This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the October/November 2022 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

This document consists of **10** printed pages.

Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

GENERIC MARKING PRINCIPLE 6:

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

MARK SCHEME NOTES

The following notes are intended to aid interpretation of mark schemes in general, but individual mark schemes may include marks awarded for specific reasons outside the scope of these notes.

Types of mark

M   Method marks, awarded for a valid method applied to the problem.

A   Accuracy mark, awarded for a correct answer or intermediate step correctly obtained. For accuracy marks to be given, the associated Method mark must be earned or implied.

B   Mark for a correct result or statement independent of Method marks.

When a part of a question has two or more 'method' steps, the M marks are in principle independent unless the scheme specifically says otherwise; and similarly where there are several B marks allocated. The notation 'dep' is used to indicate that a particular M or B mark is dependent on an earlier, asterisked, mark in the scheme.

The symbol $\sqrt{}$ implies that the A or B mark indicated is allowed for work correctly following on from previously incorrect results. Otherwise, A and B marks are given for correct work only.

Abbreviations

AG   answer given on question paper
awrt   answer which rounds to
cao   correct answer only
dep   dependent
ft   follow through after error
oe   or equivalent
SC   special case
soi   seen or implied
www   without wrong working

Question	Answer	Marks	Partial Marks
1(a)	Qualitative	**3**	B1
	Quantitative continuous		B1B1
1(b)	7 and 15 seen **or** 15 – '7' where 5 < '7' < 10	**2**	M1
	8		A1
1(c)	25% $\times$ 144 **oe**	**2**	M1
	36		A1

Question	Answer	Marks	Partial Marks
2(a)	Sectional or composite bar chart	**2**	B1
	It will show the totals [for each sport]/which is the most popular [sport] **oe**		B1
2(b)	6/25 **oe** Correct numerator in a probability	**2**	B1
	Correct denominator in a probability		B1
2(c)	3/11 **oe**	**1**	B1
2(d)	1/2 **oe**	**1**	B1

Question	Answer	Marks	Partial Marks
3(a)	Sample has 2 of each battery size **oe**	**3**	M1
	[To be representative sample should have] 100/600 $\times$ 6 [of D], 300/600 $\times$ 6 [of AA], 200/600 $\times$ 6 [of AAA] **oe**		M1
	Should have 1 [of D], 3 [of AA] and 2 [of AAA] so not representative		A1
3(b)	1/6 $\times$ 5, 3/6 $\times$ 5 and 2/6 $\times$ 5 **oe**	**2**	M1
	Leading to 1, 2, 2		A1

Question	Answer	Marks	Partial Marks
4(a)	Use of P($A{\cap}B$) = P(A) $\times$ P(B)	**3**	M1
	Use of P($A{\cup}B$) = P(A) + P(B) – 'P($A{\cap}B$)'		M1
	0.58 **oe**		A1
4(b)	Use of P($A{\cup}B$) – P($A{\cap}B$) **oe**	**2**	M1
	0.46 **oe**		A1
4(c)	(1 – 0.3) $\times$ (1 – 0.4) **or** 1 – *their* **(a)** **or** 1 – 0.3 – 0.4 + 0.3 $\times$ 0.4	**2**	M1
	0.42		A1

Question	Answer	Marks	Partial Marks
5(a)	250 $\times$ 12 or 3000 **or** 0.8 $\times$ 1200 or 960	**2**	M1
	3000 : 960 : 360 **or** e.g. 250 $\times$ 12 : 0.8 $\times$ 1200 : 360 leading to 25 : 8 : 3 **AG**		A1
5(b)	109 seen [for rent]	**5**	B1
	100 seen [for electricity]		B1
	98 seen [for other costs]		B1
	(25 $\times$ '109' + 8 $\times$ '100' + 3 $\times$ '98')/(25 + 8 + 3) [= 3819/36] **oe**		M1
	106.1		A1
5(c)	For example, 'the **amount** of electricity/**number** of units used may have changed/increased/decreased.'	**1**	B1

Question	Answer	Marks	Partial Marks
6(a)	600 + (50 – 28)/(90 – 28) × (1000 – 600) 600 + a fraction of the class width (1000 – 600) or 400	**4**	M1
	Division of the class width by (90 – 28) or 62		M1
	Multiplication of the class width by (50 – 28) or 22		M1
	Or 1000 – (90 – 50)/(90 – 28) × (1000 – 600) 1000 – a fraction of the class width (1000 – 600) or 400		(M1)
	Division of the class width by (90 – 28) or 62		(M1)
	Multiplication of the class width by (90 – 50) or 40		(M1)
	Or (600 × (90 – 50) + 1000 × (50 – 28))/(90 – 28) Correct numerator **oe**		(M2)
	Correct denominator **oe**		(M1)
	742 **cao**		A1
6(b)	That the masses of the parcels are increasing linearly (between 600 g and 1000 g) **oe**	**1**	B1

Question	Answer	Marks	Partial Marks

7(a)	15 correct entries added to left of diagram, correctly ordered (from right to left) and equally spaced.
	
