, and full marks were attained by one candidate who had revised comprehensively. Part (c)(ii) concerning the SANS experiment was the least well answered, with several candidates being confused as to the P and Q parameters in the question.
2. This question was popular (attracting the highest number of attempts of any question on the paper) and was generally quite well answered. The earlier parts of the question concern the Flory-Huggins model, and the latter concern a possible deviation from that model which may occur in real systems. Generally candidate engaged well with both sections, providing sketches that incorporated the key features.
Note: The paper which the candidates sat contained two typos in this question. The first typo was in the equation at the start of the question (a theta appeared in place of a phi). This error was noted early in the exam and was announced to the candidates; there was no indication that it has caused any difficulty for any of the candidates. The second typo was in part (d) of the question, where the words "negative" and "positive" were transposed. This was noted later in the exam, and by the time it was announced to all candidates some had already attempted the question. Both the examiners marking the paper were careful to observe any potential confusion that might have arisen from the typo and to assign marks appropriately, however there was little indication that this typo had impacted on the candidates' attempts on the question. Some candidates had noted the typo and pointed it out in their scripts while others had simply ignored it. The performance of the candidates on this part of the question was compared with the performance on the other parts, and no anomalies were noted.
3. This question had the lowest average mark (7.4) of all questions on the paper. Only one candidate exceeded half marks and the lowest mark was 2.5. The first two parts of the question was straight forward and required discussion of breakdown of planar solid-liquid interface. The second part carry the majority of marks concerned metallisation and active metal brazing as routes for joining metals and ceramics for which the majority of candidates showed little knowledge.
4. A question covering two topics attempted by 9 candidates. The first topic concerned a derivation Chvorinov's law for the time taken for a casting to freeze and a numerical application of it. The second required discussion of electron beam and laser welding processes. The average mark was significantly below the average for the paper. There were three excellent scripts showing detailed knowledge of the subject which attained marks in excess of 80%. The other six scripts were much weaker scoring less than 30% and often lacked fairly basic information.
5. This question attracted only 7 answers and had a mean mark below the mean for the paper. Responses to the initial section on supply and demand of energy were disappointing with many limiting discussion to electricity. Many answers to the section on emerging technologies could have been strengthened by attempts to quantify (explicitly requested in the question). The final section concerning nuclear fusion and sought information about possible tritium breeder concepts. One candidate provided well-argued answers and achieved a mark above 80%.
6. A popular question with a high average mark. No doubt the question was attractive to candidates in part because several sections can be attempted using only general knowledge of materials science and energy production. The final part of the question, concerning the operation of electrochemical capacitors, was appreciably less well answered than the earlier sections – some candidates failed to distinguish between electrochemical capacitors and standard capacitors, or even confused them with batteries.
7. Question concerning the processing, properties and microstructure of steel and Ti alloy for use in aircraft landing gear. The question was popular though the mean mark for the question was slightly below that for the paper. Most candidates correctly identified desirable properties for the application and limitation for the two materials. Major alloying additions were less well reported particularly for the steel and some struggled to identify desirable microstructures and processing routes to achieve them. Weaker scripts failed to identify beta-Ti alloy was required. Three candidates achieved first class marks with well-argued scripts, however there were some weak answers too with two candidates only achieving 24%.

8. The least popular question on the paper. The four attempts included one strong effort, two mid-scoring answers and one relatively poor one. The candidates did not emphasise the diffusionless nature of martensitic transforms in the opening part of the question. Marks were gained/lost relatively uniformly over the four sections of the question. Some candidates answered the earlier sections of the question using the specific case of steels, rather than recognising the broader context (whereas the question referred to steels only in part d).
9. A popular question with a high mean mark (65%) well above the average for the paper. The initial sections concerning synthesis and conformations of proteins was generally answered reasonably well. The section on J-curve behaviour and effects of arteriosclerosis were slightly less well answered. 5 of the 14 candidates achieved a mark in excess of 70% with 3 of these being particularly strong answers (>80%). Only one candidate failed to achieve 40%.
10. A biomaterials question on degradation and repair of fractured bone. The mean mark for the question was close to that for the paper. Initial sections concerned risk factors and characteristic changes to bone for osteoporosis for which answers were reasonable. The subsequent section on repair of lumbar vertebrae and greater trochanter yielded answers of more variable quality. Only one candidate achieved a mark above 70%, but there were no candidates falling below the 40% level.
11. An unpopular question, with attempts ranging from fairly strong to very weak. Despite part (a) being straightforward bookwork, and structured into a number simple two mark sub-questions, generally candidates lost several marks here. Attempts at the sketch and discussion sections of part (b) were credible; but only two of the five candidates had substantial ideas on part (b)(iii), i.e. increasing the resistivity.
12. A question that was mid-ranking in terms of popularity and its mean mark, and with attempts ranging from near-perfect to very poor. Several candidates were enthusiastic about the topic, with one candidate taking the time to inform the examiners that the Czochralski growth process "...is really amazing! And it even looks cool!". Generally marks were gained and lost fairly uniformly over the question, except that the final part (e) was attempted poorly by several of the candidates. This question had a typo in the paper that the candidates saw: equation $C_L = K C_S$ in part (b) has constant K on the wrong side. This was noted early in the exam, and was announced to all candidates. The examiners took care to assign marks in fair consideration of the potentially disruptive effect of the typo, but in fact there was little indication that this had a significant effect on the candidates' attempts.

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 (%)		
	2014/15	2013/14	2012/13	2014/15	2013/14	2012/13
I	9	8	8	36.0	36.4	29.6
II.I	13	8	16	52.0	36.4	59.3
II.II	3	5	3	12.0	22.7	11.1
III	0	1	0	0	4.55	0
Pass	0	0	0	0	0	0
Fail	0	0	0	0	0	0
Total	25	22	27	-	-	-

(2) The use of vivas

The Part II examination in Materials Science consists only of a research project, for which a thesis not exceeding 12,000 words, or 100 pages, is produced. The mark for the Part II is for the thesis alone. All candidates were given a viva solely to clarify points of detail and to ensure that the thesis presented had been prepared by the candidate being examined. The discussion in the vivas was led by the internal Examiners or Assessors who had read the thesis fully but the other examiners, including an external examiner, also had the opportunity to ask questions.

(3) Marking of theses

All theses were double blind marked by two internal Examiners or Assessors, and were inspected by one external. Due to the small number of candidates, which makes it easy to identify who is working on a particular research topic, anonymous marking is not possible. Provisional marks were exchanged in advance of the viva, to allow a brief discussion of differences of assessment, which if necessary could be explored further during the viva. Following the viva, a final agreed mark was decided between all the examiners. The two internal Examiners/Assessors who read the thesis provided the greatest input to the decision making process.

B. NEW EXAMINING METHODS AND PROCEDURES

New procedures for dealing with mitigating circumstances, such as illness to a candidate, were introduced across the University as described in Part 13 of the 'Regulations for the Conduct of University Examinations' section of the Examination Regulations 2014. This change was captured in the Examination Conventions distributed to candidates.

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

The new procedures for dealing with 'Factors Affecting Performance' (FAPs) should be reconsidered. Our overall reaction is summarised by the following two points:

1. Mechanisms for ensuring consistency in responding to FAPs from year to year and between Examination Boards need to be established. Devolving decision making to the individual Examination Boards is likely to generate inconsistency in how mitigating circumstances are treated, which may in turn risk the University's reputation for fairness. A more centralised process at Divisional or University level would help achieve a consistent approach and be more in line with other institutions.
2. The wealth of experience in dealing with mitigating circumstances accumulated over many years within the Proctors Office is not available within the individual Examination Boards. Serious consideration should be given to returning FAPs to the Proctors Office and if necessary increasing the resource available there.

If however the mechanism for dealing with FAPs remains substantially in the form it was this year, then at least the policy regarding evidence should be improved:

3. Too much onus is placed on the candidate to provide evidence to support their statement. It is clear that in some circumstances the candidate may not be able to provide documented evidence or not be able to think clearly enough to identify what evidence to provide.
4. Examiners should be permitted to seek further corroborating evidence when assessing FAPs. The current procedures have moved the task of assessing FAPs to the examiners but they have no remit to seek helpful additional information in contrast to previous procedures which allowed the Proctors Office to make further investigation.

