Question Number	Scheme	Marks
4(a)	There are **2 outcomes**, faulty (component) or not faulty (component) There is a **fixed number** of components (sent to the company for testing) Faults occur **independently** The **probability** of a faulty (component) is **constant**	B1B1
		(2)
(b)	$\left[H_0 : p = 0.2 \quad H_1 : p \neq 0.2\right]$	
	$\left[P(X \leqslant 1) =\right] 0.0105$ or $\left[P(X \leqslant 2) =\right] 0.0442$	M1
	$\left[P(X \geqslant 11) = 1 - P(X \leqslant 10) =\right] 0.0256$ or $\left[P(X \geqslant 12) = 1 - P(X \leqslant 11) =\right] 0.0095$	M1
	$X \leqslant 1 \cup X \geqslant 11$	A1
		(3)
(c)	$\left[0.0105 + 0.0256 =\right] 0.0361$	B1ft
		(1)
(d)	4 is not in the CR [1 < 4 < 11/Do not reject H_0/Not significant]	M1
	Insufficient evidence to reject the company's **claim**	A1ft
		(2)
(e)	$H_0 : p = 0.2 \quad H_1 : p < 0.2$	B1
	$P(X \leqslant 2)$ = awrt 0.0982 or CR $\leqslant 2$	M1
	Reject H_0/Significant/2 is in CR	M1
	Sufficient evidence to suggest that the **probability** of a **faulty** electrical component has **decreased**	A1
		(4)

	Notes	**Total 12**
(a)	**B1**	One correct reason in context **or** two correct reasons not in context For context we require faults/faulty/components mentioned at least once
	B1	Two correct reasons with context mentioned **at least once** (ignore extraneous non-contradictory comments)
(b)	**M1**	For awrt 0.0105 or awrt 0.0442
	M1	For awrt 0.0256 or awrt 0.0095 (allow awrt 0.974 or awrt 0.991)
	A1	A1 for both tails of the CR oe e.g. $X < 2$ and $X > 10$ Allow use of any letter
(c)	**B1ft**	Ft their CR provided that the answer < 0.05
(d)	**M1**	Ft their CR. For a correct ft comparison of 4 with their CR from part (b) Do not allow non-contextual contradictory statements.
	A1ft	For a correct contextual statement ft their CR. Must have the words highlighted in bold Allow e.g. evidence to support **percentage** of **faulty** components is **20**%
(e)	**B1**	Both hypotheses correct must be correctly linked to H_0 and H_1 Must be in terms of p or π
	M1	For p –value of $\left[P(X \leqslant 2) =\right]$awrt 0.0982 (If multiple p –values seen, then 0.0982 must be selected) or for CR $\leqslant 2$
	M1	For a correct non contextual statement consistent with their p-value and 10% / their CR and 2 Do not allow non-contextual contradictory statements. May be implied by a correct contextual statement on its own
	A1	(Dep on 2nd M1) For a correct contextual statement. Must have the words highlighted in bold o.e.