# DS & AI
# CS & IT

## Probability & Statistics

**Lecture No. 11**

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# Recap of previous lecture

**Topic**

1. Geometric Distribution
2. Trailor of Binomial Dist.

# Topics to be Covered

**Topic**

1. Binomial Distribution Continued
2. POISSON DISTRIBUTION.

# General Points

N. Condⁿ: (1) $n$ = finite, (2) Trial are Ind. (3) Each Trial is a Bernoullie $\begin{cases} S \\ F \end{cases}$

(4) P(success) = const for each Trial.

$X \sim B\{n, p\}$, & $P(x = r\text{ success}) = {}^nC_r\, p^r q^{n-r}$

| $X$ : | 0 | 1 | 2 | 3 | ------ | $n$ |
|---|---|---|---|---|---|---|
| $P(x)$ : | $p_0$ | $p_1$ | $p_2$ | $p_3$ | ------ | $p_n$ |

Here $\sum p_i = 1$

$\text{Mean}(X) = E(X) = \sum p_i x_i = \ldots\ldots = np$

$\text{Var}(X) = E(X^2) - (E(x))^2 = \sum p_i x_i^2 - (np)^2 = \ldots\ldots = npq$ & $SD = \sqrt{npq}$

In B. Dist Mean > Variance

# Binomial Dist

Necessary Condⁿ for B. Dist → There are four N. Conditions;

① Number of Trials (R. Exp) should be finite i.e $n$ = finite

② Each Trial (R. Exp) should be Independent.

③ Each Trial (R Exp) has only two possible outcomes known as success / failure

i.e (Each Trial must be of Bernoullie Type)

④ The prob of success for each Trial (R Exp) should be constant.

Shortcut → whenever we are not sure about the Location of success, we can use B. Dist.

Def$^n$:→ Let X is Discrete Random Variable (DRV) such that it's Probability Mass function (p.m.f) is defined as;

$$\boxed{P(X = r \text{ success}) = {}^nC_r \cdot p^r \cdot q^{n-r}} \quad \text{where } q + p = 1 \begin{cases} p = P(\text{success}) \\ q = P(\text{failure}) \end{cases}$$

then X is Called Binomial Random Variable (B.R.V) & the distribution formed is Called B. Distribution, with parameters n & p.

ie X can be denoted as $X \sim B\{n, p\}$

① Parameter/Statistical Attributes → those Numerical Quantities which are necessary to apply Standard Result are called Parameters

② $X = \{\text{which is Required}\} = \text{success}$

(3) Binomial Dist is as follows:

| $X$ | 0 | 1 | 2 | 3 | ..... | $n$ |
|---|---|---|---|---|---|---|
| $P(X)$ | $p_0$ | $p_1$ | $p_2$ | $p_3$ | ..... | $p_n$ |

where $n$ = Number of Trials & $p_i = P(X = i \text{ success}) = {}^nC_i\, p^i q^{n-i}$

(i) $\text{Mean}(X) = E(X) = \sum_{i=0}^{n} p_i x_i = p_0 x_0 + p_1 x_1 + p_2 x_2 + \cdots + p_n x_n$

$= \cdots\cdots\cdots = np$ learn

(ii) $\text{Var}(X) = E(X^2) - E^2(X) = \sum_{i=0}^{n} p_i x_i^2 - (np)^2 = \cdots\cdots = npq$ learn.

(iii) $S.D(\sigma) = +\sqrt{npq}$.

eg: In case of Binomial Dist;

$$\boxed{\text{Mean} > \text{Variance}}$$

**eg:** A coin is tossed 6 times then find the prob that only 1st two outcomes are H?

Req Prob $= P[HHTTTT] = \left(\frac{1}{2}\right)^2 \cdot \left(\frac{1}{2}\right)^4 = \frac{1}{64}$ fav case $= \{(HHTTTT)\}$

**eg:** A coin is tossed 6 times then Find the prob of getting exactly 2 Heads?

App II Total Cases $= \frac{\text{fav Cases}}{\text{Total Cases}} = \frac{\left(\frac{6!}{2!\,4!}\right)}{2^6} = \frac{15}{64}$

App III (Using Binomial Dist) Req Prob $= {}^6C_2 \cdot p^2 q^4 = 15 \times \left(\frac{1}{2}\right)^2 \times \left(\frac{1}{2}\right)^4 = \frac{15}{64}$

