PROBLEMS:

1. A machine manufacturing screws is known to produce 5% defective. In a random sample of 15 screws, what is the probability that there are
(i). exactly 3 defectives, (ii). Not more than 3 defectives

Ans. $p = \frac{5}{100}$, $q = \frac{95}{100}$, (i). $p(x = 3) = 0.0307$, (ii). $p(x \leq 3) = 0.994$

2. In a large consignment of electric bulb 10% are defective. A random sample of 20 is taken for inspection. Find the probability that (i). all are good bulbs, (ii). at most there are 3 defective bulbs, (iii). exactly there are 3 defective bulbs

Ans. $= \frac{1}{10}$, $q = \frac{9}{10}$, $n = 20$, X – no. of defectives.
(i). $P(X = 0) = 0.1216$, (ii). $P(X \leq 3) = 0.8666$, (iii). $P(X = 3) = 0.19$

3. During war, one ship out of 9 was sunk on an average in making a certain voyage. What is the probability that exactly 3 out of a convoy of 6 ships would arrive safely?

Ans. $P(\text{ship sinks}) = p = \frac{1}{9}$, $q = \frac{8}{9}$, $n = 6$
$P(3 \text{ arrives safely out of } 6) = P(3 \text{ sinks}) = P(X = 3) = 0.0193$

4. If on the average rain falls on 10 days in every 30 days, obtain the probability that
(i). rain will fall on at least 3 days of a given week and
(ii). First 3 days of a given week will be fine and the remaining 4 days wet.

Ans. Prob. of rain fall, $= \frac{10}{30} = \frac{1}{3}$, $q = \frac{2}{3}$, $n = 3$.
X – no. of days in a week to have rain.
(i). $P(x \geq 3) = 0.4293$,
(ii). $P(3 \text{ days are fine and remaining 4 days wet}) = q^3 p^4 = 0.0037$.