Furthermore, if the mechanism remains devolved then there is a further issue of timing to note:

5. FAP statements are currently passed to the Examiners if received ahead of the Examination Board but with no regard to the timing of the FAP Panel. This timing issue led to one FAP statement being received after the FAP Panel had met and so could not be considered until the Examination Board itself.

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 (2015, attached) were put on the Departmental website and sent electronically to all candidates on 13 March 2015, and in hard-copy for the start of Trinity term. 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 25 candidates for the examination and all were awarded Honours. The examination required the candidates to submit a thesis (maximum 12,000 words) on a research project carried out by candidates during the year, usually in the Department of Materials. Candidates were given a 25 minute viva, during which they were asked detailed questions on their thesis and research work.

The theses were generally of a high quality, and most candidates were able to explain their work well in the vivas. The marks for the Part II examination ranged from 49% to 82%, with an overall mean mark towards the top of the 2(i) range. The external Examiners played an important role in deciding the final marks for the candidates and the Chairman would like to express his thanks to both of them for their hard work in inspecting 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.

If necessary, where approved by the Proctors, the Examiners took into account the impact of dyslexia and other specific learning difficulties and/or other special arrangements. These allowances seemed satisfactory.

mark (%)	Overall mark		Part 2 Project		Part I Mark	
	Male	Female	Male	Female	Male	Female
40–50	-	-	-	1	-	-
50–60	2	2	3	1	3	4
60–70	5	7	5	7	5	5

70–80	7	2	5	2	5	2
80–90	-	-	1	-	1	-
Totals	14	11	14	11	14	11

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 (2014) and Part II for these candidates are 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

One application for consideration of Factors Affecting Performance was received and included supporting medical certificates. The FAP was considered carefully and was deemed to have had serious impact. A fair course of action was agreed. This was documented in a FAP report.



F. NAMES OF MEMBERS OF THE BOARD OF EXAMINERS

Prof. A.J. Wilkinson (Chairman)	Prof. S.C. Benjamin
Prof. C.R.M. Grovenor	Prof. A.I. Kirkland
Prof. J.M. Smith	Prof. P.R. Wilshaw
Prof. M.G. Burke (external)	Prof. M.J. Reece (external)

Examination Conventions 2014/15

Materials Science - Final Honours School

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. Normally the relevant Regulations and Course Handbook are the editions published in the year in which the candidate embarked on the FHS programme.

The attention of candidates for Part I of the Examination is drawn to key phrases in clauses 5 and 7 of Section A and clause 3 under Part I of Section B of the Special Regulations for the Honour School of Materials Science:

Section A. 5. No candidate may present him or herself for examination in Part II unless he or she has been adjudged worthy of Honours by the Examiners in Part I.

Section A. 7. To achieve Honours at Part I normally a candidate must fulfil all of the requirements under (a), (b) & (c) of this clause. (a) Obtain a minimum mark of 40% averaged over all elements of assessment for the Part I Examination, (b) obtain a minimum mark of 40% in each of at least four of the six written papers sat in Trinity Term of the year of Part I of the Second Public Examination, and (c) satisfy the coursework requirements set out in Section B, Part I [of the Regulations].

Section B. Part I. 3. In the assessment of the Materials coursework, the Examiners shall take into consideration the requirement for a candidate to complete satisfactorily the coursework to a level prescribed from time to time by the Faculty of Materials and published in the Course Handbook. Normally, failure to complete satisfactorily all five elements of Materials Coursework will constitute failure of Part I of the Second Public Examination.

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.

The Materials Science Examiners in Trinity 2015 are: Prof. Angus Wilkinson (Chair), Prof. Angus Kirkland, Prof. Chris Grovenor, Prof. Jason Smith, Prof. Peter Wilshaw and Prof. Simon Benjamin. The external examiners are Prof. Grace Burke, University of Manchester, and Prof. Mike Reece, Queen Mary, University of London.

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 candidate's college, who will, if the matter is deemed of importance, contact the Proctors. The Proctors in turn communicate with the Chairman of Examiners.

If there are believed to be mitigating circumstances, such as illness, which may have affected the candidate's progress with coursework or performance in a written exam these should be drawn to the attention of the candidate's college as soon as practicable. Candidates should complete the form entitled 'Factors affecting performance in examinations' and submit this to the college with appropriate supporting material. The Senior Tutor of the college will submit the application to the Registrar for forwarding to the Chairman of Examiners for consideration according to Part 13 of the 'Regulations for the Conduct of University Examinations' section of the Examination Regulations 2014.

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

* for the 2014-15 examinations the Nominating Committee comprised Prof Grovenor & Dr Taylor.

[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.]

Procedures covering late submission of or failure to submit/deliver one or more elements of coursework to the Examiners

The Examination Regulations stipulate specific dates for submission of the required elements of coursework to the Examiners (1. One piece of Engineering & Society Coursework; 2. A set of twelve reports of practical work as specified in the Course Handbook (normally each individual report within the set has been marked already as the laboratory course progresses); 3. A Team Design Project Report and associated oral presentation; 4. A set of four 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 of these six elements of coursework and any consequent penalties are set out in the 'Late submission and non-submission of a thesis or other written exercise' clause of the 'Regulations for the Conduct of University Examinations' section of the Examination Regulations (Part 14, 'Late Submission, Non-submission, Non-appearance and Withdrawal from Examinations' in the 2014 Regulations).

Under the provisions permitted by the regulation, late submission of an element of coursework, as defined above, for Materials Science examinations will normally result in one of the following:

- (a) With permission from the Proctors under para 14.7 no penalty.
- (b) With permission from the Proctors under paras 14.9 and 14.10, 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 the circumstances and to any advice given in the Proctors' "Notes for the Guidance of Examiners and Chairmen of Examiners". The reduction may not take the mark below 40%.
- (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.
- (d) Where, without the permission of the Proctors under paras 14.9 and 14.10, work is proffered so late that it would be impractical to accept it for assessment a mark of zero shall be recorded and, as per the Special Regulations for the Honour School of Material Science, normally the candidate will have failed Part I or II as appropriate of the Examination as a whole.
- (e) Where no work is submitted a mark of zero shall be recorded and, as per the Special Regulations for the Honour School of Material Science, normally the candidate will have failed Part I or II as appropriate of the Examination as a whole.

Where an element of coursework is not submitted or is proffered so late that it would be impractical to accept it for assessment the Proctors may, exceptionally, 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 *for the element of coursework in question* (i) the Examiners will award a mark of zero and (ii) dispensation will be granted from the Regulation that requires a minimum mark of 40% if the candidate is not to fail the examination as a whole.

Elements of coursework comprising more than one individual piece of assessed coursework

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.

The consequences of failure to submit individual practical reports or failure to submit/deliver other individual pieces of assessed coursework that contribute to one of the *elements* of coursework scheduled in the Special Regulations for the Honour School of Material Science are set out in the MS/MEM FHS Handbook (sections 7 and 10.8 of the 2014/15 version) and are **separate** to the provisions described above. In short normally this will be deemed to be a failure to complete satisfactorily the relevant element of Materials Coursework and will therefore constitute failure of Part I of the Second Public Examination.

Where an individual practical report or other individual piece of assessed coursework that contributes to one of the *elements* of coursework scheduled in the Special Regulations for the Honour School of Material Science is not submitted or is proffered so late that it would be impractical to accept it for assessment the Proctors may, exceptionally, 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 *for the individual piece of coursework in question* (i) the Examiners will award a mark of zero and (ii) dispensation will be granted from the Regulation that requires submission/delivery of every individual piece of assessed coursework if the candidate is not to fail the examination as a whole.

For elements of coursework with a defined word limit: if a candidate exceeds this word limit without permission normally the examiners will apply a penalty of 10% of the maximum mark available for the piece of work. [It is only possible to apply for permission to exceed a word limit if the Examination Regulations for the specific element of coursework concerned state explicitly that such an application is permitted, excepting that the Proctors may, exceptionally, under their general authority grant such permission.]

2. PART I

(1) *Setting of papers*

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

(2) *Paper Format*

All General papers comprise eight questions from which candidates attempt five. Each question is worth 20 marks. The total number of marks available on each general paper is 100. Materials Option papers comprise one section for each twelve-hour Options lecture course, each section containing two questions: candidates are required to answer one question from each of any three sections and a fourth question drawn from any one of the same three sections. The total number of marks available on each option paper is 100, and all questions carry equal marks. Questions are often divided into parts, with the marks for each part indicated on the question paper. Marking criteria are given in section 4.

