FSMQ

Foundations of Advanced Mathematics (MEI)

Unit **6989:** Multiple Choice

Free Standing Mathematics Qualification

OCR Report to Centres January 2016

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This report on the examination provides information on the performance of candidates which it is hoped will be useful to teachers in their preparation of candidates for future examinations. It is intended to be constructive and informative and to promote better understanding of the specification content, of the operation of the scheme of assessment and of the application of assessment criteria.

Reports should be read in conjunction with the published question papers and mark schemes for the examination.

OCR will not enter into any discussion or correspondence in connection with this report.

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OCR REPORT TO CENTRES

Foundations of Advanced Mathematics – 6989

General comments

There were just fewer than 500 entries for this series. The mean mark was 29.
There were a number of questions that were found to be easy by the majority of candidates but other questions were perhaps a little more difficult than usual. The lowest mark was 11, scored by 1 candidate but only 3 scored the maximum mark of 40.
Unusually, there were fewer than 20 questions for which at least one candidate offered no answer with 3 failing to answer a number and 5 failing to answer one question. These were scattered throughout the paper so this did not provide any evidence that candidates found the paper too long.

Usually I report that in all questions each of the distracting responses was selected by at least one candidate. In this series, however, no candidate offered response A as the answer to question 5, though some candidates gave the other two wrong responses.

In 8 questions the correct response was answered by fewer than 50% of candidates; this was rather more than usual. In question 33 more candidates chose response C than those choosing the correct response of D.

Q9 Arithmetic; conversion of units
While there are 1000 mm in a metre, that means that in 1 m^3 there are 1000^3 mm^3. Only 49% said that $8^3m^3 = 8000^3mm^3$ was incorrect. An equal number thought that the conversion of feet and inches to cm and kg to pounds was wrong.

Q15 Arithmetic; rounding errors
Given that the numbers in the calculation were only correct to 2 decimal places, the greatest answer (0.51129...) is found by taking the maximum value of the two numbers in the numerator and the minimum value in the denominator. Likewise, the minimum value is 0.50837....
Since the answer can be anything between these extreme values the most appropriate accuracy is the number of decimal places to which both will round. That is, 2 decimal places. Only 49% thought that this was the correct response: 41% thought that 3 decimal places was appropriate.

Q18 Algebra; solution of inequalities
Response D, where there was an upper and lower limit was the 2nd most popular response (35%)
The incorrect solution was response C where the inequality sign was the wrong way round.

Q28 Algebra; solution of a quadratic equation
Only 50% gave the correct solution. The most popular 2nd choice was response C which contains two sign errors.

Q33 Mensuration of a cone
Given the formulae printed on the question paper, candidates should have had no difficulty in deciding that responses A and B were correct. Response C required candidates to find the side of the curved surface, which is not 6. The purpose of inserting the side *l* on the diagram was to give the hint that the value for the formula was $\sqrt{37}$ making response C correct. However, 38% of candidates thought that this was the response to choose as being incorrect. In response D the formula for the volume of the cone is $V = \frac{1}{3}\pi r^2 h$ which looks at first sight as though *V* is proportional to *h*. However, *r*and *h* are connected and so *V* is not in fact proportional to *h*. Only

34% of candidates decided that this was the incorrect answer and therefore the correct response.

Q36 Algebra; powers
A is the wrong answer as the negative power applies to *a* only and not also 3. Only 36% realised this while 34% thought that C was wrong. For the powers $(4 + (-3) - (-7) = 8$ meaning that this statement is correct.

Q38 Vectors; resultants by calculation
A significant number of candidates could not cope with the idea that the plane was heading due south but was not actually travelling in that direction. So 45% chose either A or B as their response while only 39% chose the correct response, which was C

Q40 trigonometry; the sine rule
This question required a two stage solution. First the length BD had to be found, then in the triangle BDC the sine rule had to be applied. Calculators would then give the acute angle, 43.1° which had to be converted by subtracting from 180°. Only 43% managed this with the other responses being chosen equally.

As in previous sessions I offer a summary of questions and topics with the approximate percentage of candidates giving the correct responses.

Percentage obtaining the correct response	Question	Topic
91 – 100	5	Arithmetic - standard form
	6	Arithmetic - understanding of terms
	7	Statistics - understanding of a pie chart
	10	Arithmetic - calculations involving negative numbers
	16	Arithmetic - sensible units
	17	Arithmetic - fractions, decimals and percentages
	19	Algebra - forming an equation from words
	24	Algebra - simultaneous equations
	26	Algebra - conversion graph
	34	Graphs - intersection of curve and line
81 – 90	2	Arithmetic - fractions
	3	Statistics - measures of central tendency and spread
	4	Algebra - substitution of numbers into a formula
	23	Statistics - cumulative frequency
	25	Statistics - comparing two data sets
	30	Probability - relative frequency
71 – 80	12	Vectors - in coordinate form
	13	Statistics - sampling
	14	Graphs - coordinates and lines
	21	Algebra - rearrangement of formulae
	27	Algebra - solution of equations
	35	Probability - tree diagram
	37	Arithmetic - ratios

61 – 70	1	Arithmetic - understanding of terms
	8	Algebra - sequences
	11	Algebra - understanding of polynomial expressions
	29	Arithmetic - approximations
	32	Trigonometry - angle ratios in right-angled triangle
51 – 60	20	Arithmetic - scale drawings
	22	Algebra - addition of algebraic fractions
	31	Trigonometry - 3D calculations
	39	Graphs - cubic curve and area
41 – 50	9	Arithmetic - conversion of units
	15	Arithmetic - rounding errors
	18	Algebra - solution of inequalities
	28	Algebra - solution of quadratic equations
	40	Trigonometry - non-right-angled triangle
31 – 40	33	Arithmetic - mensuration of cone
	36	Algebra - indices
	38	Vectors - calculations from drawing

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