

Linear Programming

Part - 2



ASSERTION AND REASON BASED MCQs

(1 Mark each)

Directions : In the following questions, A statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as

- (A) Both A and R are true and R is the correct explanation of A
 (B) Both A and R are true but R is NOT the correct explanation of A
 (C) A is true but R is false
 (D) A is false but R is True

Q. 1. Assertion (A): Feasible region is the set of points which satisfy all of the given constraints and objective function too.

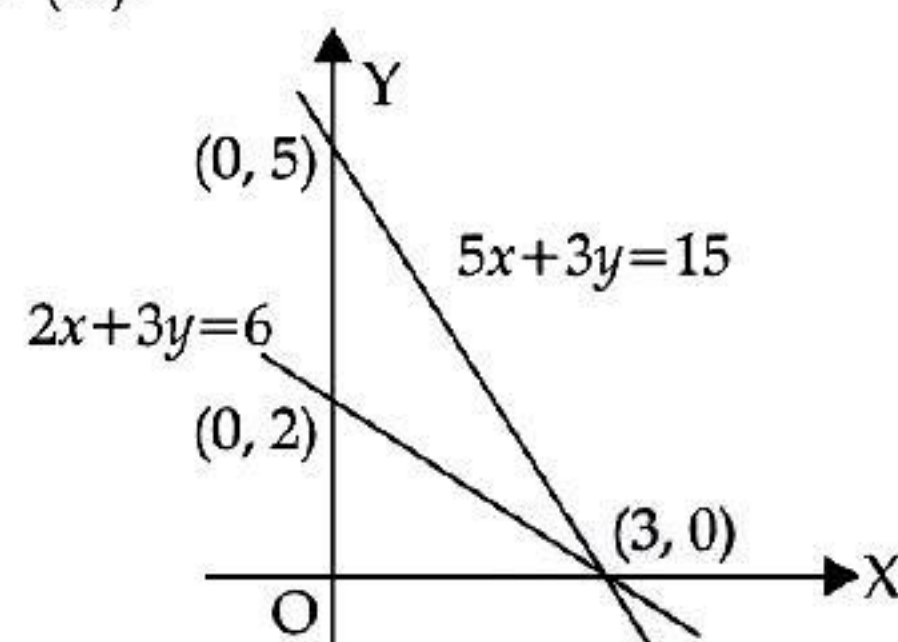
Reason (R): The optimal value of the objective function is attained at the points on X-axis only.

Ans. Option (C) is correct.

Explanation: The optimal value of the objective function is attained at the corner points of feasible region.

Q. 2. Assertion (A): The intermediate solutions of constraints must be checked by substituting them back into objective function.

Reason (R):



Here (0, 2); (0, 0) and (3, 0) all are vertices of feasible region.

Ans. Option (D) is correct.