(3) *Marking of papers*

All scripts are double marked, blind, by the setter and the checker each awarding an integer mark for each question. After individual marking the two examiners meet to agree marks question by question. If the differences in marks are small (~10% of the total available for the question, 2-3 marks for most questions), the two marks are averaged, with no rounding applied. Otherwise the examiners identify the discrepancy and read the answer again, either in whole or in part, to reconcile the differences. If after this process the examiners still cannot agree, they seek the help of the Chairman, or another examiner as appropriate, to adjudicate. An integer total mark for each paper is awarded, where necessary rounding up to achieve this. Options papers are marked by course lecturers acting as assessors and an examiner acting as a checker. The external examiners provide an independent check on the whole process of setting and marking. The rubric on each paper indicates a prescribed number of answers required (e.g. "candidates are required to submit answers to no more than five questions"). Candidates will be asked to indicate on their cover sheet which questions, up to the prescribed number, they are submitting for marking. If the cover slip is not completed then the examiners will mark the questions in numerical order by question number. If the candidate lists more than the prescribed number of questions then questions will be marked in the order listed until the prescribed number has been reached. 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 examiners 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 (a) 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 in total are allocated 60 marks. Part I examiners have the authority to set a practical examination. Penalties for late submission of an individual practical report are prescribed in the Course Handbook and are applied prior to any additional penalties incurred under the provision of section 1 of the present Conventions.

(5) *Marking Industrial Visits*

Four industrial visit reports should be submitted during Part I. Reports are assessed by the Industrial Visits Academic Organiser on a good / satisfactory / non-satisfactory basis, and are allocated a total of 20 marks. Guidance on the requirements for the reports is provided at the annual 'Introduction to Industrial Visits' talk. Formative feedback is provided on the first of the four reports.

(6) *Marking Engineering and Society Essays*

The business plan for "Entrepreneurship and new ventures" is double marked, blind, by two assessors appointed by the Faculty of Materials. The written business plan is allocated a total of 20 marks. Guidance on the requirements for the written business plan and an outline marking scheme are published in the FHS Course Handbook. Further guidance is provided at the 'Building a Business' tutorials, the slides from which are published on WebLearn.

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. Guidance on the requirements for the report and an outline marking scheme are provided in the 'Team Design Projects Briefing Note' published on the Teaching pages of the Oxford Materials website.

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

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

3. PART II

The Part II project is assessed by means of a thesis which is submitted to the Examiners, who will also take into account a written report from the candidate's supervisor. The marking criteria are published in the Part II Course Handbook.

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

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

A *viva voce* examination is held: the purpose of the viva is to clarify any points the readers believe should be explored, and to ascertain the extent to which the work reported is the candidate's. An examiners' discussion is held after the viva, involving all Part II examiners, excepting any who have supervised the candidate's Part II project or are their college tutor. During this discussion Part B of the supervisor's report is taken into account. The outcome of the discussion is an agreed mark for the project. In arriving at the agreed mark the Examiners will take into account all of the following, (i) the comments and provisional marks of the original markers, (ii) the candidate's understanding of their work as demonstrated during the viva and (iii) the opinion of the external examiner who has seen the thesis. It is stressed that it is the scientific content of the project and the candidate's understanding of their work that is being considered in the viva.

If the two provisional marks allocated in advance of the viva differ significantly (that is, normally by more than 10% of the maximum available for a Part II project) this will be addressed explicitly during the discussion after the viva. In the majority of other cases the viva has only a small influence on the agreed mark awarded to a Part II thesis.

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

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

4. CLASSIFICATION & MARKING CRITERIA

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

Class I Honours 70 – 100	The candidate shows excellent problem-solving skills and excellent knowledge of the material over a wide range of topics, and is able to use that knowledge innovatively and/or in unfamiliar contexts.
Class Iii Honours 60 – 69	The candidate shows good or very good problem-solving skills, and good or very good knowledge of much of the material over a wide range of topics.
Class Iiii Honours 50 – 59	The candidate shows basic problem-solving skills and adequate knowledge of most of the material.

Class III Honours 40 - 49	The candidate shows reasonable understanding of at least part of the basic material and some problem solving skills. Although there may be a few good answers, the majority of answers will contain errors in calculations and/or show incomplete understanding of the topics.
Pass 30 - 39	The candidate shows some limited grasp of basic material over a restricted range of topics, but with large gaps in understanding. There need not be any good quality answers, but there will be indications of some competence.
Fail 0 - 29	The candidate shows inadequate grasp of the basic material. The work is likely to show major misunderstanding and confusion, and/or inaccurate calculations; the answers to most of the questions attempted are likely to be fragmentary only.

In borderline cases the examiners use their discretion and consider the overall quality of the work the candidate has presented for examination. The external examiners often play 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 be waived only 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 2015 (For Part I and Part II students who embarked on the FHS respectively in 2013/14 and 2012/13)

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

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 year and last is fewer than six, numerical data are confidential.

Category	Number			Percentage		
	2014/15	2013/14	2012/13	2014/15	2013/14	2012/13
Distinction	n/a	n/a	n/a	n/a	n/a	n/a
Pass	n/a	n/a	9	n/a	n/a	100
Fail	n/a	n/a	0	n/a	n/a	0

(2) The use of vivas

As stated in the Examination Conventions, vivas are no longer used in the Part I examination.

(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

New procedures for dealing with mitigating circumstances, such as illness to a candidate, were introduced across the University as described in Part 13 of the 'Regulations for the Conduct of University Examinations' section of the Examination Regulations 2014. This change was captured in the Examination Conventions distributed to candidates.

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

The new procedures for dealing with 'Factors Affecting Performance' (FAPs) should be reconsidered. Our overall reaction is summarised by the following two points:

1. Mechanisms for ensuring consistency in responding to FAPs from year to year and between Examination Boards need to be established. Devolving decision making to the individual Examination Boards is likely to generate inconsistency in how mitigating circumstances are treated, which may in turn risk the University's reputation for fairness. A more centralised process at Divisional or University level would help achieve a consistent approach and be more in line with other institutions.
2. The wealth of experience in dealing with mitigating circumstances accumulated over many years within the Proctors Office is not available within the individual Examination Boards. Serious consideration should be given to returning FAPs to the Proctors Office and if necessary increasing the resource available there.

If however the mechanism for dealing with FAPs remains substantially in the form it was this year, then at least the policy regarding evidence should be improved:

3. Too much onus is placed on the candidate to provide evidence to support their statement. It is clear that in some circumstances the candidate may not be able to provide documented evidence or not be able to think clearly enough to identify what evidence to provide.
4. Examiners should be permitted to seek further corroborating evidence when assessing FAPs. The current procedures have moved the task of assessing FAPs to the examiners but they have no remit to seek helpful additional information in contrast to previous procedures which allowed the Proctors Office to make further investigation.

Furthermore, if the mechanism remains devolved then there is a further issue of timing to note:

5. FAP statements are currently passed to the Examiners if received ahead of the Examination Board but with no regard to the timing of the FAP Panel. This timing issue led to one FAP statement being received after the FAP Panel had met and so could not be considered until the Examination Board itself.

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 were put on the Departmental website and sent electronically, along with other information in a letter from the Chair of Examiners to all candidates, on 13 March 2015, and in hard-copy for the start of Trinity term. The Examination Conventions were agreed by the Board of Examiners and the Department's Academic Committee.

Part II

A. GENERAL COMMENTS ON THE EXAMINATION

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

The written papers consisted of four Materials papers, two Economics papers and one Management paper, each of which lasted three hours. For the Materials papers, candidates were required to answer five questions out of eight, as in previous years. The Economics and Management Examiners followed their usual procedures.

Team design projects were marked by two Examiners, one of whom was the Chairman. Teams were marked as groups containing MS and MEM students. The allocation of bonus or penalty marks is permitted under the Conventions. Penalty marks were deducted from two MS students who had not engaged well with the projects, and associated uplifts in marks were made to compensate other members of the affected project teams.

Reports for each of the industrial visits were assessed by the Industrial Visits Organiser, appointed as Assessor.

The overall mean mark for Part I (MS and MEM) was in the middle of the 2(i) band. All MS and MEM general papers results were considered by the examiners and it was agreed that the papers were fair.

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

There were two candidates: both males. With these small numbers, the breakdown of the results by gender is confidential (see Section E).

