Question 12 **(13 marks)**

The Slate Tablet Company produces a variety of electronic tablets. It wants to gather information on consumers' interest in its tablets.

(a) In each of the following cases, comment, giving reasons, whether or not the proposed sampling method introduces bias.

(i) A Slate Tablet Company representative stood outside an electronics store on a Saturday morning and asked people entering the store 'If you were to purchase an electronic tablet would you choose a Slate Tablet or an inferior brand?' (2 marks)

(ii) Fifteen hundred randomly selected mobile phone numbers were telephoned and people were asked 'Which brand of electronic tablet do you prefer?' (2 marks)

A common problem with a particular tablet is screen failure. The manufacturer of Slate Tablets has found that 1% of its tablet screens will fail within three years. A sample of 200 tablets is taken. Let the random variable X denote the number of tablets that have screen failure within three years in the sample of 200.

(b) What is the distribution of X? (2 marks)

(c) What is the probability that more than four tablets will have screen failure within three years? (2 marks)

In a random sample of 200 Slate Tablets, four of them had screen failure within three years.

(d) Calculate an approximate 95% confidence interval for the proportion of tablets that have screen failure within three years. Give your answer to four decimal places. (3 marks)

(e) The company's quality control department wants the proportion of tablets with faulty screens to be between 0.5% and 1%. Based on your confidence interval, decide whether the quality control department is meeting its target. Justify your decision. (2 marks)