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Section-4

Q1

Ans. Given:-

Mean, $\lambda = 4$

No. of days, $N = 100$

(i) $P(x=0) = e^{-\lambda} \cdot \lambda^0$

$= e^{-4} = 0.01831$

∴ Required no. of days $= N \cdot P(x=0)$

$= 100 \times 0.01831$

$= 1.831 \approx 2$ Ans.

(ii) $P(x \geq 2) = 1 - P(x < 2) = 1 - [P(x=0) + P(x=1)]$

$= 1 - \left[e^{-4} + \frac{e^{-4}(4)}{1!}\right]$

$= 1 - 5e^{-4}$

$= 0.90842$

∴ Required no. of days $= N \cdot P(x \geq 2)$

$= 100 \times 0.90842$

$= 90.842 \approx 91$ Ans.

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

$$= \frac{e^{-4}(4)^0}{0!} + \frac{e^{-4}(4)^1}{1!} + \frac{e^{-4}(4)^2}{2!} + \frac{e^{-4}(4)^3}{3!}$$

$$= e^{-4} + 4e^{-4} + 8e^{-4} + \frac{64}{6}e^{-4}$$

$$= 0.43347$$

∴ Required no. of days $= N \cdot P(x \leq 3)$

$= 100 \times 0.43347$

$= 43.347 \approx 43$ Ans.

(iv) $P(2 < x < 5) = P(x=3) + P(x=4)$

$$= \frac{e^{-4}(4)^3}{3!} + \frac{e^{-4}(4)^4}{4!}$$

$$= \left(\frac{64}{6} + \frac{256}{24}\right)e^{-4}$$

$$= 0.3907$$

∴ Required no. of days $= N \cdot P(2 < x < 5)$

$= 100 \times 0.3907$

$= 39.07 \approx 39$ Ans.