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) Breakdown of the results by gender

	Overall mark		Written Examinations		Coursework	
	Male	Female	Male	Female	Male	Female
mark (%)						
40–50	■	■	■	■	■	■

50-60	■	■	■	■	■	■
60-70	■	■	■	■	■	■
70-80	■	■	■	■	■	■
80-90	■	■	■	■	■	■
Totals	■	■	■	■	■	■

The performance of the male and female candidates was as follows:

Written Papers Averages – [REDACTED]

Coursework Averages – [REDACTED]

Overall Part I Averages – [REDACTED]

F. NAMES OF MEMBERS OF THE BOARD OF EXAMINERS

Prof. A.J. Wilkinson (Chairman)

Prof. S.C. Benjamin

Prof. C.R.M. Grovenor

Prof. A.I. Kirkland

Prof. J.M. Smith

Prof. P.R. Wilshaw

Dr. C.D. McKenna (Management)

Prof. A.D. Morrison (Management)

Prof. J.K.H. Quah (Economics)

Prof. M.J. Ellison (Economics)

Prof. M.G. Burke (External)

Prof. P.D. Haynes (External)

Prof. B. MacCarthy (External, Management)

Dr H. Simpson (External, Economics)

General Paper 1 – Structure and Transformations

See report under Materials Science Part I

General Paper 2 – Electronic Properties of Materials

See report under Materials Science Part I

General Paper 3 – Mechanical Properties

See report under Materials Science Part I

General Paper 4 – Engineering Applications of Materials

See report under Materials Science Part I

Examiners' Report for MEM Part I 2015 – Economics Papers

For 2014 Intro to Economics and 2015 Microeconomics please see E&M Prelims Examiners' Reports at https://weblearn.ox.ac.uk/portal/hierarchy/socsci/econ/curr_student/undergrad/examinations/page/home

Examiners' Report for MEM Part I 2015 – Management Papers

For 2015 General Management please see E&M Prelims Examiners' Reports at
https://weblearn.ox.ac.uk/portal/hierarchy/socsci/econ/curr_student/undergrad/examinations/page/home

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 this year and in 2012/13 is fewer than six, numerical data are confidential (see section E, below).

Class	Number			Percentage (%)		
	2014/15	2013/14	2012/13	2014/15	2013/14	2012/13
I	n/a	1	n/a	n/a	11.11	n/a
II.I	n/a	7	n/a	n/a	77.78	n/a
II.II	n/a	1	n/a	n/a	11.11	n/a
III	n/a	-	n/a	n/a	0	n/a
Pass	n/a	0	n/a	n/a	0	n/a
Fail	n/a	0	n/a	n/a	0	n/a
Total	3	9	3	-	-	-

(2) The use of vivas

Vivas were not used for this Examination.

(3) Marking of scripts

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

B. NEW EXAMINING METHODS AND PROCEDURES

New procedures for dealing with mitigating circumstances, such as illness to a candidate, were introduced across the University as described in Part 13 of the 'Regulations for the Conduct of University Examinations' section of the Examination Regulations 2014. This change was captured in the Examination Conventions distributed to candidates.

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

The new procedures for dealing with 'Factors Affecting Performance' (FAPs) should be reconsidered. Our overall reaction is summarised by the following two points:

1. Mechanisms for ensuring consistency in responding to FAPs from year to year and between Examination Boards need to be established. Devolving decision making to the individual Examination Boards is likely to generate inconsistency in how mitigating circumstances are treated, which may in turn risk the University's reputation for fairness. A more centralised process at Divisional or University level would help achieve a consistent approach and be more in line with other institutions.
2. The wealth of experience in dealing with mitigating circumstances accumulated over many years within the Proctors Office is not available within the individual Examination Boards. Serious consideration should be given to returning FAPs to the Proctors Office and if necessary increasing the resource available there.

If however the mechanism for dealing with FAPs remains substantially in the form it was this year, then at least the policy regarding evidence should be improved:

3. Too much onus is placed on the candidate to provide evidence to support their statement. It is clear that in some circumstances the candidate may not be able to provide documented evidence or not be able to think clearly enough to identify what evidence to provide.

4. Examiners should be permitted to seek further corroborating evidence when assessing FAPs. The current procedures have moved the task of assessing FAPs to the examiners but they have no remit to seek helpful additional information in contrast to previous procedures which allowed the Proctors Office to make further investigation.

Furthermore, if the mechanism remains devolved then there is a further issue of timing to note:

5. FAP statements are currently passed to the Examiners if received ahead of the Examination Board but with no regard to the timing of the FAP Panel. This timing issue led to one FAP statement being received after the FAP Panel had met and so could not be considered until the Examination Board itself.

A statement should be added to the Conventions concerning how Examiners will handle any failure to comply with instruction on choice of questions for the Option Papers.

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 were put on the Departmental website and sent electronically, along with other information in a letter from the Chair of Examiners to all candidates, on 13 March 2015, and in hard-copy for the start of Trinity term. The Examination Conventions were agreed by the Board of Examiners and the Department's Academic Committee.

Part II

A. GENERAL COMMENTS ON THE EXAMINATION

There were three candidates for the examination. The examination consisted of two written papers, one being a compulsory Materials Options paper, and the other paper being selected from a range of Economics and Management options. For the Materials Options paper, candidates were offered twelve questions in six sections each containing two questions; candidates were required to answer four questions, one from each of three sections and one from any of the same three 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 two written papers. The reports on these 24-week Management projects are marked by staff at the Said Business School. For reasons of anonymity, the details of the overall mean marks are discussed in Section E, below.

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

Due to the small number of candidates for this examination, the numerical data are confidential (see section E, below).

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

Due to the small number of candidates numerical data are confidential (see section E, below).

D. COMMENTS ON PAPERS AND INDIVIDUAL QUESTIONS

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

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

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

(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 three candidates, all of whom were awarded Honours, with one 1st class category and two in the 2(i) category.

Class	Number			Percentage (%)		
	2014/15	2013/14	2012/13	2014/15	2013/14	2012/13
I	1	1	0	33.33	11.11	0
II.I	2	7	1	66.66	77.78	100
II.II	0	1	0	0	11.11	0
III	0	0	0	0	0	0
Pass	0	0	0	0	0	0
Fail	0	0	0	0	0	

(2) Breakdown of the results by gender

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

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

All candidates sat the Materials Options paper, for which the mean mark (MEM only) was ■■■■■. In addition, two candidates sat the ■■■■■ paper, achieving an average of ■■■■ whilst the other candidate sat the ■■■■■ paper, achieving ■■■■■.

(4) Equal Opportunities issues

Insofar as can be judged from the small sample size, the performance of male and female candidates was ■■■■■.

If necessary, where approved by the Proctors, the Examiners took into account the impact of dyslexia and other specific learning difficulties and/or other special arrangements. These allowances seemed satisfactory.

F. NAMES OF MEMBERS OF THE BOARD OF EXAMINERS

Prof. A.J. Wilkinson (Chairman)

Prof. S.C. Benjamin

Prof. C.R.M. Grovenor

Prof. A.I. Kirkland

Prof. J.M. Smith

Prof. P.R. Wilshaw

Dr. C.D. McKenna (Management)

Prof. A.D. Morrison (Management)

Prof. J.K.H. Quah (Economics)

Prof. M.J. Ellison (Economics)

Prof. M.G. Burke (External)

Prof. P.D. Haynes (External)

Prof. B. MacCarthy (External, Management)

Dr H. Simpson (External, Economics)

Materials Options Paper 2

See report under Materials Science Part I

Examiners' Report for MEM Part II 2015 – Economics Papers

No Economics papers were selected by the 2015 MEM Part II candidates from the suite of Economics & Management options

For 2015 FHS Economics papers please see PPE FHS Examiners' Reports at https://weblearn.ox.ac.uk/portal/hierarchy/socsci/econ/curr_student/undergrad/examinations/page/home

Examiners' Report for MEM Part II 2015 – Management Papers

Written Papers

For 2015 FHS Management papers please see E&M FHS Examiners' Reports at https://weblearn.ox.ac.uk/portal/hierarchy/socsci/econ/curr_student/undergrad/examinations/page/home

Management Project

No report is produced

Examination Conventions 2014/15

Materials, Economics and Management - Final Honours School

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. Normally the relevant Regulations and Course Handbook are the editions published in the year in which the candidate embarked on the FHS programme.

