2. The manager of a shop investigates the number of customers served by staff that work in the shop.
The manager records the number of customers being served in 100 consecutive five-minute time intervals.

The results are shown in the table below.

Number of customers	0	1	2	3	4	5	6 or more
Frequency	5	38	32	17	7	1	0

The manager plans to test whether or not a Poisson model is suitable for these data.

(a) Show that the sample mean number of customers served is 1.86

(1)

The manager uses the sample mean to calculate the following expected frequencies, correct to 3 decimal places.

Number of customers	0	1	2	3	4	5	6 or more
Expected frequency	15.567	28.955	26.928	16.696	7.763	2.888	r

(b) Explain why the value of r is 1.203

(1)

The manager combines cells 4, 5 and '6 or more', before continuing the test.

(c) Explain why it is necessary for the manager to do this.

(1)

After combining these cells, the manager calculates that $\sum \frac{(O-E)^2}{E} = 12.2$ correct to 3 significant figures.

(d) Carry out the manager's test at the 1% significance level.
You should clearly state the hypotheses, the degrees of freedom and the critical value used.

(4)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Question 2 continued

Question 2 continued

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Question 2 continued

(Total for Question 2 is 7 marks)