

MATHEMATICS

SUBJECT 9164

PAPER 4

GENERAL COMMENTS

The paper was fair to most candidates as it had few application questions. Most candidates attempted almost all the questions in Section A and only a few candidates attempted questions in Section B (Mechanics).

The few centres which attempted Section B did not do so perfectly. Centres are reminded to use the correct formula sheet and tables (i.e. MF7) tables to avoid disadvantaging students by asking them to memorize formulae which are supposed to be in the formula booklet.

Centres are also discouraged from using ZOU formula sheets and tables as candidates tend to use methods which are not in the syllabus.

COMMENTS ON INDIVIDUAL QUESTIONS

SECTION A – STATISTICS

The section was fairly done by most candidates.

QUESTION 1

A well answered question in which candidates were able to draw up the probability distribution table of X but not failed to state the nature of the distribution. Common wrong answers were discrete and normal distribution.

QUESTION 2

The question was well done with the exception of a few candidates who used the Poisson distribution which does not apply since the conditions for the use of Poisson distribution were not satisfied. Some of those who used the Normal approximation failed to apply the continuity correction correctly.

QUESTION 3

Fairly done though some candidates did not draw the diagram in part (a) and for those who attempted to draw, either they did not label or had the wrong shape. In part (b), some candidates failed to interpret limits correctly.

QUESTION 4

The question was well answered. The most common error was failure to reproduce the variance with terms of a^2 and b^2 and instead gave it in linear form. Most candidates did not specify the required integer values.

QUESTION 5

The question was poorly done by most candidates. Most only answer part (a)(i) correctly. Candidates were expected to multiply A'B'C'A in (a) (ii) but instead most multiplied A'A. In (a) (iii) candidates were expected to use sum to infinity of a GP with $a = \frac{1}{6}$ and $r = \left(\frac{5}{6}\right)^3$ but instead most used $a = \frac{1}{6}$ and $r = \frac{5}{6}$ or $\left(\frac{5}{6}\right)$. In (b) the most common error was the use of the conditional probability formulae.

QUESTION 6

The question was fairly done though most candidates had problems in identifying use of the T distribution with seven (7) degrees of freedom in (b). Most candidates did not attempt to use the T distribution. Instead most candidates used the Normal distribution.

QUESTION 7

The question was well done. Answers to part (b) were affected by premature rounding off of the gradient (m) and the intercept (c). In part (c), only a few candidates managed to give the three required properties which were positive, strong/high and linear. Some candidates used the Normal equations, sum of squares whose formulae are not in the data booklet MF7 resulting in quoting the wrong formulae.

QUESTION 8

The question was well done though some candidates had problems in interpreting probabilities.

- i) at least two buses hired out, i.e. $P(X \geq 2) = 1 - [P(X=0) + P(X=1)]$
- ii) the demand exceeds number available, i.e. $P(X > 5) = 1 - [P(X=0) + P(X=1) + P(X=2) + P(X=3) + P(X=4) + P(X=5)]$.

QUESTION 9

This question was fairly done. Most candidates failed to use correct scale and plot all points, especially first point (495; 0). Some candidates left out the comment on the distribution in (d).

QUESTION 10

This question was well done. Weak candidates either failed to give the hypothesis correctly or left out the critical value. Most candidates did not compare using actual values; instead they used Z_{cal} and Z_{crit} . On comparison, candidates are advised to compare the actual $|Z_{cal}|$ value with the actual Z_{crit} value.

On part (b) some candidates used $\bar{x} = 9.3$ instead of the required $M = 8.9$ when starting the Null Hypothesis (H_0). Some also used a one tailed test. Of those who used the two tailed test, some used the wrong critical value of 1,645. Some calculated also compared a probability with a Z value.

QUESTION 11

This question was well done. Weak candidates failed to calculate λ to get 2.33125. Most candidates failed to apply the concept that $\sum P(X=x) = 1$ when calculating expected frequencies hence they could not add up to 160. The number of decimal places for λ , i.e. 2 or 2.3, affected the number of cells hence the degrees of freedom, thus most candidates failed to get the appropriate critical value X_{crit}^2 . On comparison of X_{calc}^2 and X_{crit}^2 , most candidates did not use the actual values and instead just used X_{calc}^2 and X_{crit}^2 .

SECTION B

The section on mechanics was poorly done. Most candidates did not attempt any questions from this section and those who did showed lack of knowledge of the concepts in mechanics. In some centres, no candidates attempted to answer this section.

QUESTION 12

This question was poorly done. Some candidates who attempted to use the equation of a trajectory failed to substitute correctly. A few of those who used the components of distance, equated 2.5 to the distance attained by the stone after $\sqrt{3}$ seconds and failed to interpret the resulting inequality.

QUESTION 13

This question was poorly done. Candidates failed to identify forces acting on the block and hence failed to resolve in both directions correctly the major problem was resolving the horizontal force in the direction parallel and perpendicular to the plane.

QUESTION 14

The question was fairly done.

Most candidates failed to evaluate the velocity when $t = 8$. Common wrong answers were $v = -18 \text{ m/s}$ or $v = 0.24 \text{ m/s}$ and hence the graph in (b) was wrongly drawn. Thus the required distance could not be obtained correctly.

QUESTION 15

Well done by candidates who attempted it. In part (c), some candidates used $\frac{3}{7}g$ for acceleration instead of $g = 9.81$ since after the 5 kg particle hits the ground, the 2 kg particle will then move freely under gravity. Most candidates failed to interpret the distance moved by the 2 kg mass before the 5 kg mass hits the ground.