Question Number	Scheme	Marks
5 (a)	$\hat{p} = \dfrac{0\times2+1\times40+2\times90+3\times85+4\times30+5\times3}{250\times5}$ or $\hat{p} = \dfrac{40+180+255+120+15}{250\times5}\left(=\dfrac{610}{1250}=\dfrac{122}{250}\right)$	M1
	$=0.488$	A1
		(2)
(b)	$250 - (41.92 + \ldots + 6.92)$	M1
	$= 8.79$	A1
		(2)
(c)	H_0 : Binomial distribution is suitable/sensible (model) H_1 : Binomial distribution is not suitable/sensible (model)	B1
	$\dfrac{(2-'8.8')^2}{'8.8'}\left[=5.25...\right]$	M1
	$\left[\sum\dfrac{(O-E)^2}{E}=\right]5.70+'5.25'=10.95$	dM1 A1
	$\nu = 6-1-1=4$	B1
	$\chi^2_4(0.05)=9.488 \Rightarrow$ CR..9.488	B1ft
	[In CR/Significant/Reject H_0] Significant evidence to suggest that a binomial distribution is not a suitable model	A1
		(7)

	Notes	**Total 11**
(a)	**M1**	For a correct method to find $\hat{p}$ May be implied by 0.488. Allow one error or omission for one of their products.
	A1	0.488 oe e.g. $\dfrac{61}{125}$
(b)	**M1**	For a correct method to find r (Allow $0.512^5\times250$) May be implied by 8.79 or 8.8(0)
	A1	Allow 8.8(0)
(c)	**B1**	Both Hypotheses correct. Must be attached to H_0 and H_1 Do not allow B(5, 0.488) is a suitable model
	M1	For use of $\dfrac{(O-E)^2}{E}$ ft their part (b). If no value is found in (b) or they use 5.7 then M0. May be implied by awrt 5.25 or awrt 10.95 or 10.9 or 11.0
	dM1	Dependent on the first method mark. For 5.70 + '5.25' ft their 5.25 May correctly attempt $\sum\dfrac{(O-E)^2}{E}$ or $\sum\left(\dfrac{O^2}{E}\right)-250$. May be implied by awrt 10.95 or allow 10.9 or 11.0
	A1	awrt 10.95 (allow 10.9 or 11.0)
	B1	4 [degrees of freedom] If not seen then may be implied by 9.488 or 11.143 (or better)
	B1ft	9.488 or better or ft on their dof e.g. 2: 5.991, 3: 7.815, 5: 11.07(0), 6: 12.592
	A1	Dependent on all previous method marks and a critical value > 5 where X^2>CV Requires a correct conclusion rejecting the null hypothesis. Must mention the (binomial) distribution/model