MATHEMATICS

SUBJECT 9187

PAPER 1

GENERAL COMMENTS

The paper was a standard one, covering all the sections of the syllabus. Some candidates had prepared themselves such that they were able to attempt all the questions. However, there were some who were not able to attempt answering some questions such as those on groups, etc.

Candidates are advised to manage their time correctly. Some wrote a lot of irrelevant answers on questions with few marks and had very little time in trying to answer some parts of the longer questions for which they had knowledge of.

SPECIFIC COMMENTS ON QUESTIONS

QUESTION 1

For those candidates who were able to calculate $\underline{b} \times \underline{c}$, the result of the calculation was simple to get. However, some were not able to state the geometrical interpretation of the product $\underline{a}.(\underline{b} \times \underline{c})$.

Answer: 36 being volume of the parallelepiped formed by the vectors $\underline{a}$, $\underline{b}$ and $\underline{c}$.

QUESTION 2

A number of candidates lost some marks for this question by using the data booklet formula instead of showing that $y = m\,(2x + \sqrt{4x^2 + 1})$ as required by the question.

QUESTION 3

Very good answers were seen for this question. A few had problems in trying to simplify the difference of the two initial terms and could not obtain the correct final unfactorised equation.

Most candidates were able to apply the given result to find the sum of the last part cubic terms.

Answer: 3304800

QUESTION 4

Candidates had a general knowledge of what is expected in order to prove Q+ as an abelian group under the given composition.

Candidates must be aware that they had to come up with the specific values of the identity and inverse. They had also to demonstrate how associativity is satisfied by calculation of $a \otimes (b \otimes c)$ *and* $(a \otimes b) \otimes c$ using the composition rule. Candidates had also to work out $a \otimes b$ and $b \otimes a$ to prove that commutativity was satisfied. However, some very good answers were seen.

QUESTION 5

Some good solutions to this question were seen. In very few cases there was lack of demonstration of the presence of commutativity.

QUESTION 6

Candidates had some general knowledge of what is expected in doing the proof by induction. Some, however, had some difficulty in showing that if the result holds for Pk then it also holds for $Pk+1$.

Candidates are reminded that there is need for stating the conclusion clearly in such a question.

QUESTION 7

For candidates who were familiar with integration by parts and who were able to apply the result that $cos^2\theta = 1 - sin^2\theta$, the showing was easy.

Application of the results to find the solution of the integral in 7(ii) was done well by most of the candidates, but some (very few) could not make meaning of I_0.

QUESTION 8

A number of candidates lost some marks in this question by failing to realize that $4y^2 - 1$ had linear factors. The wrong partial fractions which came out as a result of this error made the calculations for 8 (ii) and (iii) earn very little marks, if any.

QUESTION 9

More than one possible equivalent method was seen in the answering of part 9 (i). Candidates were able to sketch their lines correctly most of the times.

Good diagrams were seen where candidates used graph paper to sketch their lines. Diagrams on ordinary paper had some lines looking almost parallel.

Part 9 (iii) was done will by those who had found the equation of the image line correctly.

QUESTION 10

Candidates are advised to revise their adjoint matrices before they go on to write down the inverse of 3×3 matrix and apply it to solve some simultaneous equations. If the adjoint matrix is wrong, many marks are lost. Some equivalent methods of finding the inverse by row operations were seen.

Various methods were also seen in solving the simultaneous equation despite the fact that the question emphasizes "hence solve".

QUESTION 11

Most candidates were able to demonstrate the (a)(i) result very easily. In a few cases, some longer method of first writing $\frac{dy}{dx}$ in terms of y and A and B was seen.

In answering part (a) (ii), some candidates were not able to keep to the variables x and t and simply wrote their answers in terms of y and x. This may results in loss of marks.

In part (b), most candidates were able to solve AQE correctly. They wrote the general solution, sometimes, in a form which caused problems when applying the initial conditions.

QUESTION 12

Candidates were able to apply the correct AP formulas to work out the sum of the integers. In some few cases, complete lack of what to write made the given just a blank space.

Part (b) those who were able to work out Σr^3 using data booklet formula were able to make progress towards answering the question.

Answer: (a) 213642 (b) $n = 28$

QUESTION 13

Most candidates were able to do 13 (a) correctly. They knew the correct identity formula to apply.

Part (b)(i) was done well by most candidates but a few had some errors in expansion of $(ax + b)^2$. This had the effect of reducing marks in the subsequent parts of the question.

Answer (b) (i) $(2x - 1)^2 + 4$

(b) (ii) $\frac{1}{4}\, tan^{-1}\left(\frac{2x-1}{2}\right) + \ k \ and \ \frac{1}{2}\, sin^{-1}\left(\frac{2x-1}{2}\right) + \ C$

[Candidates are advised not to leave out the constant when writing the general solution].

QUESTION 14

Candidates must be aware of the fact that it is not enough to show that one point of a line lies on a plane demonstrates that the line lies on the plane. Some candidates lost some marks in answering part (a) (i).

Part (a) (ii) was done very well by most of the candidates. A variety of methods were seen in the working out of part (a) (iii).

Few candidates managed to work out part (b) correctly, some due to lack of ideas, but mostly due to lack of time.