Section-04

Q.1
Ans:- Mean, $\lambda = 4$, No. of days, $N = 100$

i $$P(r=0) = \frac{e^{-\lambda}\lambda^0}{0!} = e^{-4} = 0.01831$$

Required no. of days. $= N \cdot P(r=0)$
$= 100 \times 0.01831$
$= 1.831$

(ii) $P(r \geq 2) = 1 - P(r<2) = 1 - [P(r=0) + P(r=1)]$
$= 1 - \left[e^{-4} + \frac{e^{-4}(4)}{1!}\right]$
$= 1 - 5e^{-4} = 0.90842$

∴ Required no. of days $= N \cdot P(r \geq 2)$
$= 100 \times 0.90842$
$= 90.842 \approx 91$

(iii) $P(r \leq 3) = P(r=0) + P(r=1) + P(r=2) + P(r=3)$
$= \frac{e^{-4}(4)^0}{0!} + \frac{e^{-4}(4)^1}{1!} + \frac{e^{-4}(4)^2}{2!} + \frac{e^{-4}(4)^3}{3!}$
$= e^{-4} + 4e^{-4} + 8e^{-4} + \frac{64}{6}e^{-4}$
$= 0.43347$

∴ Required no. of days $= N \cdot P(r \leq 3)$
$= 100 \times 0.43347 = 43.347 \approx 43$

(iv) $P(2<r<5) = P(r=3) + P(r=4) = \frac{e^{-4}(4)^3}{3!} + \frac{e^{-4}(4)^4}{4!}$
$= \left(\frac{64}{6} + \frac{256}{64}\right)e^{-4} = 0.3907$

∴ Required no. of days
$= N \cdot P(2<r<5)$
$= 100 \times 0.3907 = 39.07 \approx 39$