KVS BHOPAL REGION CBT TEST AUG 2023
SUBJECT-MATHEMATICS
CLASS-11

TOPICS:
SETS, RELATIONS AND FUNCTIONS, TRIGONOMETRY

Case Study – 1

In a small town of 10,000 families, it was found that 40% of the families buy newspaper A, 20% buy newspaper B, 10% buy newspaper C, 5% buy A and B, 3% buy B and C and 4% buy A and C. 2% of the families buy all the three newspapers.

Now answer following questions (Q1 to Q4)

Q1. Find the number of families which buy **newspaper A only**.

(a) 3100   (b) 3200 (c) 3300 (d) 3400

<u>Feedback</u>
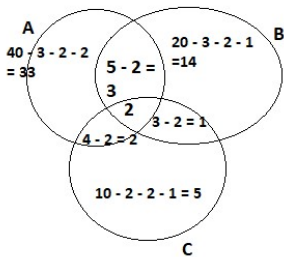
The number of families which buy newspaper $A\ only$
$= (\mathbf{40 - 3 - 2 - 2})\%\ \boldsymbol{of}\ 10000$
$= \frac{33}{100} \times \mathbf{10000} = \mathbf{3300}$

Q2. Find the number of families which buy **exactly two newspapers**.

(a) 200   (b) 600 (c) 800 (d) 1000

<u>Feedback</u>

The number of families which buy **exactly** $\boldsymbol{two\ newspapers}$
$= (3 + 2 + 1)\%\ of\ 10000$
$= \frac{6}{100} \times 10000 = 600$

 Q3. Find the number of families which buy **none of the newspapers A, B and C**.

(a) 6000   (b) 4400 (c) 4200 (d) 4000

Q4. Find the number of families which buy **exactly one newspaper**.

(a) 4800   (b) 5200 (c) 6000 (d) 4000

Case Study 2

After school hours, Manisha, student of class XI is attending hobby classes and doing a designing course. Now a days she is working on a canvas similar to cartesian plane. For making a particular design she wants to take x-coordinate from the set A={0,1,2,3,5} and y-coordinate from the set B={-3,-2,-1,0,1,2,3}

Based on the above information answer the following questions (Q5 to Q7)

Q5. How many ordered pairs Manisha can make from A to B ?

(a) 12   (b) 30 (c) 35 (d) 40

Q6. If a relation from A To B is defined as R = { (a , b): a < b, a $\in$ A , b $\in$ B}.

Then how many elements are there in R

(a) 6   (b) 8 (c) 12 (d) 20

Q7. How many total relations can be defined from the Set A to the set B?

(a) 2^5 (b) 2^7 (c) 2^{12} (d) 2^{35}

Q8. Assertion (A): If A and B are two sets such that, n(A) = 3, n(B) = 6 and $A \subset B$, then the number of elements in AUB is 9.

Reason (R): If A and B are disjoint sets, then n (AUB) is n (A) + n (B).

(a)A is true, R is true; R is a correct explanation of A.

(b)A is true, R is true; R is not a correct explanation of A.

(c) A is true; R is false.

(d) A is false; R is true.

Feedback

Assertion (A) is false as
$\because A \subset B$
$\therefore A \cup B = B$
$\Rightarrow n(A \cup B) = n(B) = 6$
Reason (R): True

Q9.The value of tan 1° tan 2° tan 3° ... tan 89° is

(a) 0 (b) 1 (c) -1 (d) not defined

Feedback

$tan\ 1^0\ tan\ 2^0\ tan\ 3^0\ ....tan\ 8\ 9^0$
$= tan\ 1^0\ tan\ 2^0\ tan\ 3^0\ ....tan\ 4\ 5^0.....tan(90^0 - 3^0)\ tan(90^0 - 2^0)\ tan(90^0 - 1^0)$
$= tan\ 1^0\ tan\ 2^0\ tan\ 3^0\ ....tan\ 4\ 5^0.....cot\ 3^0\ cot\ 2^0\ cot\ 1^0$
$= tan\ 1^0\ tan\ 2^0\ tan\ 3^0\ ....\times 1 \times....\times \frac{1}{tan\ 1^0} \times \frac{1}{tan\ 2^0} \times \frac{1}{tan\ 3^0}\ = 1$

Q10. What is the value of cot (– 870°)?

(a) √3 (b) 1/√3 (c) −√3 (d) −1/√3

Feedback

$cot(-870^0) = -\ cot\ 8\ 70^0\ = -\ cot(2 \times 360^0 + 150^0)\ = -\ cot\ 1\ 50^0$
$= -\ cot(180^0 - 30^0) = -(-\ cot\ 3\ 0^0) = \sqrt{3}$

Answer Key

Case Study 1	c	b	d	b
Case Study 2	c	a	d	d
Q9. b	Q10. a			