Roll No.

Tutorial-3

Q.1)

Event A :- Draw a 47Ω resistor.
Event B :- Draw a resistor with 5% tolerance
Event C :- Draw a 100Ω resistor

$P(A) = \frac{44}{100}$ $P(B) = \frac{52}{100}$ $P(C) = \frac{32}{100}$

Event D :- Selecting 22Ω resistance
Event E :- Selecting resistance with 5% tolerance and 22Ω resistance.

$P(D) = \frac{24}{100} = 0.24$ $P(E) = \frac{16}{100} = 0.10$

Q.2)

a) Production of Plant A, B and Core

$P(A) = 0.5$ $P(B) = 0.3$ $P(C) = 0.2$

$P\left(\frac{D}{A}\right) = 002$ $P\left(\frac{D}{B}\right) = 0.05$ $P\left(\frac{D}{C}\right) = 0.01$

$P(D) = P\left(\frac{D}{A}\right)P(A) + P\left(\frac{D}{B}\right)P(B) + P\left(\frac{D}{C}\right)P(C)$

$= (0.010 + 0.015 + 0.020)$

$= 0.045$

b) $P(B/D) = \frac{P(D/B)\,P(B)}{P(D)} = \frac{0.015}{0.045} = \frac{1}{3}$

Q.3)

⇒ Manufactured by A, B and C are P(A), P(B) and P(C)

Event D :- Defective

$$P(D) = P\left(\frac{D}{A}\right)P(A) + P\left(\frac{D}{B}\right)P(B) + P\left(\frac{D}{C}\right)P(C)$$

$$= (0.04 \times 0.3) + (0.05 \times 0.3) + (0.03 \times 0.4)$$

$$= 0.039$$

$$\therefore P(A/D) = \frac{P(D/A)P(A)}{P(D)} = \frac{0.012}{0.039} = \frac{4}{13}$$

$$\therefore P(B/D) = \frac{P(D/B)P(B)}{P(D)} = \frac{5}{13}$$

$$\therefore P(C/D) = \frac{P(D/C)P(C)}{P(D)} = \frac{4}{13}$$

Q.4)

⇒ Event A :- From Bag A

Event B :- From Bag B

Event R_c :- Red Ball

Event B_l :- Black Ball

$P(R_c/A) = 3/7$ $\quad P(B_l/A) = 4/7$

$P(R_c/B) = 5/11$ $\quad P(B_l/B) = 6/11$

$$P(B/R_0) = \frac{P(R_0/B)\,P(B)}{P(R_0)}$$

$$= \frac{5/11}{3/7 + 5/11} = \frac{5/11}{68/77}$$

$$= \frac{35}{68}$$

5)

$$\Rightarrow P(\text{tail}) = \frac{1}{2} \qquad P(\text{getting } 2) = \frac{1}{6}$$

$$P(\text{tail} \cap \text{getting } 2) = P(\text{tail}) \cdot P(\text{getting } 2)$$

$$= \frac{1}{12}$$

7) $$P(D) = P\left(\frac{D}{A}\right)P(A) + P\left(\frac{D}{B}\right)P(B) + P\left(\frac{D}{C}\right)$$

$$= \frac{0.35}{3} = \frac{7}{60} = 0.11$$

8)

$$\Rightarrow P(\text{solved}) = \left(\frac{1}{2} + \frac{1}{3} + \frac{2}{3} + \frac{1}{5} + \frac{1}{6}\right) \times \frac{1}{5}$$

$$= \left(\frac{15 + 30 + 6 + 5}{30}\right) \times \frac{1}{5}$$

$$= \frac{56}{150} = 0.37$$

9)

⇒ $P(A \cup B) = P(A) + P(B)$

mutually exclusive

10)

⇒ $P(A \cup B) = P(A) + P(B)$ and $P(A \cap B) = 0$

if A & B are mutually exclusive

11)

⇒ a) | * | * | * | *

Total 4 digit numbering with repetation $= (4)^3$

$= 64$

b) Total 4 digit numbering $= 2 \times 3 \times 1 = 6$

without repetation

c) | * | * | * | 2

$(4)^3 = 64$

d) Total 4 digit numbering $= 2 \times 3 \times 1 = 6$

without repetation

12)

| M | A | T | H | E | M | A | T | I | C | S |

Vowels :- A, E, A, I

Consonants → M, T, H, M, T, C, S

No. of Parameters possible $= \frac{8!}{2! \times 2!} = \frac{4!}{2!}$

$= \frac{8 \times 7 \times 12 \times 8}{2}$

$= 720960$

13)

⇒ Event A: Part A
Event B: Part B
Event D: Defective Part

$P(A) = 0.25$ $\quad P(B) = 0.75$

$P(D|A) = 0.04$ $\quad P(D|B) = 0.02$

$$P(B|D) = \frac{P(D|B)\,P(B)}{P(D)}$$

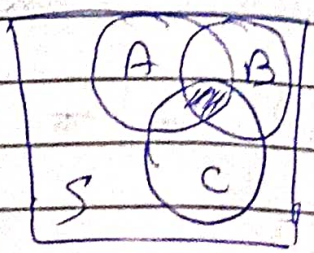
$$= \frac{0.02 \times 0.75}{0.02 \times 0.075 + 0.04 \times 0.25}$$

$$= \frac{0.0614}{0.06 + 0.04/4} = \frac{6}{10} = 0.6$$

14)

⇒ i) $P(B \text{ or } C \text{ but not } A)$

$= P(B \cup C) - P(A \cap B) - P(A \cap C) + P(A \cap B \cap C)$



ii) $P(\text{Exactly one events occur})$

$= P(A \cup B \cup C) - P(A \cap B) - P(B \cap C) - P(A \cap C) + 2P(A \cap B \cap C)$

iii) $P(\text{Exactly two events occur}) = P(A \cap B) + P(B \cap$
$+ P(C \cap A) - 3P(A \cap B$

15)

⇒ $P(A \cap B) = 0.5$ $\quad P(A) = 0.20$ $\quad P(B) = 0.35$

$P(A) + P(B) = 0.55$ $\quad P(A \cup B) = P(A) + P($

∴ So A and B are mutually exclusive