Question 39

In a complex electrical system, voltage spikes occur according to a Poisson process at an average rate of one spike every eighteen minutes.

Do not write in this margin

(a) Find the expected number of spikes to occur over an interval of one hour, and calculate the probability that over this interval there are at least two spikes.

$\lambda t = \frac{1}{18} \times 60 = 3.333$

$1 - P(0) - P(1)$

$= 1 - e^{-3.333} - e^{-3.333} \times 3.333$

$= 1 - 0.03569 - 0.1189 = 0.8454$

(b) Find the median time between spikes. [5]

$0.5 = 1 - e^{-\lambda t}$

$e^{-\lambda t} = 0.5$

$-\lambda t = -0.6931$

$t = \frac{-0.6931}{1/18} = 12.48 \text{ mins}$

[END OF QUESTION PAPER]