KVS BHOPAL REGION CBT TEST JULY 2023
SUBJECT-MATHEMATICS
CLASS-12

Case study -1

Sheela (S) and Harshita (H) are playing Ludo at home during COVID-19. While rolling the dice, Sheela's sister Rama observed and noted the possible outcomes of the throw every time belongs to set {1,2,3,4,5,6}. Le A be the set of players while B be the set of all possible outcomes.

A = {S, H}, B= {1,2,3,4,5,6}

Based on the above information, answer the following questions:

Que.1. Let R: B→ B be defined by R= {(x, y): y is divisible by x } is

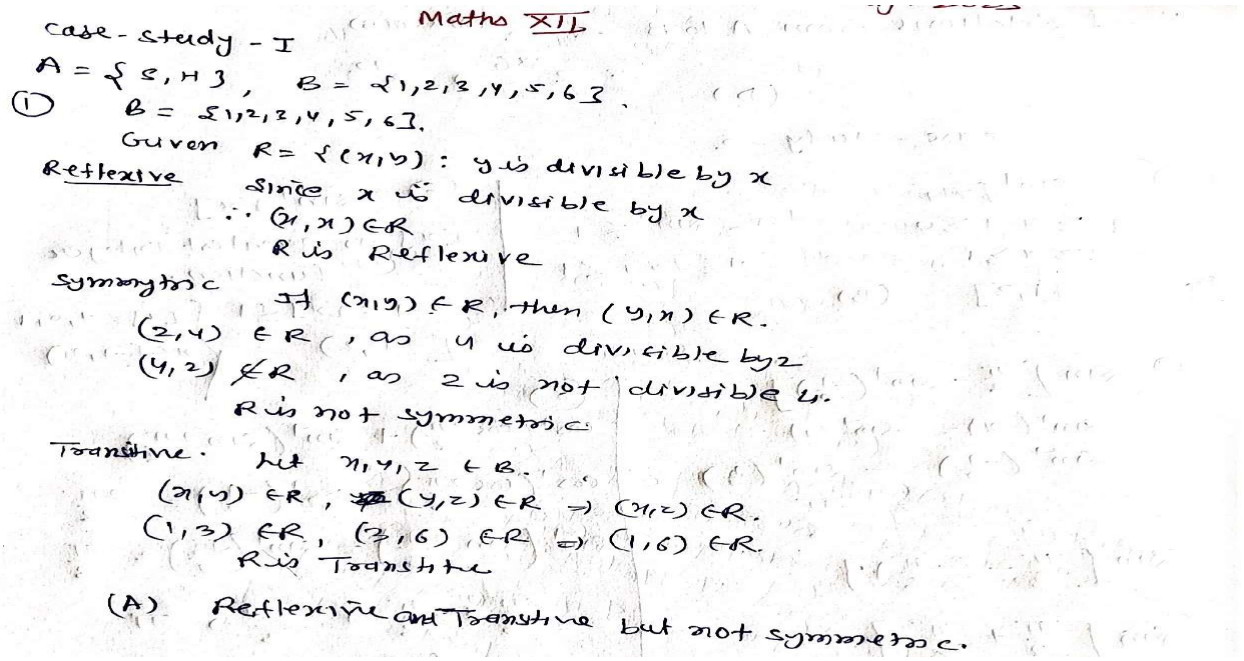
(a) Reflexive and transitive but not symmetric.

(b) Reflexive and symmetric and not transitive.

(c) Not reflexive but symmetric and transitive.

(d) Equivalence.

Feedback


Maths XII

Case-study - I

$A = \{S, H\}$, $B = \{1,2,3,4,5,6\}$.

(i) $B = \{1,2,3,4,5,6\}$.

Given $R = \{(x,y) : y \text{ is divisible by } x\}$

Reflexive

Since x is divisible by x

$\therefore (x,x) \in R$

R is Reflexive

Symmetric

If $(x,y) \in R$, then $(y,x) \in R$.

