CUET Mathematics Test

Unit VIII: Linear Programming (Intermediate Level)

SOLUTIONS

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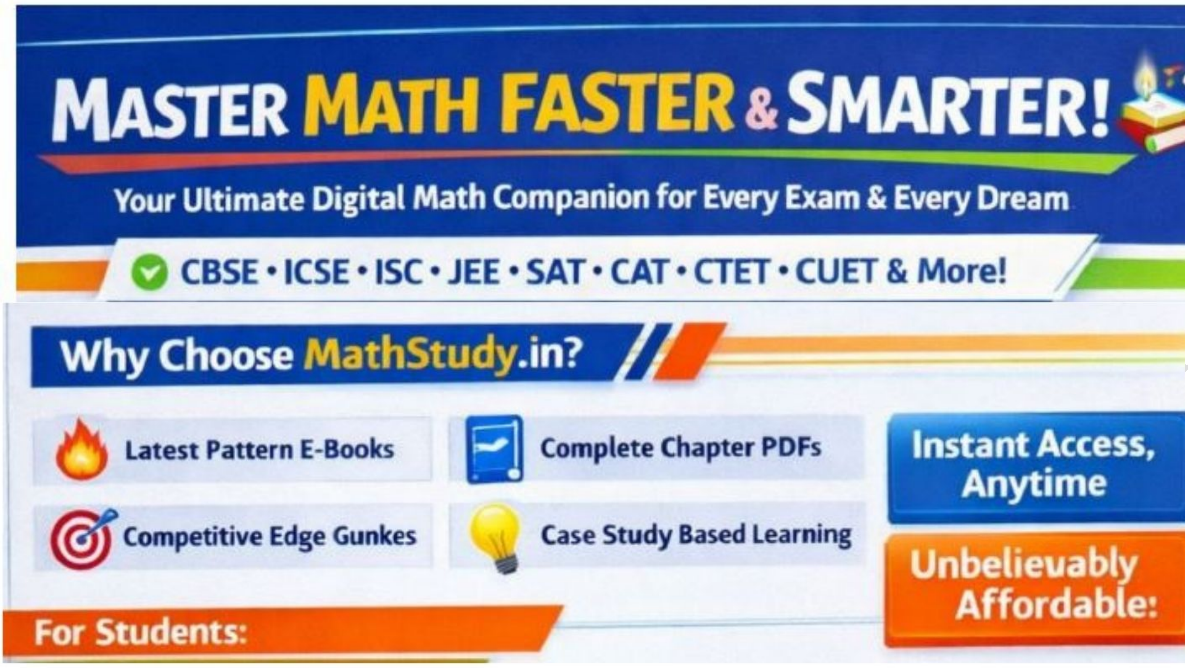

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Solutions

1. **Solution:** If two corner points yield the same optimal value, every point on the line segment joining them is also optimal. **Correct Option: (C)**

2. **Solution:** A constraint that does not restrict the feasible region further than existing constraints is redundant. **Correct Option: (B)**

3. **Solution:** $Z(0, 0) = 0, Z(4, 0) = 12, Z(0, 6) = -12$. Max is 12 at $(4, 0)$. **Correct Option: (B)**

4. **Solution:** $x + y$ cannot be both ≥ 2 and ≤ 1 at the same time. **Correct Option: (C)**

5. **Solution:** If the region is unbounded in the direction where the objective function increases, Z can become infinitely large. **Correct Option: (A)**

6. **Solution:** $(2, 3)$ gives $4 + 3 = 7 \leq 10$ and $2 + 9 = 11 \leq 15$. All others fail at least one. **Correct Option: (D)**

7. **Solution:** The Extreme Point Theorem guarantees that an optimal solution exists for a continuous function on a closed, bounded set. **Correct Option: (B)**

8. **Solution:** $Z(0, 2) = 12, Z(3, 0) = 12, Z(6, 0) = 24, Z(6, 8) = 72, Z(0, 5) = 30$. Minimum is 12. **Correct Option: (A)**

9. **Solution:** Adding equations: $3x = 18 \Rightarrow x = 6$. Then $y = 4$. **Correct Option: (A)**

10. **Solution:** The constraints form a rectangle with vertices $(0, 0), (3, 0), (3, 4), (0, 4)$. **Correct Option: (C)**

11. **Solution:** $Z(0, 20) = 180, Z(15, 15) = 45+135 = 180, Z(5, 5) = 15+45 = 60, Z(0, 10) = 90$. Max is 180. **Correct Option: (A)**

12. **Solution:** $Z(0, 10) = 30, Z(2, 4) = 4 + 12 = 16, Z(8, 0) = 16$. The minimum value is 16. **Correct Option: (A)**

13. **Solution:** The graphical method involves moving a line with a constant slope (Iso-profit) across the region. **Correct Option: (A)**

14. **Solution:** Any point that satisfies all constraints (the region itself) is a feasible solution. **Correct Option: (B)**

15. **Solution:** $Z = 1$ at $(1, 0)$ and $(0, 1)$. Since these are on the boundary $x + y = 1$, every point on that segment is optimal. **Correct Option: (C)**