The attention of candidates for Part I of the Examination is drawn to key phrases in clauses 6 and 7 of Section A and under Part I of Section B of the Special Regulations for the Honour School of Materials, Economics and Management:

Section A. 6. ...no candidate may present him or herself for examination in Part II unless he or she has been adjudged worthy of Honours by the Examiners in Part I.

Section A. 7. To achieve Honours at Part I normally a candidate must fulfil all of the requirements under (a), (b) & (c) of this clause. (a) Obtain a minimum mark of 40% averaged over all elements of assessment for the Part I Examination, (b) obtain a minimum mark of 40% in each of at least four of the six written papers sat in Trinity Term of the year of Part I of the Second Public Examination, and (c) satisfy the coursework requirements set out in Section B, Part I [of the Regulations].

Section B. Part I. In the assessment of the Materials coursework, the Examiners shall take into consideration the requirement for a candidate to complete satisfactorily the coursework to a level prescribed from time to time by the Faculty of Materials and published in the Course Handbook. Normally, failure to complete satisfactorily all three elements of Materials Coursework will constitute failure of Part I of the Second Public Examination.

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.

The Materials, Economics and Management Examiners in Trinity 2015 are: Prof. Angus Wilkinson (Chair), Prof. Angus Kirkland, Prof. Chris Grovenor, Prof. Jason Smith, Prof. Peter Wilshaw and Prof. Simon Benjamin (examiners from the Department of Materials Science); Dr Chris McKenna, Prof. Alan Morrison, Prof. Thomas Powell (examiners from the Said Business School); and Prof. John Quah, Prof. Martin Ellison, (examiners from the Department of Economics). The external examiners are Prof. Grace Burke, University of Manchester; Prof. Mike Reece, Queen Mary University of London; Dr Helen Simpson (Economics, University of Bristol) and Prof. Bart MacCarthy (Management, Nottingham University Business School).

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

* for the 2014-15 examinations the Nominating Committee comprised Prof Grovenor & Dr Taylor.

communication must be via the candidate's college, who will, if the matter is deemed of importance, contact the Proctors. The Proctors in turn communicate with the Chairman of Examiners.

If there are believed to be mitigating circumstances, such as illness, which may have affected the candidate's progress with coursework or performance in a written exam these should be drawn to the attention of the candidate's college as soon as practicable. Candidates should complete the form entitled 'Factors affecting performance in examinations' and submit this to the college with appropriate supporting material. The Senior Tutor of the college will submit the application to the Registrar for forwarding to the Chairman of Examiners for consideration according to Part 13 of the 'Regulations for the Conduct of University Examinations' section of the Examination Regulations 2014.

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.]

Procedures covering late submission of or failure to submit/deliver one or more elements of coursework to the Examiners

The Examination Regulations stipulate specific dates for submission of the required elements of coursework to the Examiners (1. A set of nine reports of practical work as specified in the Course Handbook (normally each individual report within the set has been marked already as the laboratory course progresses); 2. A Team Design Project Report and associated oral presentation; 3. A set of four Industrial Visit Reports as specified in the course handbook; and 4. A Part II Management Project Report). Rules governing late submission of these four elements of coursework and any consequent penalties are set out in the 'Late submission and non-submission of a thesis or other written exercise' clause of the 'Regulations for the Conduct of University Examinations' section of the Examination Regulations (Part 14, 'Late Submission, Non-submission, Non-appearance and Withdrawal from Examinations' in the 2014 Regulations).

Under the provisions permitted by the regulation, late submission of an element of coursework, as defined above, for Materials, Economics & Management examinations will normally result in one of the following:

- (a) With permission from the Proctors under paras 14.9 and 14.10, 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 the circumstances and to any advice given in the Proctors' "Notes for the Guidance of Examiners and Chairmen of Examiners". The reduction may not take the mark below 40%.
- (b) 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.
- (c) Where, without the permission of the Proctors under paras 14.9 and 14.10, work is proffered so late that it would be impractical to accept it for assessment a mark of zero shall be recorded and, as per the Special Regulations for the Honour School of Materials, Economics & Management, normally the candidate will have failed Part I or II as appropriate of the Examination as a whole.
- (d) Where no work is submitted a mark of zero shall be recorded and, as per the Special Regulations for the Honour School of Materials, Economics & Management, normally the candidate will have failed Part I or II as appropriate of the Examination as a whole.

Where an element of coursework is not submitted or is proffered so late that it would be impractical to accept it for assessment the Proctors may, exceptionally, 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 *for the element of coursework in question* (i) the Examiners will award a mark of zero and (ii) dispensation will be granted from the

Regulation that requires a minimum mark of 40% if the candidate is not to fail the examination as a whole.

Elements of coursework comprising more than one individual piece of assessed coursework

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.

The consequences of failure to submit individual practical reports or failure to submit/deliver other individual pieces of assessed coursework that contribute to one of the elements of coursework scheduled in the Special Regulations for the Honour School of Materials, Economics & Management are set out in the MS/MEM FHS Handbook (sections 7 and 10.8 of the 2014/15 version) and are **separate** to the provisions described above. In short normally this will be deemed to be a failure to complete satisfactorily the relevant element of Materials Coursework and will therefore constitute failure of Part I of the Second Public Examination.

Where an individual practical report or other individual piece of assessed coursework that contributes to one of the *elements* of coursework scheduled in the Special Regulations for the Honour School of Materials, Economics and Management is not submitted or is proffered so late that it would be impractical to accept it for assessment the Proctors may, exceptionally, 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 *for the individual piece of coursework in question* (i) the Examiners will award a mark of zero and (ii) dispensation will be granted from the Regulation that requires submission/delivery of every individual piece of assessed coursework if the candidate is not to fail the examination as a whole.

For elements of coursework with a defined word limit: if a candidate exceeds this word limit without permission normally the examiners will apply a penalty of 10% of the maximum mark available for the piece of work. [It is only possible to apply for permission to exceed a word limit if the Examination Regulations for the specific element of coursework concerned state explicitly that such an application is permitted, excepting that the Proctors may, exceptionally, under their general authority grant such permission.]

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 2nd year. This paper will be set and examined as for all other Part I and Part II Economics papers (see below) and contributes to the Part I mark. The marks for this paper will be formally ratified by the Board of examiners for Part I examinations held in the Trinity Term following that in which the Ec1 paper is sat.

Candidates for Part I (3rd year)

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

Candidates for Part II (4th year)

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

(1) Setting of papers

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

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

(2) *Paper format*

Materials Papers

All Materials general papers comprise eight questions from which candidates attempt five and are taken in Part I. Each question is worth 20 marks. The total number of marks available on each general paper is 100. Materials Option papers comprise one section for each twelve-hour Options lecture course, each section containing two questions: candidates are required to answer one question from each of any three sections and a fourth question drawn from any one of the same three sections. The total number of marks available on each option paper is 100, and all questions carry equal marks. Questions are often divided into parts, with the marks for each part indicated on the question paper. Marking criteria are given in section 3.

Economics and Management papers

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

(3) *Marking of papers*

Materials Papers

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

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

The Materials 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 questions in numerical order by question number. If the candidate lists more than the prescribed number of questions then questions will be marked in the order listed until the prescribed number has been reached. 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 examiners 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 (a) 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, blind. The two assessors who marked the script then meet in order to reach an agreed mark. Should they fail to agree, then the appropriate set of Economics and Management Examiners will determine the final mark.

In cases of short weight, the maximum achievable mark is lowered by the proportion of the paper missing. (For example, in a paper requiring four answers where a candidate has attempted only three, the maximum achievable mark is 75.) In cases where an answer has been partially completed, the markers will use their discretion to decide what proportion of the answer is missing. Marks reflecting such a penalty are flagged "SW" with the proportion of the paper completed (e.g. "SW 75%"). In the case of overweight papers it is left to the discretion of the two markers to decide which of the material to disregard. In cases where the rubric requires candidates to show a specified breadth of knowledge, and where it is unambiguously clear that such a requirement has not been met, the mark for the script will be lowered by at least 5 points. Marks reflecting such a penalty are flagged by "RR" with the number of marks deducted.

