

1. SETS

①

Class: VIII . MATHEMATICS FOUNDATION + SOLUTIONS

TEACHING TASK
JEEMAINS LEVEL

2025-26

01. $A = \{1, 2, 3, 4\} \Rightarrow n(A) = 4$
 $\therefore n[P(A)] = 2^n = 2^4 = 16$ Ans: C

02. $A \cup B \cup C = \{1, 2, 3, 4, 5, 6\}$ Ans: D

03. $A \Delta B = (A - B) \cup (B - A)$
 $= \{1, 2, 3\} \cup \{ \}$
 $= \{1, 2, 3\}$ Ans: D

04. $A' = U - A$
 $= \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{5, 6, 7, 8, 9, 10\}$
 $= \{1, 2, 3, 4\}$ Ans: A

05. $A = \{\frac{2}{3}\}$, $B = \{0\}$
Only A and B are Singleton sets Ans: C

06. $A = \{x: x < 1 \text{ and } x > 3\}$
 $B = \{x: x^2 = 9 \text{ and } 3x = 7\}$
These two sets are null sets. Ans: B

07. $n(A) = 7$
No. of proper subsets of A $= 2^n - 1 = 2^7 - 1$ Ans: C

OR

$$B - A = \{1, 4, 6, 9\} - \{4, 5, 8, 12\}$$

$$= \{1, 6, 9\}$$

(2)

$$A - (B - A) = \{4, 5, 8, 12\} - \{1, 6, 9\}$$

$$= \{4, 5, 8, 12\}$$

Ans: A

09. Clearly, $A - (B \cup C) = (A - B) \cap (A - C)$

$A - (B \cap C) = (A - B) \cup (A - C)$ Ans: D

10. $A = \{1, 3, 7, 15, 31\}$, $B = \{2, 4, 8, 16\}$

$$A \Delta B = (A - B) \cup (B - A)$$

$$= \{1, 3, 7, 15, 31\} \cup \{2, 4, 8, 16\}$$

Ans: B

ADVANCED
LEVEL

01 $\{x: |x|=5, x \in \mathbb{N}\} = \{\pm 5\}$

$\{x: |x|=6, x \in \mathbb{Z}\} = \{\pm 6\}$

$\{x: x^2 + 2x + 1 = 0, x \in \mathbb{N}\} = \emptyset$

$\{x: x^2 = 7, x \in \mathbb{N}\} = \emptyset$

Ans: A, B, C, D

02 $A \cap B = A \cap C$ and $A \cup B = A \cup C$

If $B = C$, then $A \cap C = A \cap C$, $A \cup C = A \cup C$
which are true

Ans: B

03 Statement I: $\{a, e, i, o, u\} \rightarrow$ finite set

Statement II: Conceptual (True)

Ans: A

04. Statement I: $2^n = 2^3 = 8$ (True)

(3)

Statement II: Conceptual (True)

Ans: A

05. Assertion: Conceptual (True)

Reason: Conceptual (True)

Ans: A

06. Assertion: Conceptual (True)

Reason: Conceptual (True)

Ans: A

07. (i) $\{A, B, C, \dots, X, Y, Z\}$ finite set

Ans:

(ii) Animals on Earth $\rightarrow$ finite set

Ans: B, C

08. Clearly (ii), is finite set

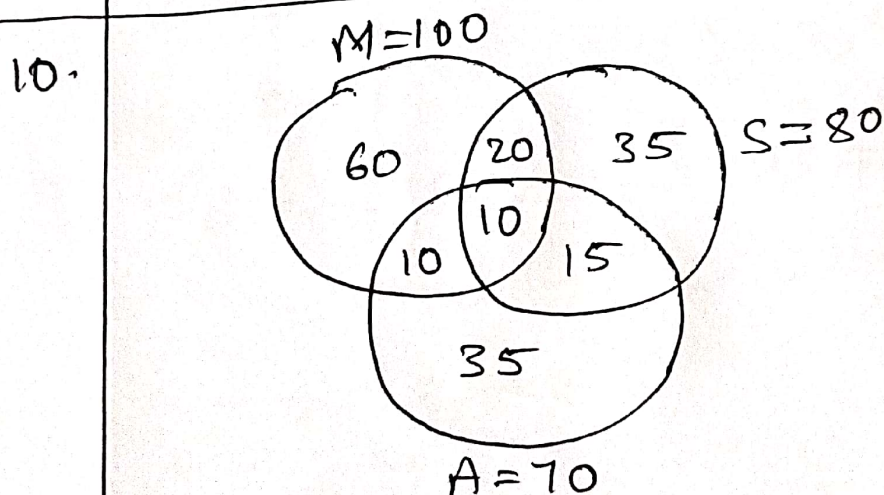
Ans: A

09. (i) Finite set (ii) Infinite set

(iii) Finite set

(iv) Infinite set

Ans: B



Exactly two Activities = $20 + 15 + 10 = 45$

Ans: C

11. Do not participate = $200 - (60 + 20 + 35 + 10 + 10 + 15 + 35)$
 $= 200 - 185$
 $= 15$

Ans: C

12

1

Ans: 1 ^④

$$13 \quad A = \{3, 9, 27, 81, 243, 729\}$$

$$B = \{9, 81, 729, 6561\}$$

$$n(A) = 6, \quad n(B) = 4, \quad n(A \cap B) = 3$$

$$\therefore n(A \cup B) = 6 + 4 - 3 = 7$$

Ans: 7

$$14 \quad a) (A \cap B)^c = \mu - (A \cap B)$$

$$b) B - A = B - (A \cap B)$$

$$c) (A - B) \cap (B - A) = \phi$$

$$d) A \cap B = \phi \Rightarrow n(A \cap B) = 0$$

Ans: p, s, q, t

$$15 \quad a) A = \{1, 2, 3, 4, 5, 6, 7\}; \quad B = \{3, 6, 7, 9\}$$

$$\text{Total subsets of } A = 2^7 = 128$$

$$C \cap B = \phi \Rightarrow C = \{1, 2, 4, 5\}$$

$$\therefore S = \{C \subseteq A, C \cap B \neq \phi\}$$

$$= \text{Total} - \{C \cap B = \phi\}$$

$$= 128 - 2^4$$

$$= 112$$

b)

$$b) A = \{n \in \mathbb{N} : \text{HCF}(n, 45) = 1\} \quad (5)$$

Here $45 = 3 \times 5$, then

'A' must be a set that does not consist of either 3 multiples or 5 multiples

$$\Rightarrow A = \{1, 2, 4, 7, 8, 11, 13, \dots\}$$

$$B = \{2K : K \in \{1, 2, 3, \dots, 100\}\}$$

$$B = \{2, 4, 6, \dots, 200\}$$

$$\text{Now, } A \cap B = \{1, 2, 4, 7, 8, 11, 13, 14, \dots\} \cap \{2, 4, 6, \dots, 200\}$$

$$= \{2, 4, 6, 8, \dots, 200\}$$

To find the sum of the elements in

$$A \cap B = 2 + 4 + 6 + 8 + \dots + 200$$

$$= 2[1 + 2 + 3 + 4 + \dots + 100]$$

$$= 2 \left[\text{Sum of natural numbers up to } 100 - \text{Sum of multiples of } 3 \text{ and } 5 \right]$$

$$= 2 \left[\frac{100 \times 101}{2} - \left[3 \times \left(\frac{33 \times 34}{2} \right) + 5 \left(\frac{20 \times 21}{2} \right) - 15 \left(\frac{6 \times 7}{2} \right) \right] \right]$$