$(2,4) \in R$, as 4 is divisible by 2

$(4,2) \notin R$, as 2 is not divisible by 4.

R is not symmetric.

Transitive. Let $x, y, z \in B$.

$(x,y) \in R$, $(y,z) \in R \Rightarrow (x,z) \in R$.

$(1,3) \in R$, $(3,6) \in R \Rightarrow (1,6) \in R$.

R is Transitive

(A) Reflexive and Transitive but not symmetric.

Que.2. Rama wants to know the number of functions from A to B. How many number of functions are possible?

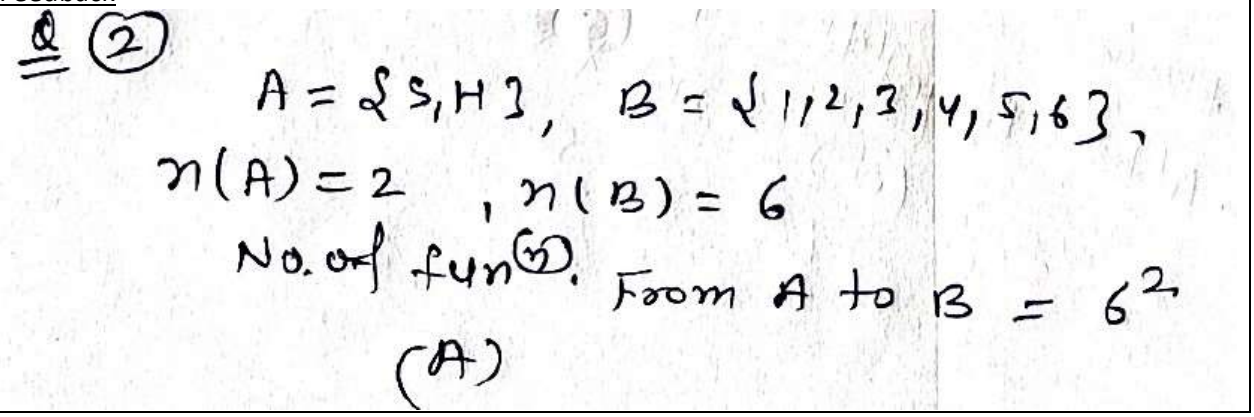
(a) 6^2

(b) 2^6

(c) 6!

(d) 2^{12}

Feedback


Q (2)

$A = \{S, H\}$, $B = \{1,2,3,4,5,6\}$,

$n(A) = 2$, $n(B) = 6$

No. of fun^{n}. From A to B $= 6^2$.

(A)

Que.3. Let R be a relation on B defined by

R= {(1, 2), (2, 2), (1, 3), (3, 4), (3, 1), (4, 3), (5,5)}. Then R is

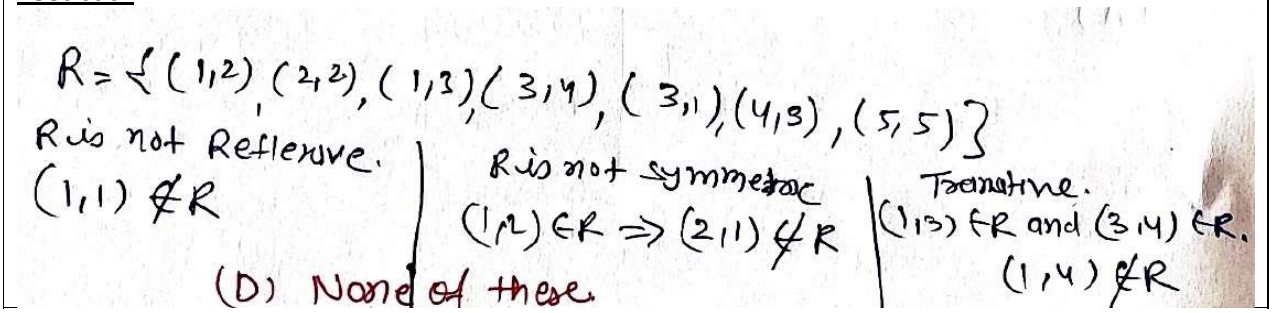
(a) Symmetric

(b) Reflexive

(c) Transitive

(d) None of these

Feedback



Que.4. Rama wants to know the number of relations possible from A to B. How many numbers of relations are possible?

