ADDITIONAL MATHEMATICS

SUBJECT 4034

PAPER 2

GENERAL COMMENT

The paper was generally poorly done by the majority of the candidates. In Section A, most of the questions were fairly done by the candidates especially questions 1, 2 and 3. Most of the candidates obtained more than half of the marks for these questions. Section B was generally unpopular to the majority of the questions. Those who attempted questions from this section had difficulties with questions 7, 8 and 9. Section C was the most popular. The majority of the candidates who attempted questions from this section had problems with question 11 and 12, but some of the candidates correctly produced answers to these questions.

COMMENTS ON INDIVIDUAL QUESTIONS

QUESTION 1

This question was answered very well by the candidates. Candidates were able to state the mode and the median of the distribution. Estimate of the mean and standard deviation was done very well. Part (iii) of the question was poorly done. Most of the candidates failed to find the inter-quartile range.

Answer:

(i) mode = 6 median = 6
(ii) mean = 6,25 standard deviation = 1,6875
(iii) $Q_1 = 5$ $Q_3 = 7$ 1QR = 7 – 5 = 2

QUESTION 2

Most candidates were able to drawn the cumulative frequency curve. However, a few failed to use the curve to estimate the median and the quartiles as well as to estimate the total number of pupils who took less than 22 minutes and more than 37 minutes to walk to school.

Answer:

(ii) median = 22 ± 1
Q1 = 17 ± 1
Q3 = 26,5 ± 1

(iii) 200 students took less than 22 min
15 students took more than 37 min
Total = 215 students.

QUESTION 3

Part (a) of this question was fairly done. Most candidates were able to use the sine rule or cosine rule to find the value of θ. Candidates had problems with part (b). They failed to resolve correctly to find the values of p and r.

Answers:

(a) θ = 19,1° , (b) p = 5,93 N r = 1,272 N

QUESTION 4

This question was the least popular in Section A. Candidates managed to find the speed with which the particle strikes the ground, but they failed grossly to find the value of H. Parts (iii) and (iv) were fairly done by the candidates.

Answer:

(i) V = 30 m/s (ii) H = 45 m (iii) Greatest height = 31,25 m
(iv) value of h = 20 m

QUESTION 5

A popular question though some few of the candidates scored all the marks. The candidates were able to find the increase in kinetic energy and potential energy, and also they managed to find the work done against frictional resistance. Candidates had problems in finding the average power output of the engine.

Answers:

(i) 67,5 kg (ii) 48 KJ (iii) 17,5 KJ
(iv) Total work done = 133 KJ
Power output = 13,3 KW

QUESTION 6

The candidates were able to calculate horizontal and vertical components of velocity of projection. Also a few candidates were able to find speed and direction of motion of the particle as it passes through A.

Answers:

(i) Vx = 25 m/s Vy = 40 m/s (ii) Speed = $\sqrt{10^2 + 25^2}$ = 26,9 m/s
Direction = $\tan^{-1}\left(\left(\frac{10}{25}\right)\right)$ = 21,8°

(iii) Time = 8 seconds (iv) Distance = 25 x 8 = 200 m.

QUESTION 7

This question was fairly done by the candidates. Those who failed to answer this question failed to resolve forces correctly to find vertical and horizontal components. Part (a) of the question was done very well as well as part (b).

Answers:

(a) (i) P = 28 N (ii) μ = 0,45
(b) (i) P = 24,5 N Q = 22,6 N
(ii) Magnitude and direction of the resultant = 45,2 N upwards.

QUESTION 8

Some parts were done well by the candidates. Most of the candidates had problems with part (iv) of the question which required the use of equations of motion to find the further distance travelled by the truck before coming to rest. Candidates scored marks from especially from parts (i) and (ii).

Answers:

(i) m = 4 kg (ii) v = 3 m/s
(iii) a = $\frac{4}{15}$ m/s^2 F = 320 N
(iv) S = 1,875 m

QUESTION 9

This was not a popular question, and it was the most difficult in this section. Most candidates who attempted the question failed to interpret it. Very few candidates correctly attempted this question. The main problem was that candidates failed to resolve forces correctly.

Answer:

(i) Retardation a = 5 m/s^2 (ii) distance S = 6,4 m

(iii) a = $\frac{35}{13}$ m/s

QUESTION 10

This was the most popular question and most candidates who attempted the question got the maximum marks. However, a few of the candidates had problems with part (b) which required them to find the price relative. Some of the candidates confused the base year and the current year.

Answers:

(a) (i) P = 0,19 K = 9
(ii) E(X2) = 88;74
(iii) Var(X) = 13,05

(b) Price Relative = $\frac{P94}{P92} x\ 100 = \frac{0,63}{0,42} x\ 100 = 150$

QUESTION 11

This question was also very popular. Most candidates who attempted the question were able to draw correct tree diagram as well as finding the probabilities. Part (b) of the question posed some difficulties to very few candidates as they could not find the standard value from the tables which now affected their calculations of the values μ and δ.

Answers:

(a) (ii) 0,7 (iii) $\frac{8}{15}$

(b) μ = 120,19
δ = 15,09

QUESTION 12

This question was attempted by the majority of the candidates. Part (a) was fairly tackled but part (b) proved to be difficult. Some candidates showed that they were not able to use permutations and combinations.

Answer:

(a) (i) p = 0,1 n = 12
(ii) P(X=3) = 0,0852

(b) (i) "C4 = 330
(ii) 100 + 15 = 115

QUESTION 13

This question was tackled fairly by candidates. Most candidates who attempted this question scored high marks. Also candidates were able to use the normal distribution to find the confidence interval.

Answers:

(i) $\bar{X} \sim N(200; \frac{52}{9})$
(ii) $P(\bar{X} > 204) = 0{,}0082$
(iii) $P(198 < \bar{X} < 203) = 0{,}0849$
(iv) Confidence interval
(196,7 ; 023,3)

QUESTION 14

The majority of the candidates who attempted this question did well. They were able to use the normal distribution tables to find probabilities. The problem encountered by few candidates was on part (iii) of the question where candidates were required to find the mean if only 5% of the bottles were to contain less than 750 ml.

Answers:

(i) 0,2266
(ii) 0,2025
(iii) μ = 769,74