(ii) $P(\text{getting exactly } 3H) = {}^6C_3 \cdot p^3 q^3 = 20 \times \left(\frac{1}{2}\right)^3 \left(\frac{1}{2}\right)^3 = \frac{20}{64}$

**eg:** A coin is tossed 6 times then find the prob that you will get 1st Head in 6th Trial?

$X = \{\text{No. of Heads}\}$, success so $X \sim$ G.Dist so Req Prob $= q^5 p = \left(\frac{1}{2}\right)^5 \left(\frac{1}{2}\right) = \frac{1}{64}$

fav $= (TTTTTH)$

eg: 10 ships are going in an Atlantic ocean then find the prob that exactly 3 will come back if history suggest that out of 11000 ships only 10000 came back?

Sol: $X = \{\text{Number of ships }\underbrace{\text{Coming Back}}\}$ → success

$n = 10$ ships, $p = P(\text{success}) = \frac{10000}{11000} = \frac{10}{11}$, $q = P(\text{failure}) = \frac{1}{11}$

$$\boxed{P(X = r \text{ success}) = {}^{n}C_{r}\, p^{r} q^{n-r}}$$

$$P(X = 3 \text{ Ships}) = {}^{10}C_{3} \left(\frac{10}{11}\right)^{3} \left(\frac{1}{11}\right)^{7} \quad \underline{\text{Ans}}$$

$n = 10$ finite,
ship ≡ Ind.
ship < will come back / will not " "
$p = P(\text{success}) = \frac{10}{11}$ (given)

Q: In a Box 10% items are Defective. If 10 items are choosen at Random then find the prob of getting exactly 2 Def items ?

Sol: $X = \{\text{Number of } \underbrace{\text{Def. items}}\} \rightarrow$ success.

$n = 10$ items, $p = P(\text{Def. item}) = 10\% = 0.1$, $q = P(\text{Non Def.}) = \frac{9}{10}$.

$$\boxed{P(X = r \text{ success}) = {}^nC_r \cdot p^r q^{n-r}}$$

$$P(X = 2 \text{ Def. items}) = {}^{10}C_2 (0.1)^2 (0.9)^8 = 0.194$$

(ii) $P(\text{getting at least one Defective item}) = ? = 1 - P(\text{No def item}) = 1 - P(X = 0 \text{ success}) = 1 - (0.9)^{10}$

A dice is thrown 8 times, find probability that 3 will show (i) exactly 2 times (ii) At least seven times (iii) at least once

$n=8$, $X = \{\underbrace{\text{Number of times 3 is coming}}_{\text{success}}\} = \{0,1,2,3,4,5,6,7,8\}$

$p = P(\text{getting } 3) = \frac{1}{6}$ & $q = P(\text{Not getting}) = \frac{5}{6}$.

$$\boxed{P(X = r \text{ success}) = {}^nC_r\, p^r q^{n-r}}$$

(1) $P(X=2) = {}^8C_2\left(\frac{1}{6}\right)^2\left(\frac{5}{6}\right)^6$

(2) $P(X \geq 7) = P(X = 7 \text{ or } 8) = {}^8C_7\, p^7 q^1 + {}^8C_8 \cdot p^8 \cdot q^0 = 8\left(\frac{1}{6}\right)^7\left(\frac{5}{6}\right) + 1\left(\frac{1}{6}\right)^8 = \frac{41}{6^8}$

(3) $P(X \geq 1) = 1 - P(X=0) = 1 - {}^8C_0\, p^0 q^8 = 1 - \left(\frac{5}{6}\right)^8$ Ans

eg: If Mean & Variance of B.Dist are 4 & 12 resp then find Complete B.Dist.

Sol: ATQ, $np = 4$, $npq = 12 \longrightarrow$ Data WRONG ($\because$ Mean should be greater than Variance)

eg If Mean & Variance of B.Dist are 12 & 4 resp then find Complete B.Dist.