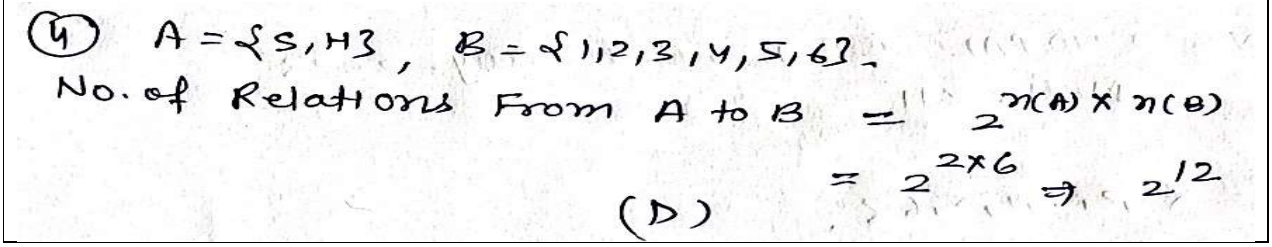
(a) 6^2

(b) 2^6

(c) 6!

(d) 2^{12}

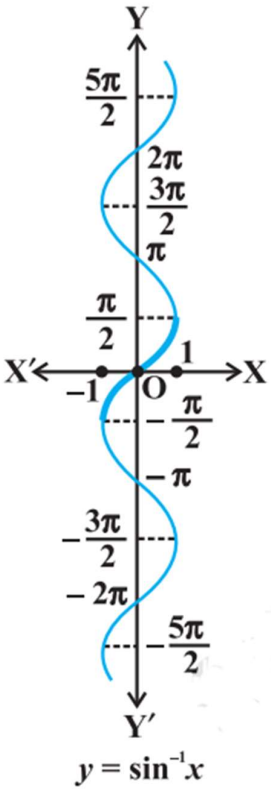
Feedback



CASE STUDY -2

In the class of Mathematics, Mr. Singh is explaining the inverse trigonometric functions. He draws the graph of the $\sin^{-1}x$ and write down the following about the principal value of branch function $\sin^{-1}$:

Principal value of branch function $\sin^{-1}$: it is a function with domain [-1,1] and range $\left[\frac{-3\pi}{2}, \frac{-\pi}{2}\right]$, $\left[\frac{-\pi}{2}, \frac{\pi}{2}\right]$, $\left[\frac{\pi}{2}, \frac{3\pi}{2}\right]$ and so on corresponding to each interval, we get a branch of the function $\sin^{-1}x$. The branch with range $\left[\frac{-\pi}{2}, \frac{\pi}{2}\right]$ is called the principal value branch. Thus $\sin^{-1}$: [-1,1]→ $\left[\frac{-\pi}{2}, \frac{\pi}{2}\right]$.

