

# 1. SETS AND RELATIONS ①

Class: IX, Mathematics 2025/26

## FOUNDATION + SOLUTIONS

### TEACHING TASK

### JEE MAINS

01. Conceptual. Ans: C

02.  $A = \{2, 4, 6, 8, 10\}$  Ans: B  
 $A = \{x \mid x \text{ is even } 1 < x \leq 10\}$

03.  $S = \{x \in \mathbb{N} \mid x^2 < 50\}$   
 $S = \{1, 2, 3, 4, 5, 6, 7\}$   
 $\therefore n(S) = 7.$  Ans: A

04. Conceptual Ans: D

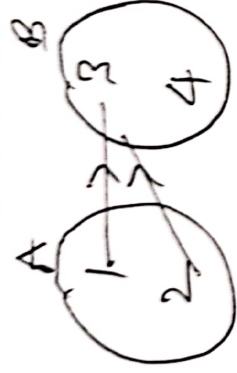
05.  ~~$(A \cup B) - (A \cap B) = A - B = \{1\}$~~  Ans:

05  $A \cup B = \{1, 2, 3, 4\}$   
 $A \cap B = \{2, 3\}$   
 $(A \cup B) - (A \cap B) = \{1, 2, 3, 4\} - \{2, 3\}$   
 $= \{1, 4\}$  Ans: A

06. Conceptual

② Ans: B

07.



many-to-one relation.

Ans: D

08

$$R = \{(x, y) \mid x^2 + y^2 = 25, x, y \in \mathbb{Z}\}.$$

$$\therefore R = \{(1, 4), (4, 1), (-1, 4), (4, -1), (0, 5), (5, 0), (-5, 0), (0, -5)\}$$

$$R = \{(3, 4), (0, 5), (5, 0), (4, 3), (-3, -4), (0, -5), (-5, 0), (-4, -3)\}$$

$$\text{Domain of } R = \{-3, -4, -5, 0, 3, 4, 5\}$$

09.

$$1 \in A \Rightarrow (1, 1) \in R$$

$$2 \in A \Rightarrow (2, 2) \in R$$

$$3 \in A \Rightarrow (3, 3) \in R$$

$$(1, 2) \in R \text{ and } (2, 1) \in R$$

$\therefore R$  is symmetric relation.

$$(1, 1) \in R$$

$$(1, 2) \in R \text{ and } (2, 1) \in R \Rightarrow (1, 1) \in R$$

$\therefore R$  is transitive relation.

Ans: —

10.

$$R = \{(1, 1), (1, 2), (1, 3), (1, 4), (2, 1), (2, 4), (3, 3), (4, 4)\}$$

$$\therefore \text{Range of } R = \{1, 2, 3, 4\}$$

Ans: A

# JEE ADVANCED

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Q1. A)  $A \cup B = \{1, 2, 3, 4, 6\}$   
 $(A \cup B)' = U - (A \cup B)$   
 $= \{1, 2, 3, 4, 5, 6\} - \{1, 2, 3, 4, 6\}$   
 $= \{5\}$  (True)

B)  $A \cap B = \{2\}$   
 $(A \cap B)' = U - (A \cap B)$   
 $= \{1, 2, 3, 4, 5, 6\} - \{2\}$   
 $= \{1, 3, 4, 5, 6\}$  (False)

C)  $A - B = \{1, 4, 6\} - \{1, 2, 3\}$   
 $= \{4, 6\}$  (True)

D)  $B - A = \{1, 2, 3\} - \{1, 4, 6\}$   
 $= \{1, 3\}$  (True)      Ans: A, C, D

Q2.  $A = \{1, 2, 3\}$ ,  $B = \{1, 2, 3\}$   
 $A = B$  (True)    D)  $A \subset B$  (False)

E)  $n(A \cap B) = 3$  (True)    D)  $A \cap B = A$  (True)  
 Ans: A, B, C, D

Statement I: Conceptual (False)

Statement II: Conceptual (True)

Ans: D

|     |                                                                                                                         |                  |
|-----|-------------------------------------------------------------------------------------------------------------------------|------------------|
| 04. | <u>Statement I:</u> Conceptual (True)<br><u>Statement II:</u> Conceptual (True)                                         | ④<br>Ans: A      |
| 05. | <u>Assertion:</u> $n(A)=4 \Rightarrow n[P(A)] = 2^4 = 16$ .<br><u>Reason:</u> No. of subsets of a set = $2^n$ . (False) | (True)<br>Ans: C |
| 06. | <u>Assertion:</u> Conceptual (True)<br><u>Reason:</u> Conceptual (True)                                                 | Ans: A           |
| 07. | $R = \{(1, 1), (2, 4), (3, 9)\}$<br>Domain of $R = \{1, 2, 3\}$                                                         | Ans: A           |
| 08. | Range of $R = \{1, 4, 9\}$                                                                                              | Ans: A           |
| 09. | $M = \{1, 4, 9, 36\}$                                                                                                   | Ans: A           |
| 10. | $n(M) = 4$                                                                                                              | Ans: C           |
| 11. | $P = \{3, 6, 12, 24\}$<br>$\therefore n(P) = 4$ .                                                                       | Ans: 4           |
| 12. | $R = \{(2, 1), (\text{del}), (3, 2), (4, 3)\}$<br>$n(R) = 3$                                                            | Ans: 3           |