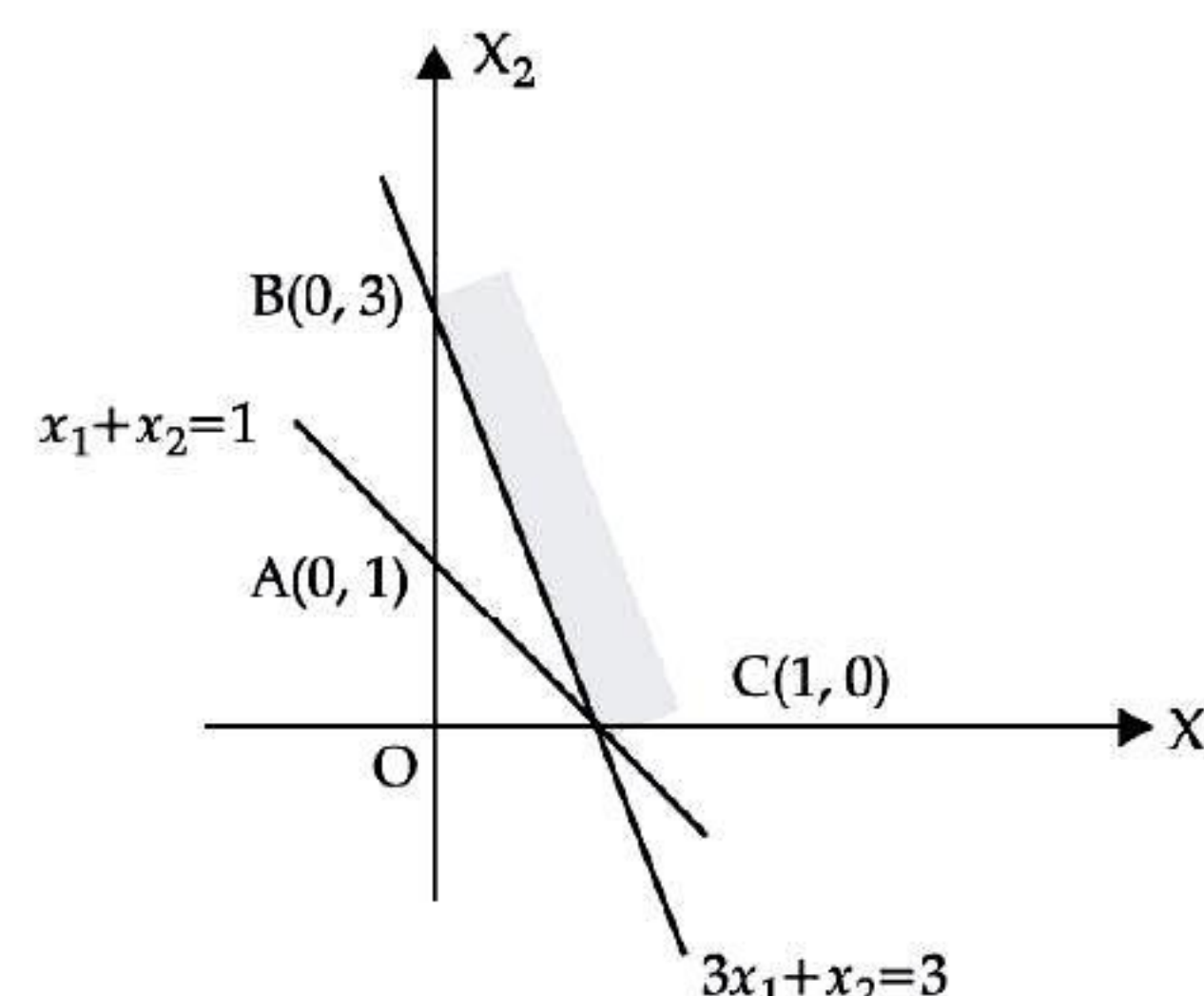
Explanation: The intermediate solutions of constraints must be checked by substituting them back into constraint equations.

Q. 3. Assertion (A) : For the constraints of linear optimizing function $Z = x_1 + x_2$ given by $x_1 + x_2 \leq 1$, $3x_1 + x_2 \geq 1$, there is no feasible region.

Reason (R): $Z = 7x + y$, subject to $5x + y \leq 5$, $x + y \geq 3$, $x \geq 0$, $y \geq 0$. Out of the corner points of feasible region (3, 0), $(\frac{1}{2}, \frac{5}{2})$, (7, 0) and (0, 5), the maximum value of Z occurs at (7, 0).

Ans. Option (B) is correct.

Explanation: Assertion (A) is correct. Clearly from the graph below that there is no feasible region.



Reason (R) is also correct.

Corner Points	$Z = 7x + y$
(3, 0)	21
$(\frac{1}{2}, \frac{5}{2})$	6
(7, 0)	49 maximum
(0, 5)	5

Q. 4. Assertion (A): $Z = 20x_1 + 20x_2$, subject to $x_1 \geq 0$, $x_2 \geq 2$, $x_1 + 2x_2 \geq 8$, $3x_1 + 2x_2 \geq 15$, $5x_1 + 2x_2 \geq 20$.

Out of the corner points of feasible region (8, 0),

$(\frac{5}{2}, \frac{15}{2})$, $(\frac{7}{2}, \frac{9}{4})$ and (0, 10), the minimum value of

Z occurs at $(\frac{7}{2}, \frac{9}{4})$.