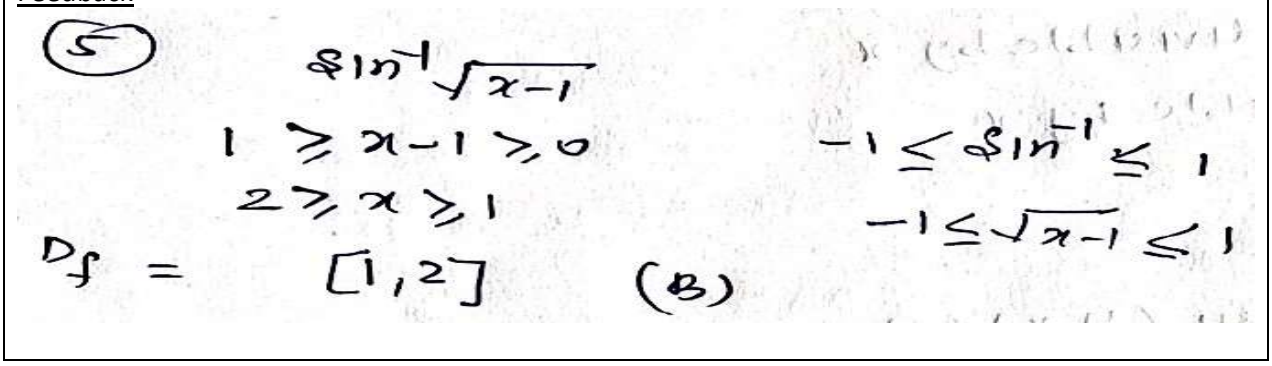


Based on the above information, answer the following questions.

Q 5. Domain of $\sin^{-1}\sqrt{x-1}$ is:

A) (1, 2) B) [1, 2] C) (1, 2] D) [1, 2)

Feedback



Q 6. Domain of $\sin^{-1}[x]$ is:

where $[x]$ is greatest integer function

A) (-1, 2) B) [-1, 2] C) (-1, 2] D) [-1, 2)

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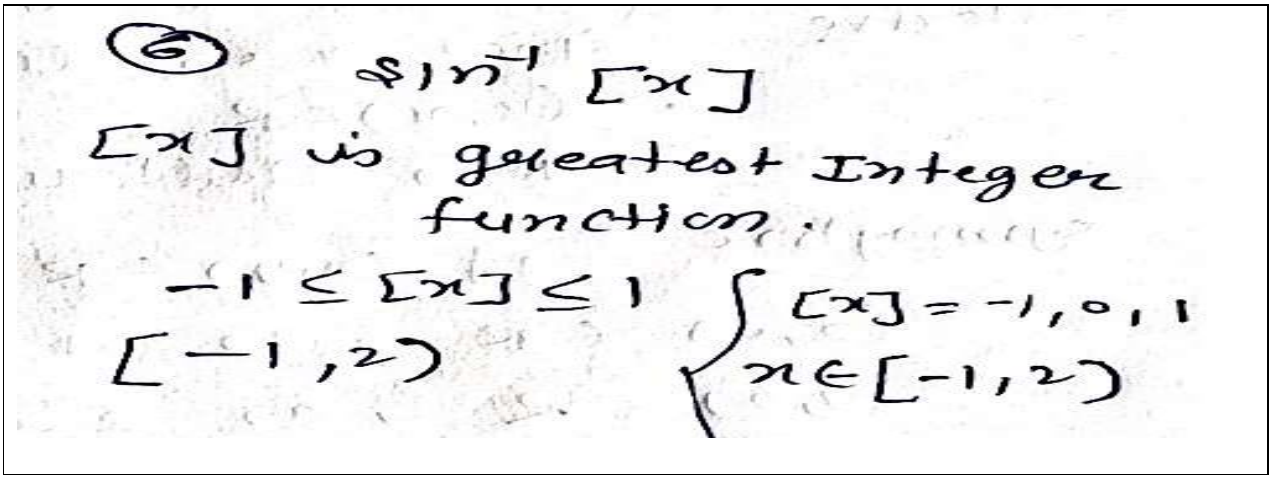

Q 7. Value of $\sin\left[\frac{\pi}{3} - \sin^{-1}\left(-\frac{1}{2}\right)\right]$ is:

A) 1 B) -1 C) 0 D) none of these

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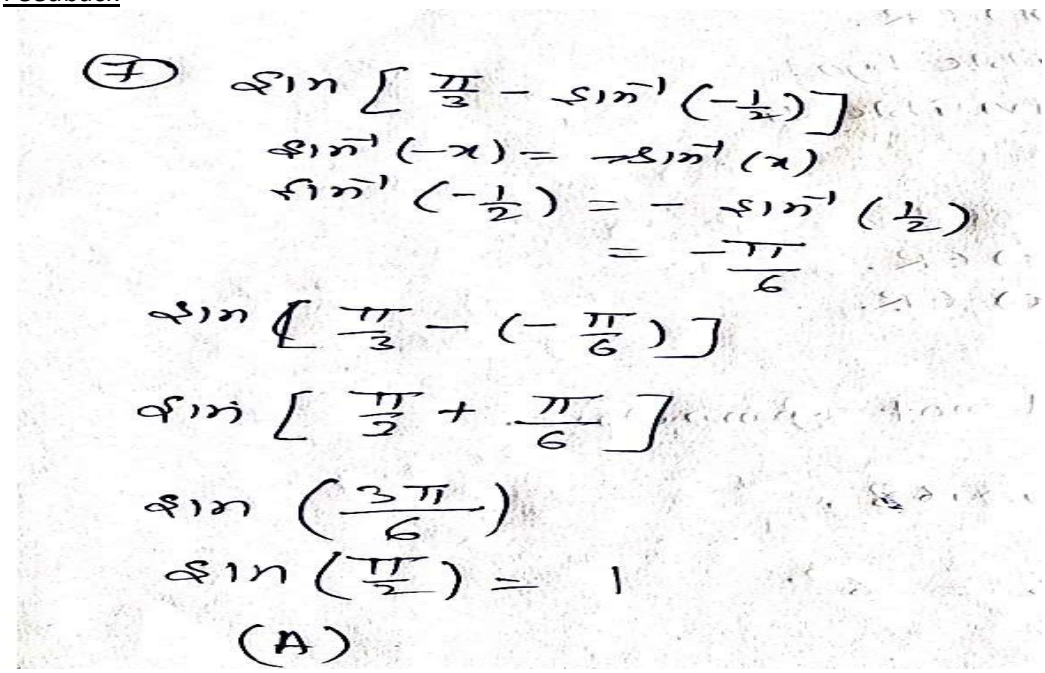
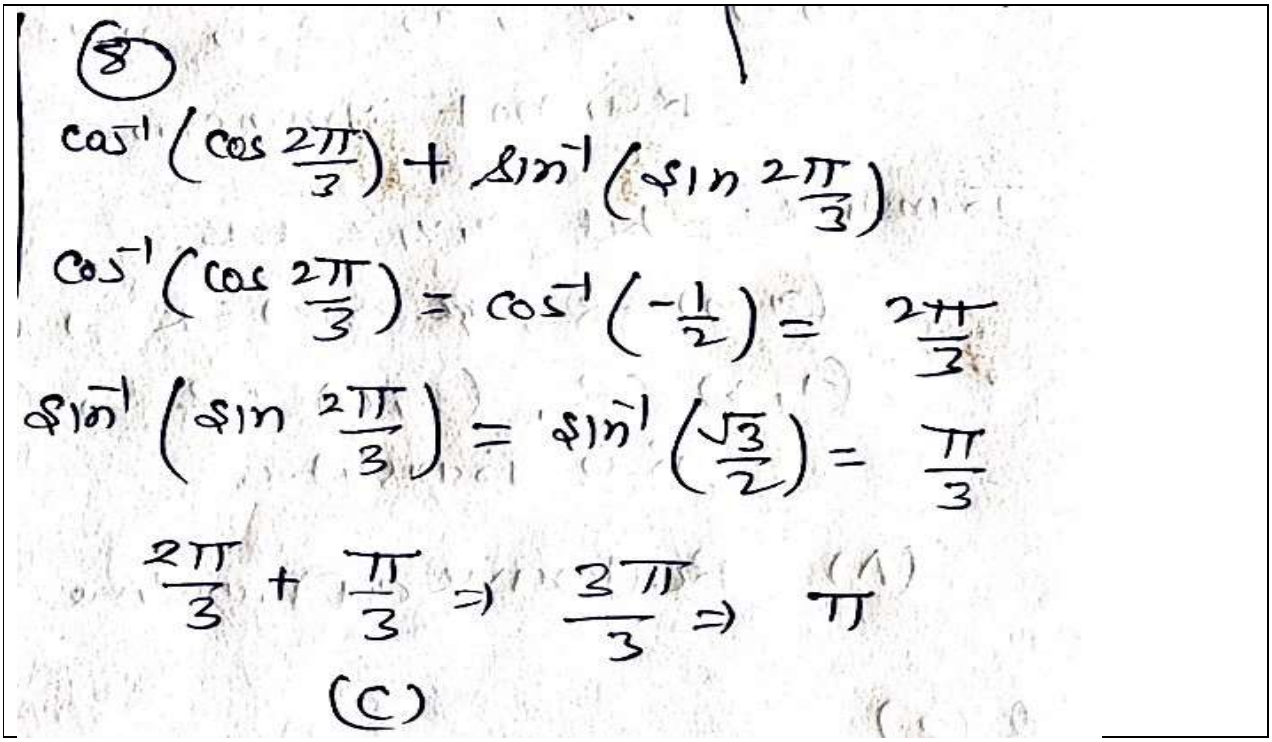