As the total number of MEM 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 examiners to adjust all marks for those papers. Where a paper has been taken by both MEM and EEM students normally the decision will be informed by the mean and the distribution of marks taken over all EEM & MEM candidates for that paper. Such adjustment is referred to as 'scaling' and in deciding what scaling, if any, to apply normally the examiners will take into account the following additional information:

- (a) For each paper, comments from the MEM examiners representing the Economics or Management Faculty as appropriate
- (b) A report by the Chairman of Examiners on any scaling adopted by the EEM examiners
- (c) The performance of the MEM cohort and the MEM+EEM cohort on the other Economics and Management papers
- (d) The performance of the MEM cohort on the Materials papers

(4) Marking of Practicals for Part I

Practicals are assessed continually by senior demonstrators in the teaching laboratory and in total are allocated 50 marks. Part I examiners have the authority to set a practical examination. Penalties for late submission of an individual practical report are prescribed in the Course Handbook and are applied prior to any additional penalties incurred under the provision of section 1 of the present Conventions.

(5) Marking Industrial Visits

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

of 20 marks. Guidance on the requirements for the reports is provided at the annual 'Introduction to Industrial Visits' talk. Formative feedback is provided in the first of the four reports.

(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. Guidance on the requirements for the report and an outline marking scheme are provided in the 'Team Design Projects Briefing Note' published on the Teaching pages of the Oxford Materials website.

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

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

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

The process is:

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

3. CLASSIFICATION & MARKING CRITERIA

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

Class I Honours 70 – 100	The candidate shows excellent problem-solving skills and excellent knowledge of the material over a wide range of topics, and is able to use that knowledge innovatively and/or in unfamiliar contexts.
Class Iii Honours 60 – 69	The candidate shows good or very good problem-solving skills, and good or very good knowledge of much of the material over a wide range of topics.
Class Iiii Honours 50 – 59	The candidate shows basic problem-solving skills and adequate knowledge of most of the material.
Class III Honours 40 - 49	The candidate shows reasonable understanding of at least part of the basic material and some problem solving skills. Although there may be a few good answers, the majority of answers will contain errors in calculations and/or show incomplete understanding of the topics.
Pass	The candidate shows some limited grasp of basic material over a restricted range of

30 - 39	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 examiners often play 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 be waived only in exceptional circumstances, with permission from the Education Committee.

Annex: Summary of marks awarded for different components of the MEM Final Examination in 2015 (For Part I and Part II students who embarked on the FHS respectively in 2013/14 and 2012/13)

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

MATERIALS EXTERNAL EXAMINERS' REPORTS

EXTERNAL EXAMINER REPORT FORM 2015



Title of Examination:		Department of Materials – Honours School of Materials Science; Honors School of Materials, Economics, and Management
External Examiner Details	Title:	Professor
	Name:	M. Grace Burke
	Position:	Director – Materials Performance Centre Director – Electron Microscopy Centre
	Home Institution:	University of Manchester

Please complete both Parts A and B.

Part A		<i>Please (✓) as applicable*</i>		
		Yes	No	N/A
A1.	Did you receive sufficient information and evidence in a timely manner to be able to carry out the role of External Examiner effectively?	✓		
A2.	Are the academic standards and the achievements of students comparable with those in other UK higher education institutions of which you have experience?	✓		
A3.	Do the threshold standards for the programme appropriately reflect the frameworks for higher education qualifications and any applicable subject benchmark statement? <i>[Please refer to paragraph 3(c) of the Guidelines for External Examiner Reports].</i>	✓		
A4.	Does the assessment process measure student achievement rigorously and fairly against the intended outcomes of the programme(s)?	✓		
A5.	Is the assessment process conducted in line with the University's policies and regulations?	✓		
A6.	Have issues raised in your previous reports been responded to and/or addressed to your satisfaction?	✓		

* If you answer "No" to any question, please provide further comments in Part B. Further comments may also be given in Part B, if desired, if you answer "Yes" or "N/A".

Part B

B1. Academic standards

- a. *How do academic standards achieved by the students compare with those achieved by students at other higher education institutions of which you have experience?*

The careful and rigorous admissions process at the University is designed to select only the very best students; thus, the student achievement and performance standards are higher than most Universities. The Department of Materials is internationally-recognized as the one of the premier Materials Science Departments world-wide. I have noted that there are significant differences in the technical content amongst Materials Science Departments in UK universities (and internationally). However, it is abundantly clear that the breadth of material covered during the undergraduate course, the educational standards and student achievement are extremely rigorous, and reflect the University's exceptionally high standards.

- b. *Please comment on student performance and achievement across the relevant programmes or parts of programmes (those examining in joint schools are particularly asked to comment on their subject in relation to the whole award).*

The student performance standard in these Honours Schools continues to be very high, and is a credit to the University. The range of technical achievement evidenced through the Part II vivas I evaluated ranged from good to outstanding. As to be expected, the calibre of the research varied somewhat. There were clearly outstanding students with superb performance during their vivas, and many very good students. The 2015 First Class Honours graduates will most definitely be a credit to the Department and the University throughout their future careers.

B2. Rigour and conduct of the assessment process

Please comment on the rigour and conduct of the assessment process, including whether it ensures equity of treatment for students, and whether it has been conducted fairly and within the University's regulations and guidance.

I am very satisfied that the assessment processes are rigorous and fully reflect the high standards that are expected at the University. Specifically, the Department of Materials has ensured that all written examinations are marked "blindly" by two examiners with no knowledge of the student's identity. I personally reviewed numerous examination papers from all four General Papers and selected Optional Papers. I was impressed that the examiners marked the answers fairly and thoughtfully. Also, appropriate attention and consideration was given with respect to additional considerations such as health and disabilities. The Part II vivas were assessed by two Internal Examiners and the Independent External Examiner, thereby providing external input into the formal marking process. This was particularly appropriate in situations where there was a significant difference in the internal examiners' marks. As an External Examiner, I was permitted to question each student, and provide an independent review of the thesis to the Internal Examiners. This was the second year in which this process was used; the process was successful and efficient. The rigorous assessment processes enabled clear differentiation of student performance (First Class, Upper and Lower Second Class Honours).

B3. Issues

Are there any issues which you feel should be brought to the attention of supervising committees in the faculty/department, division or wider University?

An area that merits further attention and clarification concerns the recent changes in the University's Mitigation Process whereby the responsibilities have now been transferred to the Departments. It is my understanding that the Mitigation Process was previously handled by another part of the University. This new process appears to be inadequate as the Department Examination Board does not have the ability to request pertinent information, e.g., it cannot contact the Tutor of a student pursuing a Mitigation action. Furthermore, it was noted that under the previous system, the Proctor had the ability to contact the student's College for information. The new/current system does not give this remit to the Examination Board. Nevertheless, the Examination Board conducted serious, thoughtful deliberations, but these were hampered by the new system, which does not empower the Board to obtain additional pertinent information. It is suggested that this Mitigation system be clarified so that all necessary information can be acquired, and that a balanced and fair review can be performed.

B4. Good practice and enhancement opportunities

Please comment/provide recommendations on any good practice and innovation relating to learning, teaching and assessment, and any opportunities to enhance the quality of the learning opportunities provided to students that should be noted and disseminated more widely as appropriate.


The incorporation of the Advanced Characterisation Module and Modelling Module in 2013-14 was excellent, and I am pleased that it has continued because it is very important for the students who will pursue materials research careers. I noted, however, that a higher proportion of students had selected the Modelling Module in this year's assessment. While I commend the Department for including these very pertinent and important components in the programme, it might be beneficial to have the Advanced Characterisation Module as a mandatory part of the undergraduate programme.

The Department of Materials is to be commended on the assessment process for the Part I coursework/examination papers and the Part II theses. The modified process for the External Examiners was effective as it enables the External Examiners to concentrate on the thesis, with the opportunity for further clarification and assessment of the student's depth of knowledge. This process is efficient, fair and commendable.

B5. Any other comments

Please provide any other comments you may have about any aspect of the examination process. Please also use this space to address any issues specifically required by any applicable professional body. If your term of office is now concluded, please provide an overview here.

I once again congratulate the Department of Materials on their extremely successful programme, rigorous internal assessments, and very high standards of student achievement.

Signature:	
Date:	24 July 2015
Please email your completed form (preferably as a word document attachment) to: external-examiners@admin.ox.ac.uk and copied to the applicable divisional contact.	
Alternatively, please return a copy by post to: The Vice-Chancellor c/o Catherine Whalley, Head of Education Planning & Quality Review, Education Policy Support, University Offices, Wellington Square, Oxford OX1 2JD.	



Title of Examination:		Materials Science
External Examiner Details	Title:	Prof
	Name:	M J Reece
	Position:	NA
	Home Institution:	Queen Mary University of London

Please complete both Parts A and B.