Reason (R) :

Corner Points	$Z = 20x_1 + 20x_2$
(8, 0)	160
$(\frac{5}{2}, \frac{15}{2})$	125
$(\frac{7}{2}, \frac{9}{4})$	115 minimum
(0, 10)	200

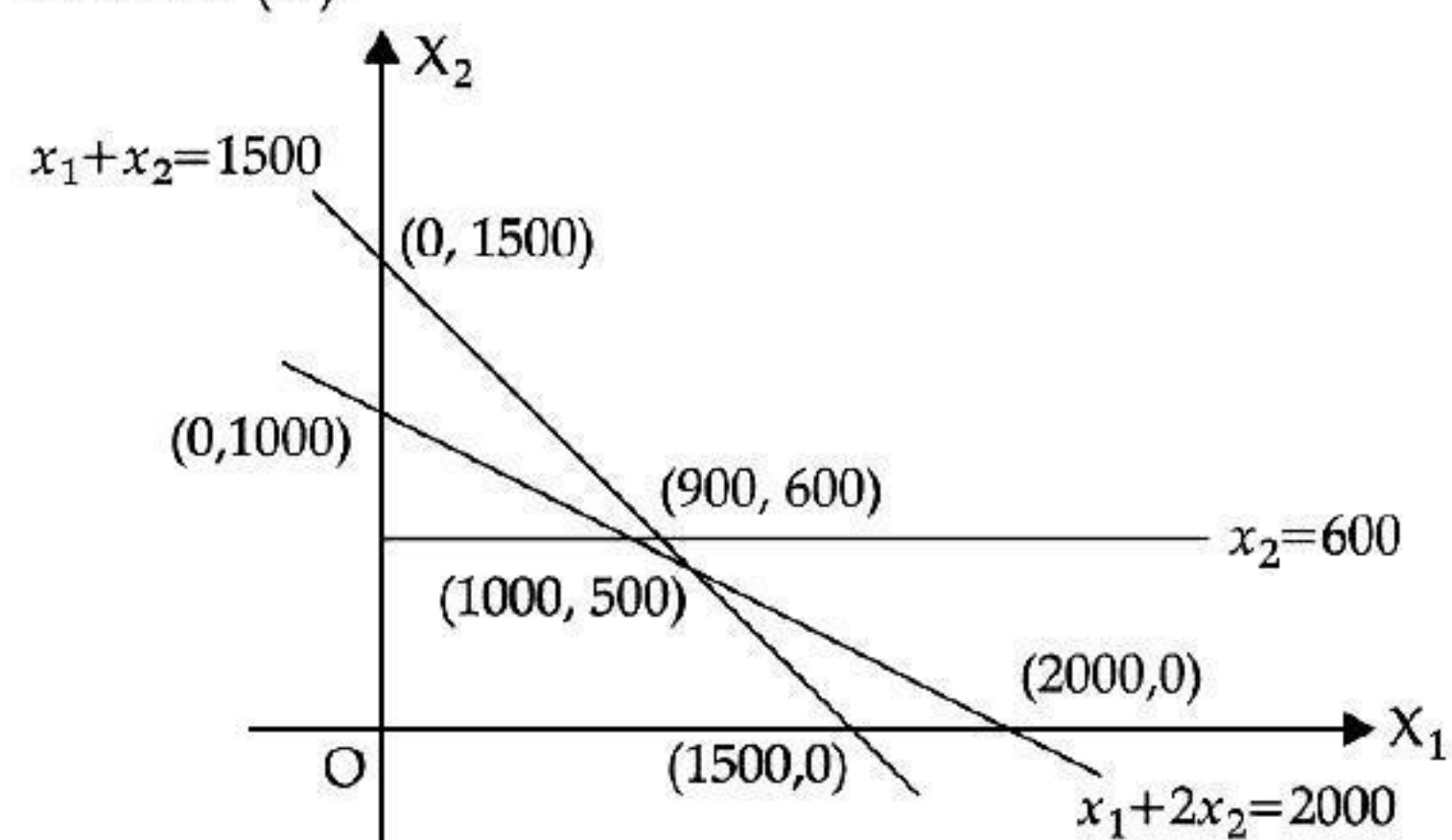
Ans. Option (A) is correct.

