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SECTION : SE (R)

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ASSIGNMENT # 02

QUESTION # 01

Let,

a = Electronic Components

$P(a > 6000) = 0.42$

$P(a \leq 4000) = 0.04$

(a) $P(a \leq 6000) = 1 - P(a > 6000)$

$= 1 - 0.42$

$= 0.58$

(b) $P(a > 4000) = 1 - P(a \leq 4000)$

$= 1 - 0.04$

$= 0.96$

QUESTION # 02

$P(B) = 0.25$ $\quad P(F) = 0.17$

$P(T) = 0.18$ $\quad P(A) = 0.40$

(a) According to statment,

$P(B \cap F) = 0.15.$

$P(B \cup F) = P(B) + P(F) - P(B \cap F)$

$= 0.25 + 0.17 - 0.15$

$P(B \cup F) = 0.27$

(b) $P(\text{No Defects}) = 1 - P(B \cup F)$

$= 1 - 0.27$

$= 0.73$

QUESTION # 03

Total in Physics Class , 10 J - 30 S - 10 G

Having Grade 'A' , 3 J - 10 S - 5 G

$$P(S/A) = \frac{P(S \cap A)}{P(A)} \quad \text{--- (i)}$$

$$P(A) = \frac{n(A)}{S(A)} = \frac{3+10+5}{10+10+30} = \frac{9}{25}$$

$$P(S \cap A) = \frac{10}{50} = \frac{1}{5}.$$

Hence, putting in (2)

$$P(S/A) = \frac{1}{5} \times \frac{25}{9}$$

$$P(S/A) = 5/9.$$

QUESTION # 04

$$P(A) = P(B) = 0.96$$ ∴ Two Fire Engines Specific when needed

(a)

$$A' = 1 - A = 1 - 0.96$$

$$A' = 0.04.$$

$$B' = 1 - B = 1 - 0.96$$

$$B' = 0.04.$$

$$P(A' \cap B') = P(A') \cdot P(B')$$

$$= (0.04) \cdot (0.04)$$

$$P(A' \cap B') = 0.0016.$$

(b)

$$P(A \cup B) = 1 - P(A' \cap B')$$

$$= 1 - 0.0016$$

$$P(A \cup B) = 0.9984$$

QUESTION # 05

Spades (4) Club (1)

Diamonds (6) Hearts (2)

The Number of Bridge Hands $= {}^{13}C_4 \cdot {}^{13}C_6 \cdot {}^{13}C_1 \cdot {}^{13}C_2$

$= 715 \times 1716 \times 13 \times 78$

$= 1244117160$

QUESTION # 06

$P(1) = 70\% = 0.7$ $P(E/1) = 0.02$

$P(2) = 30\% = 0.3$ $P(E/2) = 0.04$

using Bayers Theorem,

$$P(E/1) = \frac{P(E \cap 1)}{P(1)}$$ hence,

$$P(1/E) = \frac{P(1 \cap E)}{P(E)} = \frac{P(E/1) \cdot P(1)}{P(E)}$$

$P(E) = P(1) \times P(E/1) + P(2) \times P(E/2)$

$= 0.7 \times 0.02 + 0.3 \times 0.04$

$= 0.014 + 0.012$

$P(E) = 0.26.$

$$P(1|E) = \frac{P(E|1) \cdot P(1)}{P(E)} = \frac{0.02 \times 0.7}{0.026}$$

$$= \frac{0.014}{0.026}$$

$$P(1|E) = 0.5385$$

Hence,

$$P(2|E) = 1 - P(1|E)$$

$$= 1 - 0.5385$$

$$P(2|E) = 0.4615.$$

Therefore, Engineer 1 more likely did job.

QUESTION # 07

$$P(D) = 20\% = 0.2$$

(a) $$P(D_1 \cdot D_2 \cdot D_3) = P(D_1) \cdot P(D_2) \cdot P(D_3)$$

$$= (0.2)^3$$

$$= 0.008$$

(b) Suppose, X is the event of 3 out of 4 are defective

$$P(X) = {}^4C_3 = 4.$$

$$P(D_1 \cdot D_2 \cdot D_3) = 0.008$$

$$P(\text{One is not Defective}) = 1 - P(D) \Rightarrow 1 - 0.2$$

$$= 0.8.$$

$P(X) = {}^4C_3 \times P(D_1 D_2 D_3) \times P(\text{one is not defective})$

$P(X) = 4 \times 0.008 \times 0.8$

$P(X) = 0.0256.$

QUESTION # 08.

(a) The Probabilities Sum is not equal to 1.

Hence,
Sum of Probabilities exceed 1.

$(\because 0.19 + 0.38 + 0.29 + 0.15 = 1.01)$

(b) The Probabilities Sum is not equal to 1.

Hence,
Sum of Probabilities is less then 1

$(\because 0.40 + 0.52 = 0.92)$

(c) Probabilities cannot be negative. Hence, this is a negative probability.

(d) If you only select one card, the probability of selecting a heart and a black card is zero because no, heart card is black and obviously, no black card is Hearts. So, Probability of both a heart and a black card is 0.