$$= 10100 - 3366 - 2100 + 630$$

$$= 5264.$$

$$c) n^2 - n - 10,000 \leq 0$$

$$n \in \left(\frac{1 - \sqrt{40001}}{2}, \frac{1 + \sqrt{40001}}{2} \right)$$

But $n \in \mathbb{N}$

$$\therefore A = \{1, 2, 3, \dots, 100\}$$

$$B = \{4, 7, 10, 13, \dots\}$$

$$C = \{2, 4, 6, 8, \dots\}$$

$$B - C = \{7, 13, 19, \dots, 97\}$$

$$A \cap (B - C) = \{7, 13, 19, \dots, 97\}$$

$$\text{Sum} = \frac{16}{2} [7 + 97] = 832$$

$$d) X = \{x: 1 \leq x \leq 50, x \in \mathbb{N}\}$$

$$A = \{n \text{ is a multiple of } 2\}$$

$$A = \{2, 4, 6, \dots, 50\}$$

$$\therefore n(A) = 25, n(B) = 7, n(A \cap B) = 3$$

$$\therefore n(A \cup B) = 25 + 7 - 3 = 29$$

Ans: x, p, q, t

LEARNERS TASK (Ques)

01. clearly opt: D is not well defined Ans: D

02. $X = \{1, 2, 3, 4, 5\}$ Ans: A

03. $\{4, 5, 7, 9, 11, 13\}$ Ans: B

04 $\{x / x \text{ is odd natural number \& } x < 15\}$ (7)
Ans: C

05 Conceptual
Ans: C

06 Conceptual
Ans: D

07 $n(S) = 5$
Ans: C

08 $\{4, 5, 6, 7, 8, 9\}$
Ans: D

09 $\{-2, -1, 0, 1, 2, 3, 4, 5, 6\}$
Ans: C

10 Conceptual
Ans: B

JEE MAINS LEVEL

01 $A \cup B \Rightarrow x \in A \text{ or } x \in B$
Ans: A

02 $A \cup B = \{1, 2, 3, 4, 5, 6\}$
Ans: C

03 $A \cap B = \{1, 4, 6\}$
Ans: B

04 $A \cap B = \emptyset$
Ans: C

05 $n(A) = 8$
Ans: B

06 $A = \{1, 4, 9, 16, 25\}$, $n(A) = 5$
Ans: C

07 $A - B = \{1, 2, 3\}$
Ans: A

08 $A^c = \{6, 7, 8, 9, 10\}$
Ans: B

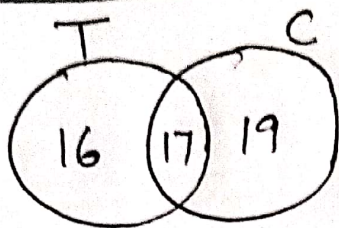
09 $A \subset B$, $A \cap B = A$
Ans: A

10 clearly (iii), (iv) are sets Ans. C

JEE ADVANCED LEVEL

(8)

01.



clearly options A, D are correct Ans: A, D

02 Let $A = \{1, 2, 3\}$, $B = \{2, 3, 4\}$

and $C = \{1, 2, 3, 5, 6\}$

clearly $A \cap B = \{2, 3\} \neq \phi$

and also $A \cap B \subseteq C$.

a) $A - C = \phi \subseteq B$

Now, $A \subseteq B$, which is False

b) $C \cup A = \{1, 2, 3, 5, 6\}$

$C \cup B = \{1, 2, 3, 5, 6\}$

$(C \cup A) \cap (C \cup B) = \phi = B$, which is False

c) $B \cap C = \{2, 3, 4\} \neq \phi$, which is TRUE

d) $A - B = \{1\} \subseteq C \Rightarrow A \subseteq C$, which is TRUE

Ans: A, B

03

Statement I: $A = \{2, 4, 6, 8, \dots\}$

$B = \{1, 3, 5, 7, \dots\}$

$A \Delta B = (A - B) \cup (B - A) = \phi \cup \phi = \phi$ (True)

Statement II: Conceptual (True)

Ans: A

04. Statement I:

(9)

$$\begin{aligned}n(A \cap B) &= n(A) + n(B) - n(A \cup B) \\&= 37 + 26 - 51 \\&= 12. \quad (\text{True})\end{aligned}$$

Ans: A

Statement II: Conceptual (True)

05

Assertion: Conceptual (True) (False)
Reason: Conceptual (True)

Ans: D

06

Assertion: Conceptual (True)
Reason: Conceptual (True)

Ans: A

07.

$$A = \{3, 5, 7, 9, 11\}; B = \{1, 4, 7, 10\}$$
$$A \cup B = \{1, 3, 4, 5, 7, 9, 10, 11\}$$

