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Q1

Total Student = 200

maths = 120   sci = 80

both = 56

probability of stud. like both subjects = ?

$$P(A) = \frac{50}{200} = 0.25 \qquad \text{Ans}$$

Q2

machine A = 0.60

machine B = 0.40

defect A = 0.05

defect B = 0.10

$$P(D) = (0.60 \times 0.05) + (0.40 \times 0.10)$$

$$= 0.03 + 0.04$$

$$P(D) = 0.07$$

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

$$= \frac{0.10 \times 0.40}{0.07}$$

$$P(B|D) = 0.571 \qquad \text{Ans}$$

Q3

Total = 10

apples = 6

oranges = 4

$$P(O) = 4/10 = 0.4 \quad \text{Ans}$$

Q4

$P(C) = 0.01$ having condition

$P(\neg C) = 0.99$ not having

$P(\text{Positive}|C) = 0.90$ (true positive rate)

$P(\text{Positive}|\neg C) = 0.10$ (false positive rate)

$P(\text{Positive}) = P(C) * P(\text{Pos}|C) + P(\neg C) * P(\text{Pos}|\neg C)$

$= (0.01 \times 0.90) + (0.99 \times 0.10)$

$= 0.108$

$P(C|\text{Pos}) = \dfrac{P(\text{Pos}|C) \cdot P(C)}{P(\text{Positive})}$

$= \dfrac{0.90 \times 0.01}{0.108} = 0.083$ **Ans**

Q5

total $= 300$ java $= 100$

both $= 50$ python $= 180$

~~P(both) =~~ $\dfrac{50}{300}$

$P(P \cup J) = P(P) + P(J) - P(\text{Both})$

$= 100 + 180 - 500 = 230$

$= \dfrac{230}{300} = 0.7667$ **Ans**

Q6

$P(R) = 0.6$ it rain

$P(U|R) = 0.9$ carry umbrella given it rain

$P(R \cap U) = P(R) \times P(U|R)$

$= 0.6 \times 0.9 = 0.54$ **Ans**

Q7 P(Passed) = 0.7
P(Studied | Passed) = 0.8   Ans

Q8

Total = 36
favourable outcomes = 6

$$P\left(\text{sum is } 7\right) = \frac{6}{36} = \frac{1}{6} = 0.1667 \text{ Ans}$$

Q9 Total balls = 10.
red = 3   Green = 2   blue = 5
red   or green =   5
$$= \frac{5}{16} = 0.5 \text{ Ans}$$

Q10 P(Public transport) = 0.30
P(Student | Public transp) = 0.60

P(Student ∧ Public transport) = P(P.t) * P(Student | P.t)
  = 0.30 × 0.60 = 0.18   Ans

Q4 P(Tea) = 0.40
P(Coffee) = 0.50
P(Tea and Coffee) = 0.20

P(Tea or Coffee) = 0.40 + 0.50 − 0.20
  = 0.76

Q12

$2^3 = 8$

favourable outcome = 3

$$P(\text{two head}) = \frac{3}{8} = 0.375 \quad \text{Ans}$$

Q13

$P(\text{Pos feed}) = 0.5$

$P(\text{Sec} | \text{Pos feed}) = 0.60$

$P(\text{Sec} | \text{no fee}) = 0$

$P(\text{Sec}) = (0.5 * 0.60) + 0$

$= 0.30$

$$P(\text{Pos feed} | \text{Sec}) = \frac{0.60 * 0.50}{0.30} = 1 \quad \text{Ans}$$

Q14.

$P(\text{veg}) = 0.40$

$P(\text{non veg}) = 0.35$

$P(\text{veg and non veg}) = 0.20$

$P(\text{veg or non veg}) = 0.40 + 0.35 - 0.20$

$= 0.55 \quad \text{Ans}$

Q15.   Total = 1000   repeat = 300

new buyer = 400   repeat and loyal = 200

$$P(\text{Repeat and loyal}) = \frac{200}{1000} = 0.20 \quad \text{Ans}$$

Q16

P(lower risk| Exec) = 0.90
P(lower risk| no Ex) = 0.10
P(Ex) = 0.60
P(no Ex) = 1 - P(Ex)
$$= 1 - 0.60 = 0.40$$

P(lower risk) = (0.60 × 0.90) + (0.40 × 0.10)
P(lower risk) = 0.58   Ans.

Q17

total = 500   both = 150
Comp = 250   maths = 100

Student in Comp = 250 + 150 = 400
Student in maths = 100 + 150 = 250

P(Comp or Maths) = 400 + 250 - 150

$$= \frac{500}{500} = 1 \quad Ans$$

Q18

P(Exceed Expectation) = 0.30
P(Promotion | Excellet Perf) = 0.50   Ans

Q19

P(Survey | Quiz) = 0.25
P(Share result | Survey) = 0.40
P(Quiz and Share result) = 0.25 × 0.40
$$= 0.10 \quad Ans$$

Q20

P(smartphone) = 300
P(tablet) = 200

P(smartphone and Tablet) = 0.25 * 500
$$= 125$$

P(smart or tablet) = 300 + 200 - 125
$$= 375$$

$$= \frac{375}{500} = 0.75 \quad Ans$$

Q21

P(Visit | Rec Offer) = 0.70
P(Purchase | Visit) = 0.50

P(Visit and Purchase) = 0.70 × 0.50
$$= 0.35 \quad Ans$$

Q22

P(Satisfied and Prod.) = $\dfrac{500}{1000}$
$$= 0.50 \quad Ans$$

Q23

P(A) = 0.50 × 800 = 400
P(B) = 0.30 × 800 = 240
P(A ∩ B) = 0.20 × 800 = 160

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

$$= 400 + 240 - 160 = 480$$

$$= \frac{480}{800} = 0.60 \quad Ans$$

Q24.

$$P(M \cup S) = P(M) + P(S) - P(M \cap S)$$
$$= 0.40 + 0.30 - 0.15$$
$$= 0.55 \quad Ans$$