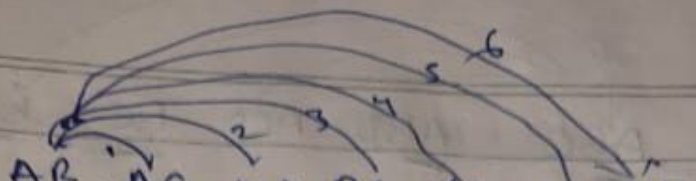
Q1



AB, AC → ABC

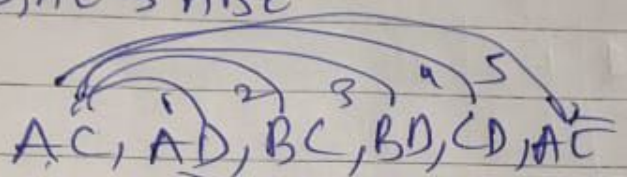
AB, AD → ABD

AB, BC

AB, BD

AB, CD → ABCD

AB, AE → ABE



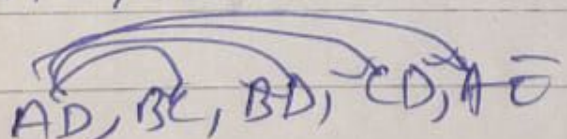
AC, AD → ACD

AC, BC →

AC, BD →

AC, CD →

AC, AE → ACE



Answer :

ABC, ABD, ACD, BCD, ABE, ACE, ADE, BCD, ABCD ✓

Q2

	Y	N
Stolen	5	5

Example-1.1 $E = -\sum_i P_i \log P_i$

$$-\frac{5}{10}\left(\log\frac{5}{10}\right) - \frac{5}{10}\left(\log\frac{5}{10}\right)$$

$$= -\log\left(\frac{5}{10}\right)_2$$

$$= -\log\left(\frac{1}{2}\right)$$

$$= -\log(2^{-1})$$

$$= +\log_2 2$$

$$= 1$$

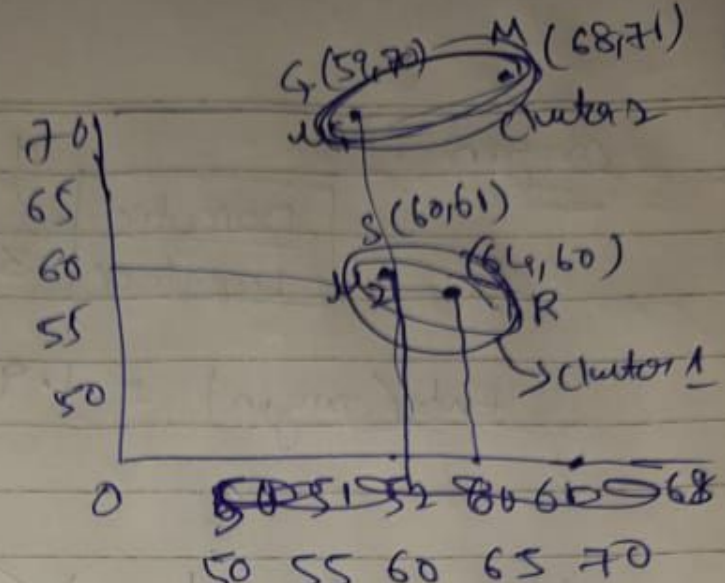
Colour:-

	Y	N
Red	3	2
Yellow	2	3

Red $-\frac{3}{5}\log\left(\frac{3}{5}\right) - \frac{2}{5}\log\left(\frac{2}{5}\right)$ $\left(\frac{5}{10}\right)$

Yello $-\frac{2}{5}\log\left(\frac{2}{5}\right) - \frac{3}{5}\log\left(\frac{3}{5}\right)$ $\left(\frac{5}{10}\right)$

Q4:



$$(S,R) = \sqrt{(64-60)^2 + (61-60)^2}$$

$$= \sqrt{4^2+1} = \sqrt{17} \simeq 4.\text{approx}$$

$$(G,M) = \sqrt{(59-68)^2 + (71-70)^2}$$

$$= \sqrt{9^2+1^2} \simeq 9$$

$(S,M) \rightarrow (SR)$ or (G,M)

$\therefore$ No of clusters $= 2$

Q6

(S,R) ✓

(G,M) ✓

Option D ✓

origin :-

	Y	N
Domestic	2	3
Imported	3	2

Entro(origin) = 1.94

Color 1.94 − 1 ✓ ≈ 1

Tm 1.72 − 1

origin 1.94 − 1 ✓ ≈ 1

$\frac{5}{10}(0.97) + \frac{5}{10}(0.97)$

E (Red) = 0.44 + 0.528

E (Yellow) = 0.44 + 0.528

$w_1 E(\text{Red}) + w_2 E(\text{Yellow})$

$= 2 \times 0.97$

$= 1.94$

Type :-

Type		Y	N
	Sports	4	2
	Guu	1	3

$E(\text{Sports}) = -\frac{4}{6}\log\left(\frac{4}{6}\right) - \frac{2}{6}\left(\log\frac{4}{6}\right)$

