2008 Paper 2 Question 6

Probability

(a) Give a brief account of the Trinomial Distribution and include in your explanation an expression that is equivalent to $\frac{n!}{r!(n-r)!}\, p^r q^{n-r}$ for the Binomial Distribution. [5 marks]

(b) An indicator light can be in one of three states: OFF, FLASHING and ON, with probabilities 1/2, 2/5 and 1/10 respectively. A test panel has five such lights whose states are mutually independent.

    (i)   What is the probability that all five lights are OFF? [3 marks]

    (ii)   What is the probability that three lights are OFF, one light is FLASHING and one light is ON? [3 marks]

    (iii) What is the probability that three or more lights are OFF and at most one is ON? [9 marks]

All results *must* be expressed as fractions.