2. A business accepts cash, bank cards or mobile apps as payment methods.

The manager wishes to test whether or not there is an association between the payment amount and the payment method used.

The manager takes a random sample of 240 payments and records the payment amount and the payment method used.

The manager's results are shown in the table.

		Payment amount		
		Under £50	**£50 to £150**	**Over £150**
Payment method	**Cash**	23	19	18
	Bank card	21	32	31
	Mobile app	16	39	41

Using these results,

(a) calculate the expected frequencies for the payment amount under £50 that

(i) use cash

(ii) use a bank card

(iii) use a mobile app

(3)

Given that for the other 6 classes $\sum \frac{(O-E)^2}{E} = 2.4048$ to 4 decimal places,

(b) test, at the 5% level of significance, whether or not there is evidence for an association between the payment amount and the payment method used.
You should state the hypotheses, the test statistic, the degrees of freedom and the critical value used for this test.

(7)

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 10 marks)