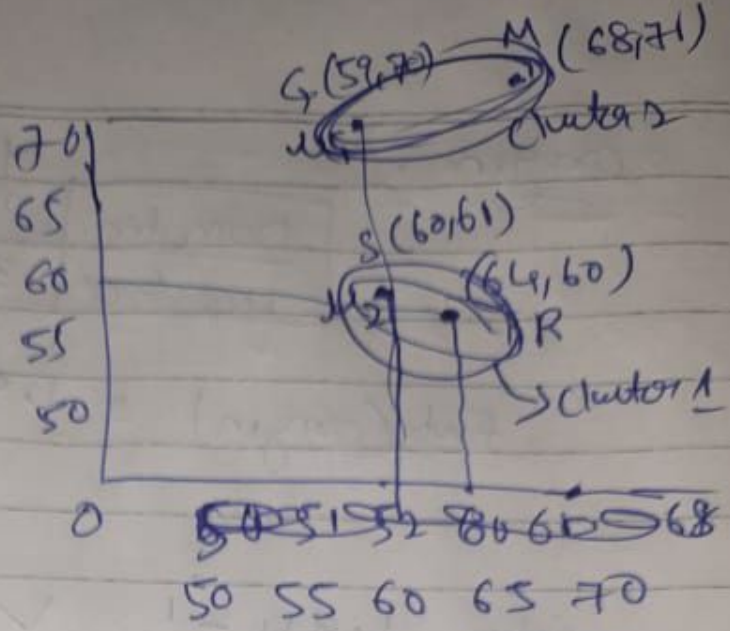
$E(\text{Guu}) = -\frac{1}{4}\log\frac{1}{4} - \frac{3}{4}\log\left(\frac{3}{4}\right)$

$E(\text{Sports}) = -\frac{2}{3}\log\left(\frac{2}{3}\right) - \frac{1}{3}\log 1/3$

$E(\text{Guu}) = -\frac{1}{4}\log(0.25) - \frac{3}{4}\left(\log 2(3)\right)$

$= 1.728$

Q4:



$$(S,R) = \sqrt{(64-60)^2 + (61-60)^2}$$

$$= \sqrt{4^2+1} = \sqrt{17} \approx 4. \text{ approx}$$

$$(G,M) = \sqrt{(59-68)^2 + (71-70)^2}$$

$$= \sqrt{9^2+1^2} \simeq 9$$

$(S,M) \Rightarrow (S,R)$ or (G,M)

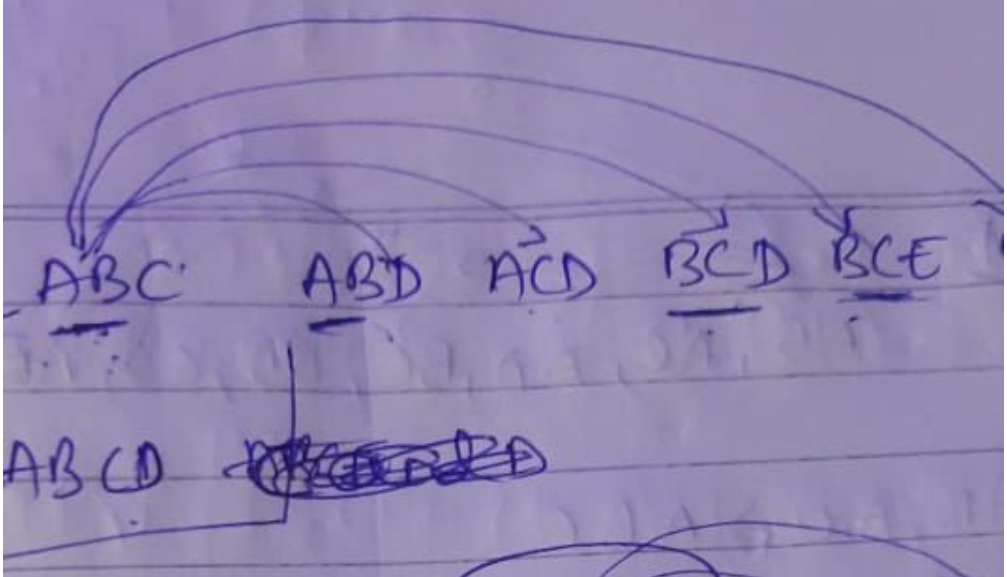
$\therefore$ No of clusters = 2

Q6

(S,R) ✓

(G,M) ✓

Option D ✓



ABCD ~~[illegible]~~

ABD, ACD, BCD, BCE, CA

BCDE

ACDE

ABCD, BCDE, ACDE

Ans:-

$$P(x_1, x_2 \dots | y) = \prod_{i=1}^{n} P(x_i | y)$$

$P(\text{Red} | \text{yes}) = 3/5$
$P(\text{Domestic} | \text{yes}) = 2/5$
$P(\text{SUV} | \text{yes}) = 1/5$

$P(Y) = 1/2$
$P(\bar{Y}) = P(N) = 1/2$
$P(\text{Red} | \text{No}) = 2/5$
$P(\text{Domestic} | \text{No}) = 3/5$
$P(\text{SUV} | \text{No}) = 4/5$

$P(\text{Red}, \text{domestic}, \text{SUV} | \text{yes})$

$$= \frac{3}{5} \times \frac{2}{5} \times \frac{1}{5} \times \frac{1}{2}$$

$$= 0.048 \times \frac{1}{2}$$

$$= 0.024$$