Roll no : 2022MCS120009

Part B.

1) Given information.

$\lambda = 0.2, x = 5$

Formula.

$$P(x = x) = \begin{cases} \frac{\lambda^x e^{-\lambda x}}{x!} & \text{for } x \geq 0 \\ \text{for } x \leq 0 \end{cases}$$

$e = 2.71828$

$= 0.2 e^{-0.2 \times 5}$

$= 0.2 e^{-2}$

$= 0.2 \times 0.3678$

$= 0.07324$

Given Information

$\lambda = 10$

i) Exactly 5 call in one hour

$$P(x=x) = \frac{e^{-\lambda} \lambda^x}{x!}$$

$$P(x=5) = \frac{e^{-10} 10^5}{5!}$$

$$= 4 e^{-10} \times \frac{100000}{120}$$

$$= e^{-10} \times 833$$

$$= 0.037$$

ii) $P(x \leq 3) = P(0) + P(1) + P(2) + P(3)$

$$= e^{-10} + e^{-10} \frac{10^1}{1!} + e^{-10} \frac{10^2}{2!} + e^{-10} \frac{10^3}{3!}$$

$$= (e^{-10}) + (e^{-10} \times 10) + (e^{-10} \times 50) + e^{-10} \times 166.$$

$$= 4.54 e^{-10} + 0.00045 + 0.0023 + 0.0076$$

$$= 0.010954$$

i) $P(x=15) = \frac{e^{-20} 20^{15}}{15!}$

$\lambda = 20$

$$= e^{-20} \times 2505824$$