Problems on Poisson Distribution :-

→ Formula used in Poisson Distribution :-

$$P(r) = \frac{e^{-m} \cdot m^r}{r!}$$

where, e^{-m} = Table value
r = No. of successes
m = mean (Average)

QN. 1. It is found that a manufactured product has on an average two defects per unit of a product inspected. Find the probability of defecting a product.
a) without any defect.
b) with three defects.

Soln :- Average defects means $m = 2$.

$$P(r) = \frac{e^{-m} \cdot m^r}{r!}$$

a) without any defect :-
It means $r = 0$.

$$P(0) = \frac{e^{-2} \cdot 2^0}{0!}$$

$$P(0) = \frac{0.13534 \times 1}{1}$$

$$P(0) = 0.13534$$

$e^{-2} = 0.13534$
Table value

b) Probability of a product with three defects :-
It means $r = 3$

$$P(3) = \frac{e^{-2} \cdot 2^3}{3!}$$

$$P(3) = \frac{0.13534 \times 8}{3 \times 2 \times 1}$$

$$P(3) = \frac{0.13534 \times 8}{6}$$

$$P(3) = 0.1804$$