Part A				
	<i>Please (✓) as applicable*</i>	Yes	No	N/A
A1.	Did you receive sufficient information and evidence in a timely manner to be able to carry out the role of External Examiner effectively?	X		
A2.	Are the academic standards and the achievements of students comparable with those in other UK higher education institutions of which you have experience?	X		
A3.	Do the threshold standards for the programme appropriately reflect the frameworks for higher education qualifications and any applicable subject benchmark statement? <i>[Please refer to paragraph 3(c) of the Guidelines for External Examiner Reports].</i>	X		
A4.	Does the assessment process measure student achievement rigorously and fairly against the intended outcomes of the programme(s)?	X		
A5.	Is the assessment process conducted in line with the University's policies and regulations?	X		
A6.	Have issues raised in your previous reports been responded to and/or addressed to your satisfaction?	NA		
<p><i>* If you answer "No" to any question, please provide further comments in Part B. Further comments may also be given in Part B, if desired, if you answer "Yes" or "N/A".</i></p>				

Part B

B1. Academic standards

I have experience of external examining at Imperial College for UG programmes and at Manchester and Cranfield Universities for masters programmes. The academic standard of the students overall is good to excellent, as would be expected at Oxford University. The range and depth of the assessments provided a good test of the students abilities, and the sum of the assessments provided good differentiation of the students in terms of their degree classification.

At the exam board we considered the results from both Parts I and Parts II. I understand that the progression in Part I this year was relatively poor compared to previous years. This was caused by the poor examination results of five students. The results from Part II/Finals was good and there was a reasonably distribution of degrees classifications. There is a joint programme between Materials Science and Economics on *Materials, Economics and Management*. There were three students in the final year of the programme this year. The assessment and management of the programme by the two departments seems to be seamless.

B2. Rigour and conduct of the assessment process

The examination papers were delivered to me in good time. The papers and solutions were well prepared. Most of the solutions were very detailed. The examination questions were challenging, and considering the eventual results, they were of an appropriate level for the students. The double marking was very thorough, and it was good to see the marking tabulated to make it easy to check the consistency of the marking between the two examiners. I examined a large number of pieces of coursework and found the marking to be careful and the feedback to students useful. The examination papers were blind marked, and the overall assessment was as anonymous as possible. Scaling was performed for two written papers (GP2 and OP1), and the criteria for applying it and adjusting the marks were clear and appropriate. The Part II Vivas while formal were conducive in an atmosphere that was conducive to settling the students to enable them to relax and perform to the best of their ability. The questions during the vivas were challenging and fair. The students were pushed hard to give them a good opportunity to demonstrate the level of their understanding. I was confident that the assessment was carried out thoroughly, professionally and fairly throughout the whole process.

B3. Issues

I was happy with every aspect of the assessment process except the process for dealing with Factors Affecting Performance. This took up a considerable amount of time at the examination board. It would be much better if this was dealt with and decisions made before the examination board. This is what is done at my own institute and others at which I have acted as an external examiner. I felt that the examination board would have benefitted from having more information, particularly input from personal tutors and more detailed doctors reports. I recommend that the university reviews the process for dealing with FAPs.

B4. Good practice and enhancement opportunities

This is my first year as an external examiner. I was not familiar with the structure of the programmes. I was impressed by the range of laboratory work performed by the students in Part I, including modelling activities. I was particularly impressed by the level of the PART II projects. The students were encouraged to show considerable independence and originality. Some of the students performed their project work at MIT. The level of some of the projects was comparable with that of a PhD student. I enjoyed and was informed by reading some of the projects. I was involved in about half of the PART II vivas. The overall standard of the students performance was good and some were excellent.

B5. Any other comments

I compliment the Department of Materials on the depth and breadth of their assessment. The students that progressed or completed are of a high standard and a credit to the university. I can well imagine them making significant contributions in the future in materials science and other fields. A number of them would make excellent PhD students. I would like to compliment the work of Prof Wilkinson and Ms Moss in ensuring that everything ran smoothly and efficiently.

Signature:	<i>Mike Reece</i>
Date:	27.07.2015
Please email your completed form (preferably as a word document attachment) to: external-examiners@admin.ox.ac.uk and copied to the applicable divisional contact.	
Alternatively, please return a copy by post to: The Vice-Chancellor c/o Catherine Whalley, Head of Education Planning & Quality Review, Education Policy Support, University Offices, Wellington Square, Oxford OX1 2JD.	

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

RESPONSE TO EXAMINERS' REPORTS 2015

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

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) and were reported to the Faculty of Materials.

1. Summary of major points

There were no major issues arising from the 2015 Examinations.

However there was great and unanimous concern among the Materials internal and external examiners over the new arrangements for dealing with Factors Affecting Performance. It will be important that these are addressed – the Chairman's report for the MS Part I sets out the concerns very clearly, Division and EdC are asked to consider these very carefully.

2. Points for inclusion in Responses to the External Examiners

MS & MEM Parts I & II: Professor MG Burke

We thank Professor Burke for her very positive report and the time and effort devoted to her role as an External Examiner, not least in the substantial task of examining the Part II MS theses.

The Department shares the concerns of its examiners on the new FAP procedures and will take forward with the Division discussions on this matter.

Professor Burke suggested that consideration be given to making the Optional Characterisation Module compulsory. The arrangements for this module and its sister option, the Modelling module, were already under review by the Department. We are not yet sure of the outcome; while there is much support for both modules becoming compulsory it has not proven possible to identify what we might cut in order to keep a balanced student load and staff load. There is also some concern over the Department's capacity in terms of demands on research instruments and teaching laboratory space to run the Characterisation module twice (which is the only way we could handle the numbers that would be involved if it became compulsory). It is also recognised that students value some element of choice in their degree programmes. That said, in parallel with our discussions on whether or not to make the Advanced Characterisation module compulsory, we are considering means by which we might increase the uptake on this module should it remain optional.

MS & MEM Parts I & II: Professor M.J. Reece

We thank Professor Reece for his very positive report and the time and effort devoted to his role as an External Examiner, not least in the substantial task of examining the Part II MS theses.

The Department shares the concerns of its examiners on the new FAP procedures and will take forward with the Division discussions on this matter.

MEM Parts I & II, Management Papers: Professor B. MacCarthy

We thank Professor MacCarthy for his positive report and for his careful scrutiny of scripts.

MEM Parts I & II, Economics Papers: Dr H Simpson

We thank Dr Simpson for her positive report and for her careful scrutiny of scripts.

3. Further Points

- (a) 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. Disappointingly, in recent years the five-year averages for FHS Materials outcomes have shown a gender gap opening up, with a higher proportion of male students gaining a first. The gap is similar to that seen for several years when results are averaged over all MPLS subjects. In Materials the gap seems to be driven by differential performance on the written papers and we are looking into this in more detail. It is still present in the 2015 finals degree classifications, but this year is reflected in both the written paper contributions and the Part II project contributions. However, the picture is reversed for both the 2015 Prelims results and the 2015 Part I results, with higher averages for the female candidates (although in the Part I case the average for female candidates is raised largely as a result of a small number of very high performances).

4. Examination Conventions

We confirm that when updating our Examination Conventions we consider the points in the EdC notes of guidance on Examinations & Assessment, as summarised in the Guidance on Examination Conventions issued by the MPLS Division.

A.O. Taylor, Chairman of DMAC, 24/10/15

E(M)EM Standing Committee

Reports from the External Examiners for the Economics & Management Components of MEM Part I & II

EXTERNAL EXAMINER REPORT FORM 2015



Title of Examination:		EXTERNAL EXAMINER REPORT (ECONOMICS) FOR THE DEGREES IN: ECONOMICS AND MANAGEMENT (10 TH JULY); ENGINEERING, ECONOMICS AND MANAGEMENT (3 RD JULY); AND MATERIALS, ECONOMICS AND MANAGEMENT (3 RD JULY)
External Examiner Details	Title:	Dr
	Name:	Helen Simpson
	Position:	Reader in Economics
	Home Institution:	University of Bristol

Please complete both Parts A and B.