Sol: ATQ, Mean = 12, Var = 4 & $q + p = 1 \Rightarrow p = \frac{2}{3}$

ie $\underbrace{np = 12, \; npq = 4}$

$(12)q = 4 \Rightarrow q = \frac{1}{3}$ & $np = 12$

$n\left(\frac{2}{3}\right) = 12 \Rightarrow n = 18$

So Complete B.Dist $= (q+p)^n = \boxed{\left(\frac{1}{3} + \frac{2}{3}\right)^{18}} = \sum_{r=0}^{18} {}^{18}C_r \left(\frac{2}{3}\right)^r \left(\frac{1}{3}\right)^{18-r} = 1^{18} = 1$

Analysis:- Class $12^{th}$ B.Th, $\boxed{\sum_{r=0}^{n} {}^nC_r\, x^{n-r} \cdot a^r = (x+a)^n}$

$$\sum_{r=0}^{n} {}^nC_r\, p^r q^{n-r} = (q+p)^n$$

In a binomial distribution, the mean is 9 and the standard deviation ($\sigma$) is $\sqrt{6}$. The value of $n$ (total number of trials) and $q$ (probability of failure of the event in each trial) respectively are:

(a) $27, \frac{1}{3}$

(b) $27, \frac{2}{3}$

(c) $36, \frac{3}{4}$

(d) $18, \frac{1}{2}$

ATQ, Mean $= 9$ , S.D $= \sqrt{6}$

i.e. $\underbrace{np = 9}$ & $\sqrt{npq} = \sqrt{6}$

i.e. $npq = 6$

$n\left(\frac{1}{3}\right) = 9$ or $(9)q = 6 \Rightarrow q = \frac{2}{3}$ so $p = \frac{1}{3}$

$n = 27$

A die has four blank faces and two faces marked 3. The chance of getting a total of 12 in 5 throws is

(a) ${}^5C_4\left(\frac{1}{3}\right)^4\left(\frac{2}{3}\right)$ (b) ${}^5C_4\left(\frac{1}{3}\right)\left(\frac{2}{3}\right)^4$

(c) ${}^5C_4\left(\frac{1}{6}\right)^5$ (d) none of these

Various cases for getting Total of 12 are as follows;

fav cases $= \{(3,3,3,3,0) \ldots\ldots ?\}$

ie in order to get Total of 12 we need exactly 4 times '3'

$X = \{\underbrace{\text{Number of times } 3 \text{ occurs}}_{\text{Success}}\}$

$p = \frac{2}{6} = \frac{1}{3}$ & $q = \frac{2}{3}$, $n = 5$

$P(X = r \text{ success}) = {}^nC_r\, p^r q^{n-r}$

so $P(X=4) = {}^5C_4\left(\frac{1}{3}\right)^4\left(\frac{2}{3}\right)^1$

The probability that a screw manufactured by a company is defective is 0.1. The company sells screws in packets containing 5 screws and gives a guarantee of replacement if one or more screws in the packet are found to be defective. The probability that a packet would have to be replaced is ______.

(a) 0.2 (b) 0.59

(c) 0.41 (d) 0.5

$X = \{\text{Number of Defective screws}\} \rightarrow$ success

$n = 5$ screws, $p = P(\text{Def. screws}) = 0.1$, $q = P(\text{Non Def screw}) = 0.9$

$P(\text{Packet will be Replaced}) = P(X \geq 1) = 1 - P(X = 0)$

$= 1 - {}^5C_0\, p^0 q^5 = 1 - q^5 = 1 - (0.9)^5 = 0.41$

**Analysis:** $P(\text{packet will be Replaced}) = 0.41 = \frac{0.41}{1} = \frac{41}{100}$

i.e. 41% packets sold, must be Replaced.

(Q) If company sells 10000 packets then find the number of packets, company will have to Replace?

Ans = 41% of 10000 = 4100 packets.

# ANALYSIS OF HYPERGEOMETRIC & BINOMIAL DIST

- If we are performing R.Exp one by one w/o Replacement then we can also use the concept of Hypergeometric Dist.
- If we are performing R.Exp one by one with Replacement then we can also use the concept of Binomial Distribution

Q: A Box contains 4 R and 3 B Marbles and we want to draw 3 Marbles one by one <u>without</u> Replacement then Find the probability of drawing 1R & 2 B Marbles?

**(M-I) By Making Cases →**

Req Prob $= P[RBB \text{ or } BRB \text{ or } BBR]$

$$= \left(\frac{4}{7}\times\frac{3}{6}\times\frac{2}{5}\right) + \left(\frac{3}{7}\times\frac{4}{6}\times\frac{2}{5}\right) + \left(\frac{3}{7}\times\frac{2}{6}\times\frac{4}{5}\right)$$

$$= \left(\frac{4}{7}\times\frac{3}{6}\times\frac{2}{5}\right)\times 3$$

**(M-II) Using Hypergeometric Distribution**

Shortcut Method.