	                    0 | 3
	              9 6 | 4
	   7 6 5 4 2 0 0 | 5
	           5 4 2 1 1 | 6
	
	(**B2** for 1 error, **B1** for 2 errors)
		4	B3

	Key: 6 | 4 | 1 represents a 41 year old female and a 46 year old male		B1

Question	Answer	Marks	Partial Marks
7(b)	<table><tr><td></td><td>Males</td><td>Females</td></tr><tr><td>LQ</td><td>50</td><td>39</td></tr><tr><td>M</td><td>55</td><td>48</td></tr><tr><td>UQ</td><td>61</td><td>63</td></tr></table> (***B2*** *for 4 or 5 correct entries,* ***B1*** *for 2 or 3 correct entries*)	**3**	B3
7(c)	Azeeb: Not correct **and** the median for the males is higher (than that of the females) **or** 55 > 48 **oe**	**2**	B1ft
	Tebogo: Correct **and** the interquartile range for the males is smaller (than that of the females) **or** 11 < 24 **oe**		B1ft
7(d)	<table><tr><td>Age</td><td>M</td><td>F</td></tr><tr><td>20 ⩽ x < 30</td><td>0</td><td>0</td></tr><tr><td>30 ⩽ x < 40</td><td>1</td><td>4</td></tr><tr><td>40 ⩽ x < 50</td><td>2</td><td>4</td></tr><tr><td>50 ⩽ x < 60</td><td>7</td><td>2</td></tr><tr><td>60 ⩽ x < 70</td><td>5</td><td>5</td></tr><tr><td>70 ⩽ x < 80</td><td>0</td><td>0</td></tr></table>	**1**	B1ft
7(e)	Correctly plotted points joined with straight-line segments	**3**	B1ft
	Suitable key		B1
	Labels 'age (years)' horizontally and 'number of people/workers' vertically		B1
7(f)	Original ages/data can be seen **Exact** medians etc. can be calculated	**1**	B1
7(g)(i)	3	**1**	B1
7(g)(ii)	They must all be 57 or over	**1**	B1

Question	Answer	Marks	Partial Marks
8(a)	Any two from • To eliminate/reduce the variation • To see the trend/find the trend line • To calculate the seasonal components • To make predictions (**B1** for one correct reason)	**2**	B2
8(b)	x = 1331.25	**3**	B1
	y = 1306.25		B1
	z = 1305.5		B1
8(c)	332 – 1306.75 [= –974.75] **or** 320 – 1297.75 [= –977.75]	**3**	M1*
	('–974.75' + '–977.75')/2 **dep**		DM1
	Or (332 + 320)/2 **and** [–](1306.75 + 1297.75)/2		(M1)
	'326' – '1302.25' **dep**		(DM1)
	–976.25 or –976.3 or –976		A1
8(d)	Correct plots vertically	**3**	B1ft
	Correct plots horizontally		B1
	Appropriate trend line		B1ft
8(e)	The ranger is not correct. The number of swans is falling over time/each year, but not each quarter.	**1**	B1
8(f)	Reading from their straight trend line at Q2 of 2022 + *their* **(c)**. E.g.: 1292 – 976	**2**	M1
	316 (Follow through only their trend line)		A1ft

Question	Answer	Marks	Partial Marks
9(a)(i)	2/9 **oe**	**1**	B1
9(a)(ii)	4/9 **oe**	**1**	B1
9(a)(iii)	1/9 **oe**	**1**	B1
9(a)(iv)	$1/3 \times 2/3 + 2/3 \times 2/3 - 1/3 \times 1/3$ **or** '2/9' + '4/9' – '1/9'	**2**	M1
	5/9 **oe**		A1

Question	Answer	Marks	Partial Marks
9(b)	[P(identical) =] 2/9 **or** [P(not identical) =] 7/9	**4**	B1
	Use of P(not identical) = 1 – P(identical)		M1
	'P(identical)' $\times$ x = 'P(not identical)' [$\times$ 1]		M1
	[$]3.50		A1
9(c)(i)	4/6 $\times$ 2/5 $\times$ 2 n $\times$ (n – 1) in denominator	**3**	M1
	product of two probabilities $\times$ 2		M1
	8/15 **oe**		A1
9(c)(ii)	2/15 **oe**	**1**	B1
9(c)(iii)	1/3 **oe** or 1 – '8/15' – '2/15'	**1**	B1ft
9(d)	3 $\times$ '8/15' + 9 $\times$ '2/15' + 6 $\times$ '1/3' **oe**	**2**	M1
	[$]4.80		A1

Question	Answer	Marks	Partial Marks
10(a)	(52 – 62)/8 **or** (54 – 68)/10	**3**	M1
	–1.25 **and** –1.4 (or correctly converting each to any common mean and standard deviation)		A1
	Hazeema (**ft**, provided one correct scaled score)		A1ft
10(b)	Σx = 62 $\times$ 159 + 68 $\times$ 141 [= 19 446]	**7**	M1
	'19 446'/(159 + 141)		M1
	Mean = 64.82 or 64.8		A1
	8 = $\sqrt{(\Sigma x^2/159 – 62^2)}$ **or** 10 = $\sqrt{(\Sigma x^2/141 – 68^2)}$ or better		M1*
	'621 372' + '666 084' [=1 287 456] **dep**		DM1
	'1287456'/(159 + 141) – '64.82'^{2} [=89.8876] **dep**		DM1
	Standard deviation = 9.48 **awrt**		A1
10(c)	Σx/(141 + 149) = 73.4 or better	**3**	M1
	'21 286' – 68 $\times$ 141 [= 11 698]		M1
	11 698/149 = 78.5 **awrt**		A1

Question	Answer	Marks	Partial Marks
10(d)	68.2 **and** 8.8	**1**	B1
10(e)	<table><tr><td></td><td>increase</td><td>decrease</td><td>same</td><td>Not enough info</td></tr><tr><td>Mean</td><td>✓</td><td></td><td></td><td></td></tr><tr><td>S. d.</td><td></td><td>✓</td><td></td><td></td></tr></table>	**2**	B1 B1