Ans: C

08

Clearly $y = \{3, 5, 9\}$ is the smallest set

Ans: A

09

$$A = \{-2, -1, 0, 1, 2\}; B = \{0, 1, 2, 3\}; C = \{1, 2\}$$
$$A \cup B \cup C = \{-2, -1, 0, 1, 2, 3\} \therefore n(A \cup B \cup C) = 6$$
$$A \cap (B \cap C) = \{1, 2\} \therefore n[A \cap (B \cap C)] = 2$$

Ans: D

10.

$$\text{Given } A = \{1, 2, 3\} \Rightarrow n(A) = 3$$
$$\text{No. of proper subsets} = 2^n - 1$$
$$= 2^3 - 1$$

Ans: B

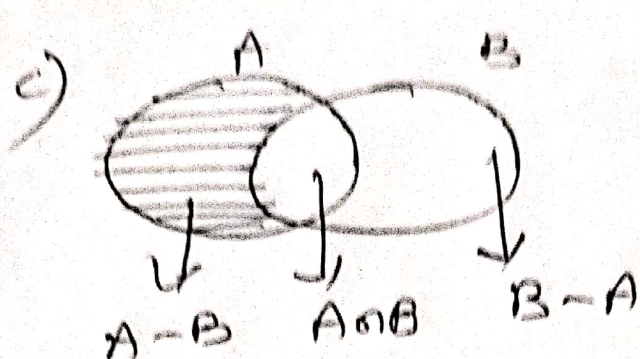
11. $A = \{1, 2, 3\} \Rightarrow n(A) = 3.$ (10)
 No. of subsets $= 2^n = 2^3$ Ans: A

12. $A = \{1, 2, 3\}$
 Improper subset $A = \{1, 2, 3\}$ Ans: A
 No. of improper subsets $= 1$

13. $n(A \cup B) = n(A) + n(B) - n(A \cap B)$
 $\Rightarrow y = 9 + 9 - 0$ Ans: 9
 $\Rightarrow y - 9 = 9$

14. Given $S = \{4, 6, 9\}$, $T = \{9, 10, 11, \dots, 1000\}$
 $A = \{a_1 + a_2 + a_3 + \dots + a_k, k \in \mathbb{N}\}$
 By the definition of A
 $A = \{a : a = 4x + 6y + 9z\}$
 Except the element 11, every element of
 set T is of the form $4x + 6y + 9z$
 for some $x, y, z \in \mathbb{W}$ Ans: 11.
 $\therefore T - A = \{11\}$

15. a) $n(A \cup B) = n(A) + n(B) - n(A \cap B)$
 $\Rightarrow n(A \cup B) + n(A \cap B) = n(A) + n(B)$
 b) $n(A \cup B) = n(A) + n(B) - n(A \cap B)$
 $= n(A) + n(B) - \phi$
 $= n(A) + n(B)$



$$\therefore n(A - B) + n(A \cap B) = n(A)$$

d) $n(B - A) + n(A \cap B) = n(B)$

Ans: S, Z, P, X

16 a) $x \in A \cap B \Leftrightarrow x \in A \text{ and } x \in B$

b) $x \notin A - B \Leftrightarrow x \notin A \text{ or } x \in B$

c) $x \notin A \cup B \Leftrightarrow x \notin A \text{ and } x \notin B$

d) $x \in A - B \Leftrightarrow x \in A \text{ and } x \notin B$

Ans: X, S, P, Z

ADDITIONAL PRACTICE QUESTIONS FOR STUDENTS

01 clearly option A is not a set

Ans. A

02 clearly (A) and (C) are only sets Ans. C

03 $A = \{6, 7, 8, 9, 10, 11, 12\} = \{x : x \in \mathbb{N}, 6 \leq x \leq 12\}$

Ans: C

04 $A = \phi$, $P(A)$ has one element

Ans. A

05 clearly (A) is the set

Ans. A

06 $A \cup B = \{1, 2, 3, 4, 5\}$

Ans. B

07 clearly $1 \in \emptyset$

Ans. B

$\Rightarrow$ THE END $\Leftarrow$