7M

4R  3 M  3B

1R  2B

$$\text{Req Prob} = \frac{{}^4C_1 \times {}^3C_2}{{}^7C_3} = \left(\frac{4}{7}\times\frac{3}{6}\times\frac{2}{5}\right)\times 3$$

Q: A Box Contains 4 R and 3 B Marbles and we want to draw 3 Marbles one by one (with) Replacement then Find the probability of drawing 1R & 2 B Marbles?

M-I By Making Cases :→

Req Prob = $P\left[RBB \text{ or } BRB \text{ or } BBR\right]$

$= \left(\frac{4}{7}\times\frac{3}{7}\times\frac{3}{7}\right) + \left(\frac{3}{7}\times\frac{4}{7}\times\frac{3}{7}\right) + \left(\frac{3}{7}\times\frac{3}{7}\times\frac{4}{7}\right)$

$= \left(\frac{4}{7}\times\frac{3}{7}\times\frac{3}{7}\right)\times 3$

M-II Using Binomial Distribution :→

$n=3$, $X = \{\text{No. of } \underbrace{\text{Red Marbles}}\}$ → success.

$p = P(RM) = \frac{4}{7}$, $q = P(BM) = \frac{3}{7}$

$P(X=r) = {}^nC_r\, p^r q^{n-r}$

$P(X = 1RM) = {}^3C_1\left(\frac{4}{7}\right)\left(\frac{3}{7}\right)^{3-1}$

$= 3\times\frac{4}{7}\times\left(\frac{3}{7}\right)^2$

Q. There are 10 Calci on a Table in which 6 are Defective & 4 are Non Def. & we want to draw three Calci one by one w/o Replacement then find the prob that there will be exactly one Defective?

**(M-I) By Making Cases →**

Req Prob = P[DNN or NDN or NND]

$$= \left(\frac{6}{10}\cdot\frac{4}{9}\cdot\frac{3}{8}\right) + \left(\frac{4}{10}\cdot\frac{6}{9}\cdot\frac{3}{8}\right) + \left(\frac{4}{10}\cdot\frac{3}{9}\cdot\frac{6}{8}\right)$$

$$= \left(\frac{6}{10}\times\frac{4}{9}\times\frac{3}{8}\right)\times 3$$

**(M-II) Using Hypergeometric Dist →**

10 Calci

6 Def → 1 Def

3 Calci

4 Non Def → 2 N Def

$$\text{Req Prob} = \frac{{}^6C_1 \times {}^4C_2}{{}^{10}C_3} = \left(\frac{6}{10}\times\frac{4}{9}\times\frac{3}{8}\right)\times 3$$

Q. There are 10 Calci on a Table in which 6 are Defective & 4 are Non Def. & we want to draw three Calci one by one with Replacement then find the prob that there will be exactly one Defective ?

M-I By Making Cases →

Req Prob = $P\{DNN \text{ or } NDN \text{ or } NND\}$

$= \left(\frac{6}{10}\frac{4}{10}\frac{4}{10}\right) + \left(\frac{4}{10}\frac{6}{10}\frac{4}{10}\right) + \left(\frac{4}{10}\frac{4}{10}\frac{6}{10}\right)$

$= \left(\frac{6}{10} \times \frac{4}{10} \times \frac{4}{10}\right) \times 3$

M-II By Binomial Dist

$X = \{\text{Number of } \underbrace{\text{Defective Calci}}\} \rightarrow$ Success

$n = 3$, $p = P(\text{Def Calci}) = \frac{6}{10}$ & $q = \frac{4}{10}$

$P(X = \text{Def Calci}) = {}^3C_1\, p^1 q^2 = 3 \times \frac{6}{10} \times \left(\frac{4}{10}\right)^2$

# POISSON DISTRIBUTION

It is a particular case of Binomial Dist under following conditions;

1. $n \to \infty$ (very large)
2. $p \to 0$ (very small)
3. $np \to \lambda$ (i.e. constant)

} these 3 conditions will be taken as Necessary conditions for Poisson Dist.