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a)  $\{\phi\}$

b)  $\{\phi, \{a\}\}$

c)  $A = \{a, b\}, n(A) = 2 \Rightarrow n[P(A)] = 2^2 = 4$

d)  $2^n$

Ans: p, q, r, s

(5)

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a)  $n(p \cup q) = n(p) + n(q) - n(p \cap q)$

b)  $2^3 = 8$

c)  $p \cap q = \phi$

Ans: p, q, r, s

d) has 4 elements

## LEARNERS TASK

### CUQ'S

01. Conceptual

Ans: B

02. Conceptual

Ans: C

03. Conceptual

Ans: B

04. Optim: C

$A \cap B = \phi$

Ans: C

05. Conceptual

Ans: B

$A' = \mu - A$

|           |                                                                                                                                           |           |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| 06.       | Conceptual                                                                                                                                | Ans: C    |
| 07.       | Conceptual                                                                                                                                | Ans: B    |
| 08.       | Conceptual                                                                                                                                | Ans: B    |
| 09.       | Conceptual                                                                                                                                | Ans: D    |
| 10.       | Conceptual.                                                                                                                               | Ans: A    |
| JEE MAINS |                                                                                                                                           |           |
| 01.       | Conceptual.                                                                                                                               | Ans: C    |
| 02.       | Conceptual                                                                                                                                | Ans: C    |
| 03.       | $A = \{C, O, M, I, T, E\}$<br>$n(A) = 6$                                                                                                  | Ans: D    |
| 04.       | $A \subseteq A \cap B$ (False)                                                                                                            | Ans: C    |
| 05.       | <br>$(A-B) \cup (B-A)$ (OR) $(A \cup B) - (A \cap B)$ | Ans: C, D |
| 06.       | Conceptual                                                                                                                                | Ans: D    |
| 07.       | Conceptual                                                                                                                                | Ans: B    |
| 08.       | Conceptual                                                                                                                                | Ans: A, C |

|                      |                                                                                                                                 |          |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------|----------|
| 09.                  | Conceptual                                                                                                                      | ⑦ Ans: B |
| 10.                  | Conceptual                                                                                                                      | Ans: B   |
| <u>IEEE ADVANCED</u> |                                                                                                                                 |          |
| 01.                  | $S = \{x: x \in \mathbb{Z}, x^2 < 0\}$ .<br>$S$ is an empty set, since $x^2 \geq 0 \quad \forall x \in \mathbb{Z}$<br>Ans: B, C |          |
| 02.                  | $A = \{2, 3, 5, 7, 11, 13\}$ .<br>$A$ is finite set, $n(A) = 6$ .<br>Ans: A, B, D                                               |          |
| 03.                  | Statement I: Conceptual (False)<br><u>Statement II: Conceptual (True)</u><br>Ans: D                                             |          |
| 04.                  | <u>Statement I: Conceptual (True)</u><br>Since $x^2 \neq -1$ .<br><u>Statement II: Conceptual (True)</u> .<br>Ans: A            |          |
| 05.                  | <u>Assertion: <math>A = \{2\} \rightarrow \text{True}</math></u><br><u>Reason: Conceptual (True)</u><br>Ans: A                  |          |
| 06.                  | <u>Assertion: Conceptual (True)</u><br><u>Reason: Conceptual (False)</u><br>Ans: C                                              |          |

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07.  $A' = U - A$

$$= \{1, 2, 3, 4, 5, 6\} - \{2, 4, 6\}$$
$$= \{1, 3, 5\}$$

Ans: B, D

08.

$$A \cup B = \{2, 4, 6\} \cup \{1, 2, 3\}$$
$$= \{1, 2, 3, 4, 6\}$$

Ans: B

09.

$$X = \{2, 4, 6\}, Y = \{2, 4, 6, 8\}$$
$$X \subset Y$$

Ans: B

Ans: B

10.

$$n(Y) = 4$$

11.

$$n(A \times B) = n(A) \times n(B)$$
$$\Rightarrow 18 = 3 \times n(B)$$
$$\Rightarrow n(B) = 6$$

Ans: 6

12.

$$R = \{(1, 1), (2, 4), (3, 9), (4, 16), (5, 25)\}$$
$$: n(R) = 5$$

Ans: 5

13 a)

13

a)  $\{4\} \rightarrow \text{Singleton set } (q)$

b)  $\{\} \rightarrow \text{Empty set } (p)$

c)  $\{a, b, c\} \rightarrow \text{Finite set } (r)$

d)  $\{2, 4, 6, 8, \dots\} \rightarrow \text{Infinite set } (s)$

Ans:  $q, p, r, s$

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a)  $A \cup \phi = A \quad (p)$

b)  $A \cap \phi = \phi \quad (q)$

c)  $A \cup A' = U \quad (r)$

d)  $A \cap A' = \phi \quad (q)$

Ans:  $p, q, r, q$

$\Rightarrow \text{TAE END} \in$