

Question 18**(9 marks)**

A building has five alarms configured in such a way that the system functions if at least two of the alarms work. The probability that an alarm fails overnight is 0.05. Let the random variable X denote the number of alarms that fail overnight.

- (a) State the distribution of X . (2 marks)

- (b) What assumptions are required for the distribution in part (a) to be valid? (2 marks)

- (c) What is the probability that the alarm system fails overnight? (2 marks)

One of the alarms is removed in the evening for maintenance and is not replaced.

- (d) What is the probability that the alarm system still works in the morning? (3 marks)