**Shortcut** :→ whenever we are not sure about $n$ But we can find it's Average Value $\lambda$ then we can apply Poisson Distribution

**Important Conclusion** :-

$$\underset{(n \,\&\, p \text{ given})}{(\text{B. Dist})} \Longrightarrow \underset{(\lambda = \text{can be calculated})}{(\text{P. Dist.})}$$

$$\not\Longleftarrow$$

But take care; if $n$ is small use Binomial & if $n$ is large use Poisson

**Defⁿ:** Let $X$ is D.R.V s.t it's p.m.f is defined as

$X \sim B\{n, p\}$

$X \sim P\{\lambda\}$

$X \sim G\{p\}$

$$\boxed{P(X = r \text{ success}) = \frac{e^{-\lambda} \cdot \lambda^r}{r!}}$$

then $X$ is called Poisson Random Variable with parameter $\lambda$ & it is denoted as $X \sim P\{\lambda\}$

**Note** ① $X = \{$ which is Required $\}$ success.

② Prob Dist:

| $X$: | 0 | 1 | 2 | 3 | 4 | ---- | $n$ |
|---|---|---|---|---|---|---|---|
| $P(x)$: | $p_0$ | $p_1$ | $p_2$ | $p_3$ | $p_4$ | --- | $p_n$ |

where $\sum p_i = 1$

③ Mean $(x) = E(x) = \sum p_i x_i = p_0 x_0 + p_1 x_1 + \dots + p_n x_n$

$= \dots\dots\dots = \lambda$ = Average

④ $\boxed{Var(x) = E(x^2) - E^2(x)} = \sum p_i x_i^2 - (\lambda)^2 = \dots\dots = \lambda$

⑤ $S.D(\sigma) = +\sqrt{\lambda}$ eg In case of POISSON Dist., Mean = Variance.

⑥ $\lambda \longrightarrow$ Average per unit time or Average per unit data

eg(i) If on an Average 5 Customers arrive at ticket window per min then $\lambda = 5$ /min

eg(ii) " " " 1 Customer arrives at " " in every 5 mins then $\lambda = \frac{1}{5}$ /min

eg(iii) " " " 3 " " " " " in a time span of 5 mins then

$\lambda = \frac{3}{5}$ per min.

H. Q. In a Bike Race, the probability of a Motorist being killed in a accident in $\frac{1}{2400}$ then find the prob that, in a Race having 200 motorist,

(i) there will be No Fatal accident

(ii) " " " at least one Fatal accident.

M-I Using Binomial Dist$^n$ — $X = \{$Number of $\underbrace{\text{Fatal accidents}}_{\text{success}}$ in one Race$\}$

$n = 200$, $p = P(F.A) = \frac{1}{2400}$ ; $q = \frac{2399}{2400}$.

① $P(X = 0\,FA) = {}^{200}C_0\, p^0 q^{200} = 1 \times 1 \times \left(\frac{2399}{2400}\right)^{200} = 0.92 = \frac{0.92}{1} = \frac{92}{100}$.

② $P(X \geq 1) = 1 - P(X = 0) = 1 - 0.92 = 0.08$.

M-II Using Poisson Dist → $X = \{\text{No. of F.A in one Race}\}$

$n = 200$ (very large)

$p = \frac{1}{2400}$ (very small)

$Av = \lambda = np = \frac{200}{2400} = \frac{1}{12}$

$P(X = r \text{ success}) = \frac{e^{-\lambda}\lambda^r}{r!}$

① $P(X = 0 \text{ FA}) = \frac{e^{-\lambda}\lambda^0}{0!} = e^{-\frac{1}{12}} = 0.92$

② $P(X \geq 1) = ? = 1 - P(X=0) = 0.08$

Analysis: $p = P(F.A) = \frac{1}{2400}$

i.e. out of 2400 Bikers, Av. No. of F.A in one R = 1

So " " 200 " , Av No. of FA in one Race

$= \frac{1}{2400} \times 200 = \frac{1}{12}$ in one Race.

i.e. $\lambda = \frac{1}{12}$ per Race.

Now proceed as before - - - - -

Q. If $X$ is P.R.V s.t $\boxed{P(X=1) = P(X=2)}$ then find Variance of $X$?

(a) $\infty$

(b) 1

(c) 2 ✓

(d) $\sqrt{2}$

$$\frac{e^{-\lambda}\cdot\lambda^{1}}{1!} = \frac{e^{-\lambda}\cdot\lambda^{2}}{2!}$$

$$\lambda = \frac{\lambda^2}{2}$$

$$\lambda^2 - 2\lambda = 0$$

$$\lambda(\lambda - 2) = 0$$

$$\lambda = 0 \text{ or } 2$$

Neglect $\lambda = 0$

so we can take $\lambda = 2$ ✓

In P. Dist,

Mean = Var = $\lambda$ = 2

The second moment of a Poisson-distributed random variable is 2. The mean of the random variable is ............