Part A		<i>Please (✓) as applicable*</i>		
		Yes	No	N/A
A1.	Did you receive sufficient information and evidence in a timely manner to be able to carry out the role of External Examiner effectively?	✓		
A2.	Are the academic standards and the achievements of students comparable with those in other UK higher education institutions of which you have experience?	✓		
A3.	Do the threshold standards for the programme appropriately reflect the frameworks for higher education qualifications and any applicable subject benchmark statement? <i>[Please refer to paragraph 3(c) of the Guidelines for External Examiner Reports].</i>	✓		
A4.	Does the assessment process measure student achievement rigorously and fairly against the intended outcomes of the programme(s)?	✓		
A5.	Is the assessment process conducted in line with the University's policies and regulations?	✓		
A6.	Have issues raised in your previous reports been responded to and/or addressed to your satisfaction?	✓		

** If you answer "No" to any question, please provide further comments in Part B. Further comments may also be given in Part B, if desired, if you answer "Yes" or "N/A".*

Part B

B1. Academic standards

a. For all three degrees the academic standards set were entirely appropriately, as were the degree classification thresholds.

As in previous years, the standards set in the Economics exam papers are comparable to, or above, the standards set at Bristol. The technical papers in quantitative economics, econometrics, economic theory and game theory set a high standard and were comparable to those set at Bristol where the undergraduate Economics and Economics and Econometrics degrees contain a strong mathematical and econometrics component. Candidates sitting the essay-based options papers tend to be given a much larger choice of questions compared to the equivalent papers at Bristol, which I expect reflects differences in tutorial teaching methods, but the standard of questions asked is similar. As in previous years, the range of option choices available to students was extremely impressive.

b. As in previous years, the achievement of students on these degree programmes is very high, demonstrating the students' ability, the depth of their understanding and also the strength of teaching.

For the degree of Economics and Management there was no evidence that students were either systematically under or over-performing on the Economics component of the course compared to Management. Strong students performed well on both elements of the programme. Given the very small numbers of students taking individual Economics papers on the Engineering, Economics and Management (EEM) and Materials, Economics and Management (MEM), degree programmes it is difficult to comment on this issue.

B2. Rigour and conduct of the assessment process

The assessment processes were rigorous and fair. As in previous years, the examination papers for Economics were very well put together, giving students ample opportunity to demonstrate their understanding, and also challenging and stretching the very best candidates, and therefore allowing the examinations process to clearly distinguish between performances at different points in the distribution.

The process of double-blind marking, followed by marks being agreed by the two markers ensures that exam performance is fairly assessed.

B3. Issues

In my first year I raised the issue of providing more solutions for exam papers. There have been substantial improvements to this over the three years, with nearly all question setters now providing sketch answers or guidance to markers for essay-based questions. As in previous years, in general, excellent solutions were provided for the technical Economics papers.

The only issue of note this year, is that on a small number of exams the two markers seemed to be marking to quite different scales (or distributions), resulting in large discrepancies in the marks. Solutions to this might be for the two markers to agree on a scale beforehand, or for

question setters to provide more guidance, for example on the marks that a very good answer might be awarded.

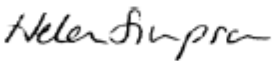
B4. Good practice and enhancement opportunities

As above, the provision of sketch answers to essay-based questions is very useful for markers. These answers are also very helpful for External Examiners when evaluating exam papers prior to the exams, and when reviewing scripts.

The provision of information and guidance for the External Examiners when assessing scripts prior to the Exam Board meetings was extremely good, in particular in terms of highlighting borderline candidates and specific scripts to review.

B5. Any other comments

This was my final year as an External Examiner for Economics on the above degree programmes. As in previous years, the examinations process was extremely well administered and managed, and I would like to highlight the excellent management of the process for Economics by Dr Simon Cowan, Professor Martin Ellison and Katherine Cumming. In addition, all three exam board meetings were again run very efficiently and professionally.

Signature:	
Date:	17.07.2015
Please email your completed form (preferably as a word document attachment) to: external-examiners@admin.ox.ac.uk and copied to the applicable divisional contact.	
Alternatively, please return a copy by post to: The Vice-Chancellor c/o Catherine Whalley, Head of Education Planning & Quality Review, Education Policy Support, University Offices, Wellington Square, Oxford OX1 2JD.	

EXTERNAL EXAMINER REPORT FORM 2015



Title of Examination:		Economics and Management; Engineering, Economics & Management; Materials, Economics & Management.
External Examiner Details	Title:	Professor
	Name:	Bart MacCarthy
	Position:	Professor of Operations Management
	Home Institution:	University of Nottingham

Please complete both Parts A and B.

Part A				
		<i>Please (✓) as applicable*</i>		
		Yes	No	N/A
A1.	Did you receive sufficient information and evidence in a timely manner to be able to carry out the role of External Examiner effectively?	✓		
A2.	Are the academic standards and the achievements of students comparable with those in other UK higher education institutions of which you have experience?	✓		
A3.	Do the threshold standards for the programme appropriately reflect the frameworks for higher education qualifications and any applicable subject benchmark statement? <i>[Please refer to paragraph 3(c) of the Guidelines for External Examiner Reports].</i>	✓		
A4.	Does the assessment process measure student achievement rigorously and fairly against the intended outcomes of the programme(s)?	✓		
A5.	Is the assessment process conducted in line with the University's policies and regulations?	✓		
A6.	Have issues raised in your previous reports been responded to and/or addressed to your satisfaction?			✓
<p><i>* If you answer "No" to any question, please provide further comments in Part B. Further comments may also be given in Part B, if desired, if you answer "Yes" or "N/A".</i></p>				

Part B

B1. Academic standards

- a. *How do academic standards achieved by the students compare with those achieved by students at other higher education institutions of which you have experience?*

High standards of achievement were evident in the examination scripts. Few students were awarded grades in the mid 2:2 or lower categories and this was appropriate.

- b. *Please comment on student performance and achievement across the relevant programmes or parts of programmes (those examining in joint schools are particularly asked to comment on their subject in relation to the whole award).*

Student performance was generally high on the business and management subjects.

B2. Rigour and conduct of the assessment process

Please comment on the rigour and conduct of the assessment process, including whether it ensures equity of treatment for students, and whether it has been conducted fairly and within the University's regulations and guidance.

I was not able to attend the Engineering board but did attend the Economics and Management board. The double marking process and the use of anonymous scripts helps to ensure rigour in examination assessments. Clear guidance was provided to the external examiners in relation to issues that had been highlighted in the preliminary meeting. This was useful in for borderline cases and candidates with poor or uneven performance. The examination board was fully attended, carefully chaired and all marginal issues and extenuating circumstances were fully debated and handled with care. I was happy with the conduct of the Board and the decisions made.

B3. Issues

Are there any issues which you feel should be brought to the attention of supervising committees in the faculty/department, division or wider University?

No.

B4. Good practice and enhancement opportunities

*Please comment/provide recommendations on any **good practice and innovation relating to learning, teaching and assessment**, and any **opportunities to enhance the quality of the learning opportunities** provided to students that should be noted and disseminated more widely as appropriate.*

The new guidelines for degree award borderlines were implemented fully and fairly. The extenuating medical evidence that was provided subsequent to the Board was handled carefully. The Chair provided a detailed summary and all members of the board had an opportunity to comment.

B5. Any other comments

Please provide any other comments you may have about any aspect of the examination process. Please also use this space to address any issues specifically required by any applicable professional body. If your term of office is now concluded, please provide an overview here.

The minor issues I raised regarding specific examination papers were dealt with appropriately.

Signature:	B L MacCarthy
Date:	2/10/2015
Please email your completed form (preferably as a word document attachment) to: external-examiners@admin.ox.ac.uk and copied to the applicable divisional contact.	
Alternatively, please return a copy by post to: The Vice-Chancellor c/o Catherine Whalley, Head of Education Planning & Quality Review, Education Policy Support, University Offices, Wellington Square, Oxford OX1 2JD.	

Extract from the Minutes of the discussion of Examiners' Reports at the EMEM Standing Committee held on 29th October 2015

STANDING COMMITTEE FOR E(M)EM

Part II - Reserved

9.4 External Examiners' Reports:

A discussion took place regarding promoting marks above the classification boundary. SS explained Engineering operates within a 2% discretion, which is in line with the University's policy. IC stated Economics do not promote to another classification, even if a mark is 69.99% and the extra .01% would result in a 1st.

SS noticed that the advice from the examiners contradicts each other and do not present a clear set of advice (in particular Angela Doufexi and J. F. Morrison).

IC discussed Helen Simpson's comments regarding disparity of marking, and explained there is a re-marking procedure in place which she was not aware of, and therefore her report highlights the need to make this clear in future.