Question Number	Scheme	Marks
3 (a)	$\frac{36\times 35}{250}$	M1
	5.04	A1
		(2)
(b)	H_0 : There is no association between when the car first experienced an engine problem and the type of engine H_1 : There is an association between when the car first experienced an engine problem and the type of engine	B1
	Observed | Expected | $\frac{(O-E)^2}{E}$ 10 | 5.04 | $\frac{(10-'5.04')^2}{'5.04'}(=4.881)$	M1
	$X^2 = 7.444 + '4.881'$	dM1
	$= 12.325$ awrt 12.3	A1
	$\nu = (3-1)(3-1) = 4$ $\quad \chi^2_4(0.05) = 9.488 \Rightarrow$ CR: X^2 …9.488	B1 B1ft
	[In the CR/Significant/Reject H_0] There is evidence of an association between when the car first experienced an engine problem and the type of engine	A1
		(7)

	Notes	**Total 9**
(a)	**M1**	For a correct method for finding the expected value (ignore other values if found)
	A1	5.04 oe isw e.g. if they attempt to find other expected frequencies as well. 5.04 with no incorrect working seen is 2/2
(b)	**B1**	Both hypotheses correct. Engine problems and type of engine mentioned at least once. (may be written in terms of independence (or association) e.g. H_0 : When the car first experienced an engine problem and the type of engine are independent H_1 : When the car first experienced an engine problem and the type of engine are not independent
	M1	For a correct method for finding the contribution to the X^2 value (seen or implied). May be seen in (a) or by the table
	dM1	Dependent on the previous method mark. For finding the test statistic X^2. Usually by adding their value to 7.444 (seen or implied). If they attempt to find the individual values using the table then the method must be correct.
	A1	awrt 12.3 (sight of awrt scores M1dM1A1)
	B1	$\nu = 4$ If not seen then may be implied by 9.488 or 11.143
	B1ft	9.488 or better or ft their DoF (e.g. $\nu = 2$, 5.991 or better or $\nu = 8$, 15.507 or $\nu = 9$, 16.919 or better)
	A1	Dependent on all previous method marks and their X^2 must lie in the critical region i.e. $X^2 >$"9.488" (where $X^2 > 7.444$) A correct contextualised conclusion which is rejecting H_0 Must mention **engine problem** and **type of engine** oe **If hypotheses are the wrong way round, then A0 here**. Do not withhold this mark if their hypotheses are in terms of ρ. Contradictory statements score A0. Condone "relationship" or "connection" here but **not** "correlation".