Q 8. Principal value of $\cos^{-1}\left(\cos\frac{2\pi}{3}\right)+\sin^{-1}\left(\sin\frac{2\pi}{3}\right)$ is:

A) $-\pi$ B) 0 C) π D) 2π

Feedback

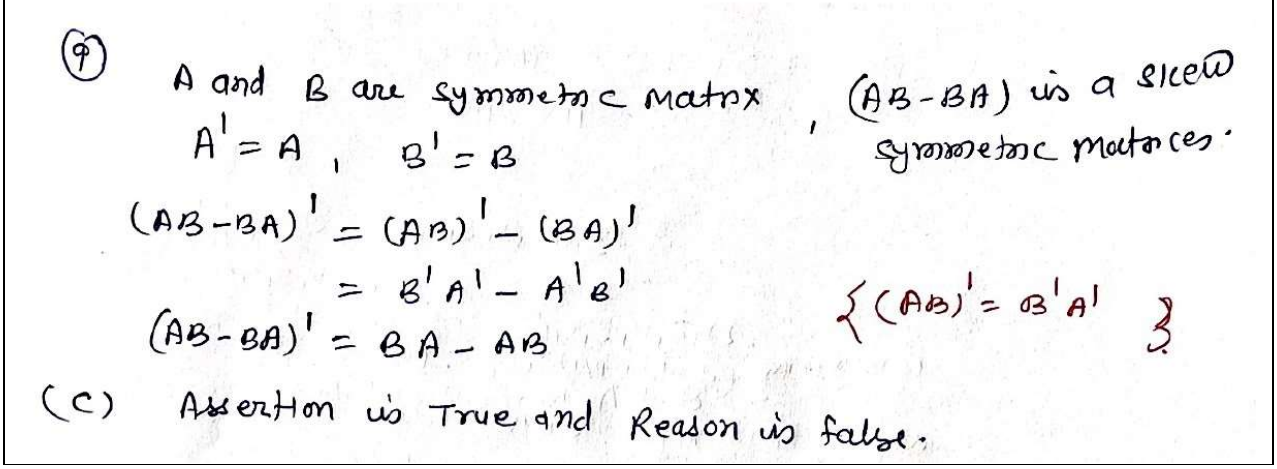


9. **Assertion**: If A and B are symmetric matrices of same order, then AB-BA is a skew symmetric matrix.

Reason: If A and B are any two square matrices of same order, then (AB)'=A'B'

(a) Both Assertion and reason are true and reason is the correct explanation of the Assertion.
(b) Both Assertion and reason are true and reason is not the correct explanation of the Assertion.
(c) Assertion is true and Reason is false
(d) Assertion is false and reason is true

Feedback



10. Assertion(A): Every square matrix, can be uniquely written as the sum of a symmetric and a skew-symmetric matrix.

Reason(R): If A is a square matrix, then $A + A^T$ is a symmetric matrix and $A - A^T$ is a skew-symmetric matrix.

