



Mark Scheme (Topic Test)

Hypothesis Test Identification

Pearson Edexcel GCE
In Statistics (9ST0)

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General Marking Guidance

Total marks

The total number of marks for the paper is 50.

Mark types

The Edexcel Statistics mark schemes use the following types of marks:

- **M** **Method** marks, awarded for 'knowing a method and attempting to apply it', unless otherwise indicated.
- **A** **Accuracy** marks can only be awarded if the relevant method (M) marks have been earned.
- **B** **Unconditional accuracy** marks are independent of M marks
- **E** **Explanation** marks

NOTE: Marks should not be subdivided.

Abbreviations

These are some of the marking abbreviations that will appear in the mark schemes.

- ft follow through
- PI possibly implied
- cao correct answer only
- cso correct solution only
(There must be no errors in this part of the question)
- awrt answers which round to
- awfw answers which fall within (a given range)
- SC special case
- nms no method shown
- oe or equivalent
- dep dependent (on a given mark or objective)
- dp decimal places
- sf significant figures
- * The answer is printed on the paper

Further notes

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied **positively**. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is **no ceiling** on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- All A marks are 'correct answer only' (cao), unless shown, for example, as A1ft to indicate that previous wrong working is to be followed through.
- All M marks are 'possibly implied' (PI) unless specifically stated otherwise in the 'Notes' column.
- After a **misread**, the subsequent A marks affected are treated as A1ft, but manifestly absurd answers should never be awarded A marks.
- **Crossed out** work should be marked UNLESS the candidate has replaced it with an alternative response.
- If **two solutions** are given, each should be marked, and the resultant mark should be the mean of the two marks, rounded down to the nearest integer if needed.

Question	Scheme	Marks	AO	Notes
1	H ₀ : Po(0.7) is a suitable model for the number of times a participant’s mind wandered (in a two-minute interval) H ₁ : Po(0.7) is not a suitable model for the number of times a participant’s mind wandered (in a two-minute interval)	B1	2.1b	Selection of Goodness of Fit test May be stated or implied by “suitable model” and “not suitable model” for H ₀ and H ₁ respectively
		B1	1.3	Both completely correct with Po(0.7) stated Must be in context
	Total	2		

Question	Scheme	Marks	AO	Notes
2	Paired t -test	B1	2.1b	Allow Paired z -test
Total		1		

Question	Scheme	Marks	AO	Notes
3	One-Factor ANOVA	B1	2.1b	Or One-Way ANOVA
Total		1		

Question	Scheme	Marks	AO	Notes
4(a)	(One-sample) z -test	B1	2.1b	
4(b)	The <u>sample</u> size is sufficiently <u>large</u>	B1	2.1b	
	May assume the <u>sample mean</u> time spent waiting in line to vote are <u>normally distributed</u> , regardless of the distribution of the population of times spent waiting in line to vote, by the <u>Central Limit Theorem</u>	E1	3.1a	Condone "CLT" Condone no context
				Must refer the normality of sample means
				May be explained in symbols provided symbols are defined
Total		3		

Question	Scheme	Marks	AO	Notes
5	Sign test	B1	2.1b	
	Total	1		

Question	Scheme	Marks	AO	Notes
6	Two-Factor ANOVA	B1	2.1b	Or Two-Way ANOVA
	Total	1		

Question	Scheme	Marks	AO	Notes
7(a)	(χ^2) Goodness of Fit test	B1	2.1b	
7(b)	<p>H_0: The exponential distribution is a suitable model for the time between decay events</p> <p>H_1: The exponential distribution is not a suitable model for the time between decay events</p>	B1	1.3	Both Must be exponential distribution Parameters must not be stated Must be in context
	Total	2		

Question	Scheme	Marks	AO	Notes
8	Wilcoxon Rank-Sum Test	B1	2.1b	
	Total	1		

Question	Scheme	Marks	AO	Notes
9	Two-Sample z -test / Independent Sample z -test / z -test for a difference between two (population) means	B1	2.1b	Must refer to two/independent samples
	Total	1		

Question	Scheme	Marks	AO	Notes
10	(One-sample) t -test	B1	2.1b	
	Total	1		

Question	Scheme	Marks	AO	Notes
11	Spearman's Rank Test	B1	2.1b	
	Total	1		

Question	Scheme	Marks	AO	Notes
12	χ^2 Test for association / Contingency Table test / Goodness of Fit test for independence	B1	2.1b	
	Total	1		

Question	Scheme	Marks	AO	Notes
13	B(200, 0.02)	B1	2.1b	OR B(200, 0.98)
	Total	1		

Question	Scheme	Marks	AO	Notes
14	Wilcoxon Signed-Rank Test	B1	2.1b	
	Total	1		

Question	Scheme	Marks	AO	Notes
15	[A = number of students in Group A who passed the exam, B = number of students in Group B who passed the exam]			
	$H_0: \pi_A - \pi_B = 0$ $H_1: \pi_A - \pi_B > 0$	B1	1.3	Both oe If letters other than A and B used, they must be defined Condone p in place of π
	Total	1		

Question	Scheme	Marks	AO	Notes
16	$H_0: \rho = 0$ $H_1: \rho \neq 0$	B1	1.3	oe using words "Population PMCC"
	Total	1		

Question	Scheme	Marks	AO	Notes
17	Paired Sign Test	B1	2.1b	
	Total	1		

Question	Scheme	Marks	AO	Notes
18(a)	Two-Sample t -test / Students t -test / t -test for the difference in two (population) means / Independent sample t -test	B1	2.1b	
18(b)	The <u>population variances</u> of <u>percentage yield</u> are <u>equal</u> for both groups	B1	3.1a	Must be in context
	Total	2		

Question	Scheme	Marks	AO	Notes
19	Paired Wilcoxon Signed-Rank Test	B1	2.1b	
	Total	1		

Question	Scheme	Marks	AO	Notes
20	(One-sample) z -test	B1	2.1b	
	Total	1		