Mean $= E(x)$

$2^{nd}$ Moment $= E(x^2)$

$3^{rd}$ Moment $= E(x^3)$

⋮

$E(x^2) = 2$ (given)

w.k. that for P. Dist, mean $=$ Var $= \lambda$ ⟹ $E(x) = \lambda$

so $\boxed{Var(X) = E(X^2) - (E(X))^2}$

so $\lambda \geq 0$

$\lambda = E(X^2) - (\lambda)^2$

$\lambda = 2 - \lambda^2$

$\boxed{\lambda^2 + \lambda - 2 = 0} \Rightarrow (\lambda + 2)(\lambda - 1) = 0$

$\lambda = \cancel{-2}, 1$ so $\boxed{\lambda = 1}$

The number of accidents occurring in a plant in a month follows Poisson distribution with mean as 5.2. The probability of occurrence of less than 2 accidents in the plant during a randomly selected month is

(a) 0.029 (b) 0.034

(c) 0.039 (d) 0.044

$X = \{\text{Number of } \underbrace{\text{Accidents}}_{\text{success}} \text{ in one month}\}$

Av No of Accidents in one Month $\lambda = 5.2$

$P(X = r \text{ success}) = \dfrac{e^{-\lambda}\cdot\lambda^r}{r!}$

$P(X<2) = P(X \le 1)$

$= P(X=0) + P(X=1)$

$= \dfrac{e^{-\lambda}\cdot\lambda^0}{0!} + \dfrac{e^{-\lambda}\cdot\lambda^1}{1!}$

$= e^{-5.2}[1+\lambda] = \dfrac{6.2}{e^{5.2}}$

$= 0.034$

Q. find the prob of getting Head in a Radomly performed single toss of a fair coin.

(M-I) $P(H) = \frac{1}{2}$ ✓

(M-II) ~~Req Prob = P(toss is Performed) × P(getting Head)~~

$$\cancel{= \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}}$$

it is nothing But JADA DIMAAG LAGANE KA NATIZAA.

It is estimated that the average number of events during a year is three. What is the probability of occurrence of not more than two events over a two-year duration? Assume that the number of events follow a poisson distribution.

(a) 0.052
(b) 0.062
(c) 0.072
(d) 0.082

$X = \{$ Number of $\underbrace{\text{Events}}_{\text{success}}$ in 2 yrs $\}$

Av No of Events $\lambda = 3$ Events per yr $= 6$ Events per two yrs

$$P(X = r \text{ success}) = \frac{e^{-\lambda} \cdot \lambda^r}{r!}$$

$$P(X \le 2) = P(X = 0 \text{ or } 1 \text{ or } 2)$$

$$= P(X=0) + P(X=1) + P(X=2)$$

$$= e^{-\lambda}\left[\frac{\lambda^0}{0!} + \frac{\lambda^1}{1!} + \frac{\lambda^2}{2!}\right]$$

$$= e^{-6}\left[1 + 6 + \frac{6^2}{2}\right] = \frac{50}{2e^6}$$

(b)

# GEN Z LANGUAGE

SP, FC, BM, YT

DPP, WT, O.T.S, asap

Q

R → ∞ pen
B → ∞ "
G → ∞ "
Y → ∞ "

, we can take only 3 pens.

Total possibilities = either all 3 of same colour → ${}^4C_1 = 4$ ways

or

All three are of diff colour → ${}^4C_3 = 4$ ways.

or

Two are of same colour & 1 of diff colour → ${}^4C_1 \times {}^3C_1 = 12$ ways.

$$\text{Req Prob} = \frac{\text{fav}}{\text{Total}} = \frac{\text{all three are of same colour}}{\text{Total cases}} = \frac{4}{4+4+12} = \frac{4}{20} = \frac{1}{5}$$

TAGDAA Question →

Q. wireless sets are manufactured with $\boxed{25}$ soldier joints each. on an Average one joint in 500 is defective. Then find the number of wireless sets to be free from defective joints in a consignment of 10000 sets?

(a) 488

(b) 9512

(c) 500

(d) 9500

Thank

YOU