GCE Examinations

Advanced Subsidiary / Advanced Level

Statistics

Module S1

Paper G

MARKING GUIDE

This guide is intended to be as helpful as possible to teachers by providing concise solutions and indicating how marks should be awarded. There are obviously alternative methods that would also gain full marks.

Method marks (M) are awarded for knowing and using a method.

Accuracy marks (A) can only be awarded when a correct method has been used.

(B) marks are independent of method marks.

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S1 Paper G – Marking Guide

1. *(a)* $0.1 + 0.15 + 0.2 = 0.45$ — A1

(b) $0.2 + 0.3 = 0.5$ — M1 A1

(c) $\sum yP(y) = (^-0.2) + (^-0.15) + 0 + 0.3 + 0.5 = 0.45$ — M1 A1

(d) $3E(Y) - 1 = 0.35$ — M1 A1 **(7)**

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2. *(a)* e.g. they earn less from regular hrs so need more to supplement income — B1

(b) $S_{pp} = 420.58 - \frac{86^2}{18} = 9.69111$ — M1

$S_{hh} = 830.25 - \frac{104.5^2}{18} = 223.569$ — M1

$S_{ph} = 487.3 - \frac{86 \times 104.5}{18} = {}^-11.9778$ — M1

$r = \frac{-11.9778}{\sqrt{9.69111 \times 223.569}} = {}^-0.2573$ — M1 A1

(c) weak –ve correlation gives some support to hypothesis — B2 **(8)**

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3. *(a)* $\bar{y} = \frac{37}{80} = 0.4625$ — M1

$\bar{C} = (250 \times 0.4625) + 3250 = £3366$ (nearest £) — M1 A1

std. dev. of $y = \sqrt{\frac{2317}{80} - 0.4625^2} = 5.3618$ — M1

std. dev. of $C = 250 \times 5.3618 = £1340$ (nearest £) — M1 A1

(b) used midpoints to represent data in each group — B1

(c) median < mean ∴ +vely skewed — B1

e.g. most cost a similar amount but some people spend a lot more — B1 **(9)**

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4. *(a)* $P(Z < \frac{38.2 - 32.5}{\sqrt{18.6}}) = P(Z < 1.32) = 0.9066$ — M2 A1

(b) $P(\frac{31 - 32.5}{\sqrt{18.6}} < Z < \frac{35 - 32.5}{\sqrt{18.6}}) = P(^-0.35 < Z < 0.58)$ — M2

$= P(Z < 0.58) - P(Z < {}^-0.35)$ — M1

$= 0.7190 - 0.3632 = 0.3558$ — A1

(c) $P(Z > \frac{110 - \mu}{7.2}) = 0.138$ — M1

$\frac{110 - \mu}{7.2} = 1.09$; $\mu = 102$ (3sf) — M1 A2 **(11)**

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5. *(a)* $\sum fx = 146$; mean $= \frac{146}{85} = 1.72$ (3sf) — M1 A1

$\sum fx^2 = 312$ — M1

std. dev. $= \sqrt{\frac{312}{85} - (1.7176)^2} = 0.849$ (3sf) — M1 A1

(b) $\sum P(x) = 19k + 16k + 11k + 4k = 50k = 1 \quad \therefore k = \frac{1}{50}$ — M2 A1

(c) $\sum xP(x) = \frac{19}{50} + \frac{32}{50} + \frac{33}{50} + \frac{16}{50} = 2$ — M1 A1

(d) e.g. mean of model not very close ∴ not very suitable — B1 **(11)**

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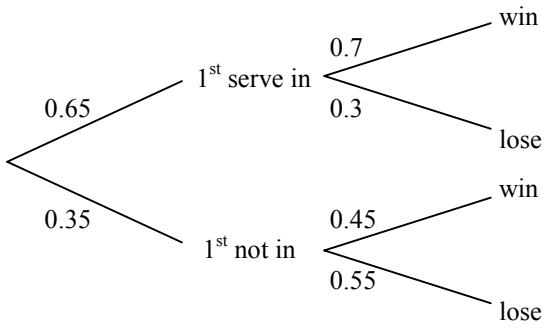
6. *(a)*



B3

(b) $(0.65 \times 0.7) + (0.35 \times 0.45) = 0.6125 \quad (\frac{49}{80})$ M2 A1

(c) $P(1^{st} \text{ serve in} \mid \text{won}) = \dfrac{P(1^{st} \text{ serve in} \cap \text{won})}{P(\text{won})}$ M1

$= \frac{0.65 \times 0.7}{0.6125} = 0.743 \text{ (3sf)} \quad (\frac{26}{35})$ M1 A1

(d) $P(1^{st} \text{ serve not in} \mid \text{lost}) = \dfrac{P(1^{st} \text{ serve not in} \cap \text{lost})}{P(\text{lost})}$ M1

$= \frac{0.35 \times 0.55}{1 - 0.6125} = 0.497 \text{ (3sf)} \quad (\frac{77}{155})$ M2 A2 **(14)**

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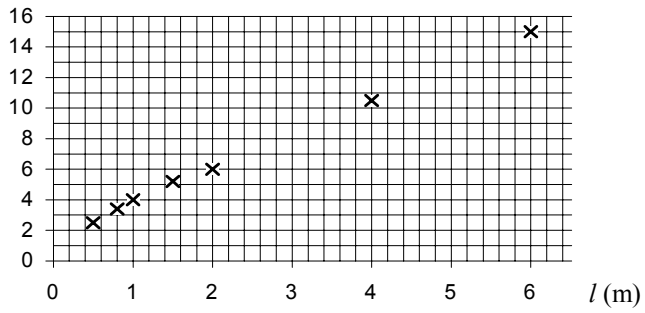
7. *(a)*



B3

(b) $S_{lp} = 159.77 - \frac{15.8 \times 46.6}{7} = 54.5871$ M1

$S_{ll} = 60.14 - \frac{15.8^2}{7} = 24.4771$ M1

$b = \frac{54.5871}{24.4771} = 2.2301$ M1 A1

$a = \frac{46.6}{7} - (2.2301 \times \frac{15.8}{7}) = 1.6234$ M1 A1

$P = 1.62 + 2.23l$ A1

(c) increase in price in £ per extra metre of tubing B1

(d) $1.62 + (2.23 \times 5.2) = £13.22$ M1 A1

(e) e.g. machine may only be able to produce tubes up to a certain length so longer ones would be very difficult and expensive to make B2 **(15)**

Total **(75)**

Performance Record – S1 Paper G

Question no.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	Total
Topic(s)	discrete r. v.	pmcc	mean + std. dev. with coding	normal dist.	mean, std. dev., modelling, discrete r. v.	probability	scatter diagram, regression	
Marks	7	8	9	11	11	14	15	75
Student								