

Reg # FA21-BSE-133

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Course Title: Discrete Structures

Section: A

Assignment: 01

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Q.No:- 01

Let A = Increment in 1st month

B = Increment in 2nd month

Given Data: C = Increment in 3rd month

$$U = 150$$

① $|A| = 65$

② $|B| = 50$

③ $|C| = 45$

④ $|A \cap B| = 30$

⑤ $|A \cap C| = 25$

⑥ $|B \cap C| = 24$

⑦ $|A \cap B \cap C| = 11$

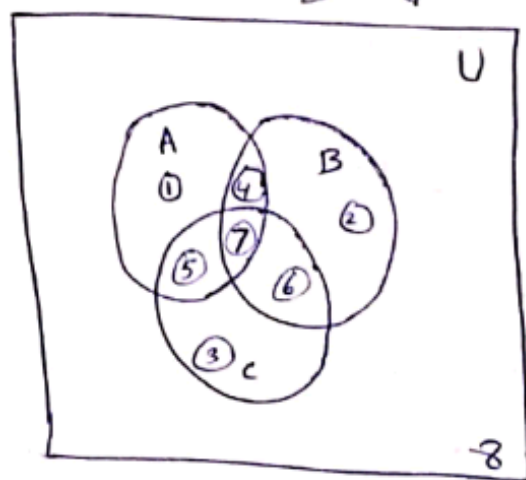
* Exact increment in ④ ⑤ & ⑥

④ $|A \cap B| = 30 - |A \cap B \cap C| = 30 - 11 = 19$

⑤ $|A \cap C| = 25 - |A \cap B \cap C| = 25 - 11 = 14$

⑥ $|B \cap C| = 24 - |A \cap B \cap C| = 24 - 11 = 13$

Ven. Diagram:



a) Only received increment in 1st month

$$|A| = 65 - (4) - (5) - (1)$$

$$= 65 - 19 - 14 - 11$$

$$\boxed{|A| = 21}$$

b) Only received increment in 2nd & 3rd
A $|B \cap C| = ?$

$$|B \cap C| = 24 - |A \cap B \cap C|$$

$$= 24 - 11$$

$$\boxed{|B \cap C| = 13}$$

c) Increment in at least 1 month

$$|A \cup B \cup C| = |A| + |B| + |C| - |A \cap B| - |A \cap C| - |B \cap C| + |A \cap B \cap C|$$

$$= 65 + 50 + 45 - 30 - 25 - 24 + 11$$

$$\boxed{|A \cup B \cup C| = 92}$$

d) Increment in exactly 1 month

$$= |A| + |B| + |C| \quad (\text{in exactly one})$$

$$= 21 + 7 + 7$$

$$= 21 + 14$$

$$\boxed{= 35}$$

$$|B| = 50 - \overset{19}{30} - \overset{13}{24} - 11$$

$$= 7$$

$$|C| = 45 - 13 - 14 - 11$$

$$= 7$$

Q no: - 02

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$$U = 200$$

Let

$A = \text{pakistani}$, $B = \text{British nationality}$, $C = \text{American}$

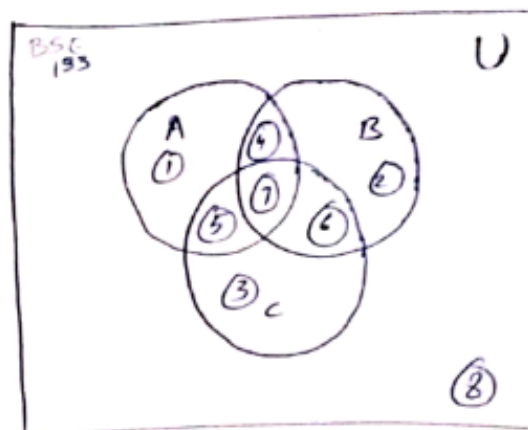
$$(1) |A| = 55 \quad (2) |B| = 72 \quad (3) |C| = 80$$

$$(4) |A \cap B| = 30$$

$$(5) |A \cap C| = 20$$

$$(6) |B \cap C| = 35$$

$$(7) |A \cap B \cap C| = 11$$



a) At least one nationality:

$$|A \cup B \cup C| = |A| + |B| + |C| - |A \cap B| - |A \cap C| - |B \cap C| + |A \cap B \cap C|$$

$$= 55 + 72 + 80 - 30 - 20 - 35 + 11$$

$$|A \cup B \cup C| = 133$$

b) Exactly one nationality:

$$(8) |B \cap C| = 35 - 11 = 24$$

$$(9) |A \cap B| = 30 - 11 = 19$$

$$(10) |A \cap C| = 20 - 11 = 9$$

$$|A| = 55 - 19 - 9 - 11 \Rightarrow 16$$

$$|B| = 72 - 24 - 19 - 11 \Rightarrow 18$$

$$|C| = 80 - 9 - 24 - 11 \Rightarrow 36$$

$$\text{Exact Nationality} = |A| + |B| + |C| = 16 + 18 + 36 = 70$$

Exact nationality = 70

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2) Not having nationality:

= U-133 or U- [AUBUC]

= 200-133

= 67

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