SEC-4

④ is Mean, $\lambda = 4$, Number of days $N = 100$

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

$= 0.01831$

∴ Required number of days $= N \cdot P[r=0]$

$= 100 \times 0.01831 = 1.831 \approx 2$

b) $P(r \geq 2) = 1 - P(r < 2) =$
$1 - [P(r=0) + P(r=1)]$

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

$= 1 - 5e^{-4} = 0.90842$

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

$= 100 \times 0.90842 = 90.842 \approx 91$

c) $P(r \leq 3) = P(r=0) + P(r=1)$
$+ P(r=2) + P(r=3)$

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

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

$= 0.43347$

∴ Required number of days $= N \cdot P(r \leq 3)$

$= 100 \times 0.43347 \approx 43$

d) $P(2 < r < 5) = P(r=3) + P(r=4)$

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

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

$= 0.3907$

∴ Required number of days $= N \cdot P(2 < r < 5)$

$= 100 \times 0.3907 = 39.07 \approx 39$