Choose the correct option from the given

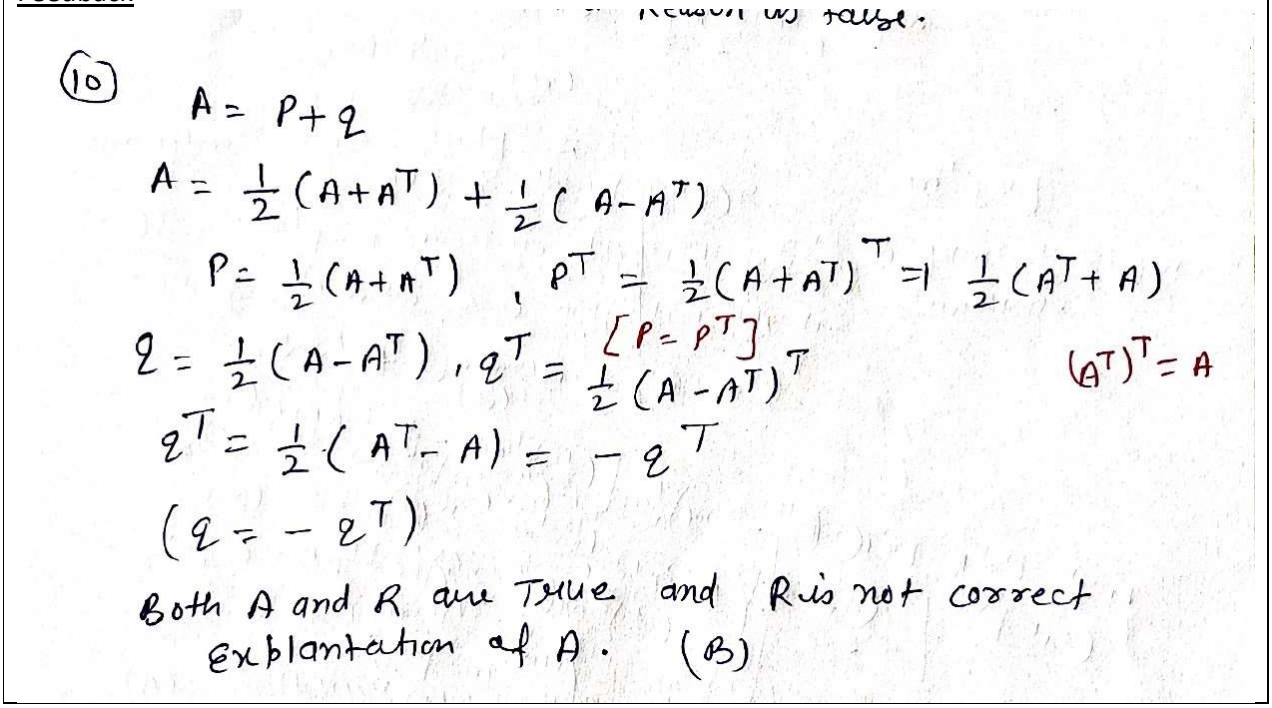
(a) Both Assertion(A) and Reason(R) are true and Reason(R) is correct explanation of Assertion(A).

(b) Both Assertion(A) and Reason(R) are true and Reason(R) is not correct explanation of Assertion(A).

(c) Assertion(A) is true but Reason(R) is false.

(d) Assertion(A) is false but Reason(R) are true.

Feedback



Case Study 1	**Q1 - A**	**Q2- A**	**Q3- D**	**Q4- D**
Case Study 2	**Q5 -B**	**Q6 -D**	**Q7 -A**	**Q8-C**
Assertion-Reason Based Questions			**Q9 -C**	**Q10- B**