OCR
RECOGNISING ACHIEVEMENT

FSMQ

Foundations of Advanced Mathematics (MEI)

INTERMEDIATE FSMQ **6989**

Report on the Unit

June 2010

6989/R/10

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All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.

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CONTENTS

Foundations of Advanced Mathematics FSMQ (6989)

REPORT ON THE UNIT

Foundations of Advanced Mathematics – 6989

There were nearly 1700 entries for this session, easily the largest number in a session, which is most encouraging. The mean mark was 25, slightly up on last year. The minimum mark scored by one candidate was 6; 6 candidates scored full marks with a further 19 scoring 39.

In all questions, every response was chosen and in all but 4 questions at least one candidate did not respond.

In 9 questions the correct response was chosen by more than 80% of candidates.

On this paper there were only 2 questions where the wrong response was chosen more than the right response..

Q12 (Average and spread)
Almost equal numbers of candidates chose each response and the greatest number by a small margin decided that the median of 4 was incorrect.

Q39 (Vectors)
36% of candidates decided that, since Gemma can paddle in still water at 5 m s^{-1} the assertion that she actually travels faster than this must be wrong. Given that the speed of the water helps her, this is in fact correct. If she heads into the current the angles of the vector triangle will be different from the triangle drawn when she heads across the current. It is therefore the assertion that the angles will be the same that is incorrect.

In a further 7 questions the correct response was chosen by a minority of candidates.

Q7 (coordinate geometry of lines)
The response that a line passes through a given point which was incorrect should have been relatively easy to check. The next most popular response was that two lines met at a given point which was true.

Q10 (Cosine rule and the area of a triangle)
One side was given correctly from the cosine rule and the area of the triangle was stated correctly. However, only 28% decided that both were correct, with equal numbers choosing the other three responses.

Q18 (Probability)
The spread of responses across the 4 were roughly equal. Yet the three correct responses were all derived from multiplying probabilities of independent events, while the correct response added three probabilities.

Q20 (Mensuration)
The incorrect answer (and therefore the correct response!) was the first where the masses of similar cylinders were divided to give a ratio. But this is the ratio of volumes and we need to take the cube root to find the ratio of heights. Although this was not asked for, the fact that the ratio was given without this being done makes it incorrect. A significant minority decided that the cost per gram was incorrect, although it was not.

Q27 (Algebraic fractions)
The specification gives this process as a topic in which the denominators are integers. A question is asked nearly every time. Yet nearly 40% of candidates gave an answer with 2 in the denominator (as a result of subtracting the denominators) rather than 15 (as a result of multiplying them).

Q32 (Speed-time graph)
Only 40% gave the right response here. This said that the car was stationary after 5 seconds while the graph indicates that the speed was 20 ms^{-1} and that it is the acceleration that is zero. A sizeable minority said that the acceleration at 1 second was not as stated. This was either because they did not know how to determine the acceleration or because no account was taken of the scales when finding the gradient of the tangent at $t = 1$.

Q37 (Solution of simultaneous equations graphically)
25% of candidates decided that "there is no solution" to simultaneous equations represented by parallel lines was incorrect.

As in previous sessions I offer a summary of questions and topics with the approximate percentage of candidates giving the correct responses. As noted in previous reports, the giving of the correct response may not be because the candidate understands the question and can discern the errors being made in the distracting responses. Attempts are made not to offer distractors in such a way that the correct response is clearly different to the rest, but our perception of typical errors might result in that happening.

	Question	**Topic**
91 – 100%	2	Arithmetic – positive and negative numbers
	24	Algebra – expressing a formula in words algebraically
81 – 90%	3	Arithmetic – calculation in standard form
	4	Arithmetic – ratio
	5	Arithmetic – approximations
	14	Algebra – solution of linear equations
	15	Arithmetic – fractions
	17	Algebra – factorisation of cubic
	25	Algebra – sequences
71 – 80%	11	Arithmetic – percentages
	19	Arithmetic – accumulation of errors
	22	Arithmetic – index form
	26	Algebra – rearrangement of formulae
	28	Statistics – grouping of data
	35	Algebra – substitution into a formula
61-70%	6	Algebra – substitution
	13	Algebra – solution of a quadratic equation
	16	Algebra – quadratic equations
	21	Statistics – appropriate diagrams
	23	Vectors – algebraic notation
	34	Arithmetic – mensuration
	36	Algebra – construction of formula
	38	Trigonometry – right-angled triangles
	40	Statistics – cumulative frequency

51 –60%	1	Arithmetic
	8	Algebra – inequalities
	9	Graphs – cubic curve
	29	Trigonometry and algebra
	30	Graphs – conversion graph
	31	Probability – mutually exclusive events
	33	Trigonometry – 3-D shape
41 – 50%	7	Graphs – equations of lines
	18	Probability – independent events
	20	Arithmetic – mensuration
	37	Graphs
31 – 40%	27	Algebra – adding fractions
	32	Graphs – speed-time graph
21 – 30%	10	Trigonometry – cosine rule and area of triangle
	12	Statistics – averages and spread
11 – 20%	39	Vectors – adding vectors graphically

Answers

1	D	21	B
2	C	22	D
3	C	23	B
4	A	24	A
5	B	25	C
6	B	26	D
7	C	27	D
8	C	28	C
9	D	29	C
10	A	30	B
11	D	31	D
12	D	32	D
13	C	33	C
14	A	34	B
15	B	35	B
16	B	36	D
17	B	37	D
18	A	38	C
19	D	39	C
20	A	40	B

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Raw mark boundaries June 2010 series

FSMQ / Level 2 Award / Entry Level

ree Standing Mathematics Qualification (FSMQ)

			Max Mark	a	b	c	d	e	u
989	Foundations of Advanced Mathematics (MEI)	Raw	40	34	29	24	20	16	0

evel 2 Award Thinking and Reasoning Skills (pilot)

			Max Mark	d	m	p	u
901/01	Written Paper	Raw	60	47	35	23	0
		UMS	60	48	36	24	0
902/01	Case Study	Raw	60	45	33	21	0
		UMS	60	48	36	24	0

ntry Level Certificate Art and Design (linear)

			Max Mark	3	2	1	u
940/01	Coursework	Raw	100	60	30	7	0
940/02	Examination	Raw	100	62	34	7	0
941/01	Coursework	Raw	100	60	30	7	0
941/02	Terminal Examination	Raw	100	62	37	7	0
942/01	Coursework	Raw	100	60	30	7	0
942/02	Terminal Examination	Raw	100	62	37	7	0
943/01	Coursework	Raw	100	60	30	7	0
943/02	Terminal Examination	Raw	100	62	37	7	0
944/01	Coursework	Raw	100	60	30	7	0
944/02	Terminal Examination	Raw	100	62	37	7	0
945/01	Coursework	Raw	100	60	30	7	0
945/02	Terminal Examination	Raw	100	62	37	7	0

ntry Level Business Studies (linear)

			Max Mark	3	2	1	u
951	Business Studies	Overall	150	98	45	n/a	0

ntry Level Child Development (linear)

			Max Mark	3	2	1	u
972	Child Development	Overall	200	132	90	48	0

ntry Level Design and Technology (linear)

			Max Mark	3	2	1	u
960	Design and Technology: Food Technology	Overall	100	67	43	15	0
961	Design and Technology: Graphic Products	Overall	100	67	43	15	0
962	Design and Technology: Resistant Materials Technology	Overall	100	67	43	15	0
964	Design and Technology: Textiles Technology	Overall	100	67	43	15	0