Explanation: Assertion (A) and Reason (R) both are correct and Reason (R) is the correct explanation of Assertion (A).

Q. 5. Assertion (A): For the constraints of a LPP problem given by

$x_1 + 2x_2 \leq 2000$, $x_1 + x_2 \leq 1500$, $x_2 \leq 600$ and $x_1, x_2 \geq 0$, the points (1000, 0), (0, 500), (2, 0) lie in the positive bounded region, but point (2000, 0) does not lie in the positive bounded region.

Reason (R):



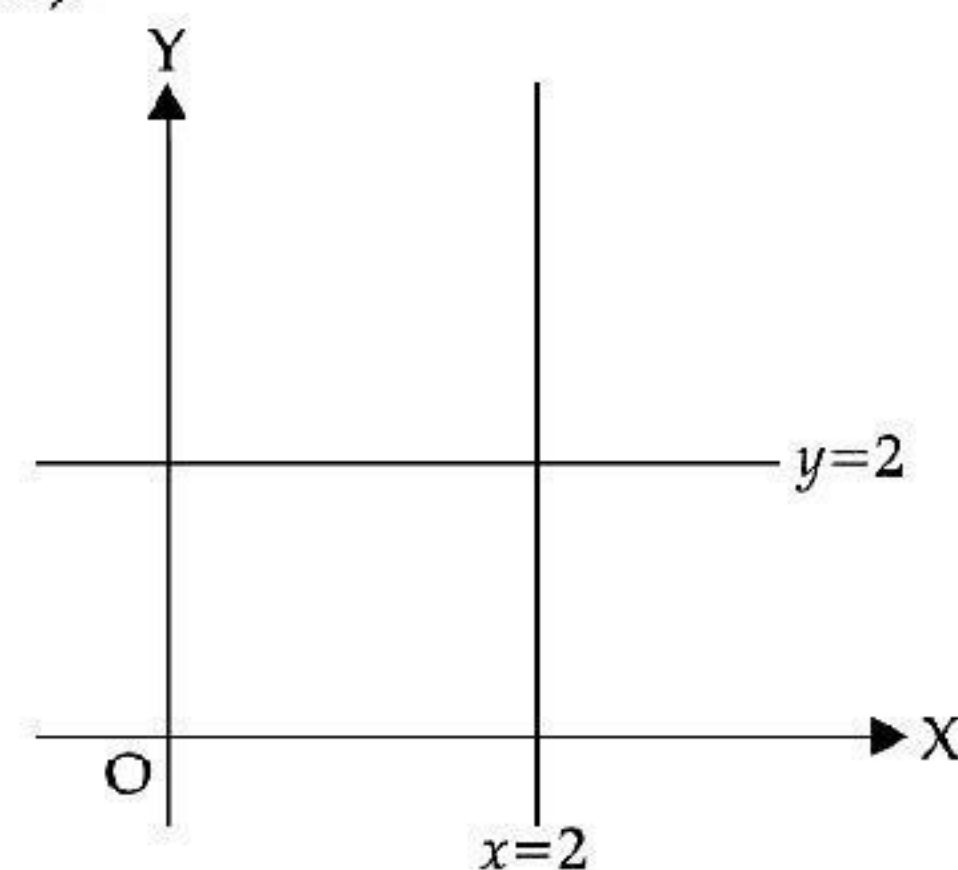
From the graph, it is clear that the point (2000, 0) is outside.

Ans. Option (A) is correct.

Explanation: Assertion (A) and Reason (R) both are correct, Reason (R) is the correct explanation of Assertion (A).

Q. 6. Assertion (A) : The graph of $x \leq 2$ and $y \geq 2$ will be situated in the first and second quadrants.

Reason (R):



Ans. Option (A) is correct.

Explanation: It is clear from the graph given in the Reason (R) that Assertion (A) is true.