Question Number	Scheme	Marks
4. (a)	p is small	B1 (1)
(b)	Let N = number of candles **not** suitable for sale	
	$N \sim B(125, 0.02)$	M1
	$\approx C \sim Po(2.5)$	A1
	$P(C \leqslant 6)$	M1
	$= 0.9858$ awrt **0.986**	A1 (4)
(c)(i)	$H_0 : p = 0.05$ $H_1 : p < 0.05$	B1
	$D \sim B(30, 0.05)$	M1
	$P(D = 0) = 0.2146$	A1
	Do not reject H_0 / not significant	M1
	The manufacturer's claim **is not** supported/There **is not** enough evidence to suggest that the proportion(oe) of candle holders with minor defects is less than 5%/ Charlie's claim **is** supported	A1 (5)
(ii)	Impossible to reject H_0 (since $P(D = 0) > 0.05$)	B1 (1)
(d)	0.95^{50} [=0.0769…] …. or $X \sim B(50, 0.05)$, $P(X = 0)$ (is still) > 0.05	M1
	(so still not possible to reject H_0) hence Ashley's change does not make the test appropriate.	A1 (2)
		[13 marks]

	Notes
(a)	B1 correct condition allow 'p is close to 0' allow '$p < 0.1$' or any value less than 0.1 (condone $np < 10$ or $np \leqslant 10$)
(b)	1st M1 recognising Binomial distribution (may be implied by Po(2.5))
	1st A1 correct distribution Po(2.5)
	2nd M1 writing or using $P(C \leqslant 6)$ from Poisson distribution
	2nd A1 awrt 0.986 from correct distribution used (calc : 0.9858126….)
	[NB : Use of binomial gives 0.98678…] Answer only 0.9858 or better scores 4 out of 4, but answer of 0.986 must see Po(2.5) to award full marks.
(c)(i)	B1 correct hypotheses in terms of p or π
	1st M1 writing or using B(30, 0.05) (may be implied by 1st A1)
	1st A1 awrt 0.215
	2nd M1 a correct ft statement consistent with their p-value and 0.05 No context needed but do not allow contradicting non contextual comments.
	2nd A1 correct conclusion in context which must be **not rejecting** H_0.
	Must use underlined words (oe) No hypotheses then A0
	Condone e.g. '5% of candle holders have minor defects'
(ii)	B1 correct reasoning which implies there is no critical region/ H_0 cannot be rejected
	Sample size is too small on its own is B0.
(d)	M1 for 0.95^{50} or for $X \sim B(50, 0.05)$ and $P(X = 0) > 0.05$
	A1 test is (still) not appropriate with M1 scored