MATHS

BOOKS - HIMALAYA MATHS (KANNADA ENGLISH)

LINEAR PROGRAMMING

Question Bank

1. Objective function of L.P.P is

A. a function to be optimized

B. a constants function

C. a relation between the variables

D. none of these

Answer: A

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2. Which of the following set is not a convex set

A. $\{(x, y) : x + y \leq 1\}$

B. $\{(x, y) : x^2 + y^2 \leq 1\}$

C. $\{(x, y) : 1 \leq x^2 + y^2 \leq 3\}$

D. $\{(x, y) : 2x^2 + 3y^2 \leq 6\}$

Answer: C

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3. Which of the following set is convex

A. $\{(x, y) : x^2 + y^2 \geq 1\}$

B. $\{(x, y) : 2x^2 + 5y^2 \leq 3\}$

C. $\{(x, y) : 4 \leq x^2 + y^2 \leq 7\}$

D. $\{(x, y) : 5 \leq 2x^2 + 5y^2 \leq 3\}$

Answer: B

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4. If $X_1 = (x_1, y_1)$ and $X_2 = (x_2, y_2)$ are two optimal solutions of a L.P.P., then

A. $\lambda X_1 + (1 - \lambda) X_2, \lambda$ in R is also an optimal solution

B. $\lambda X_1 + (1 + \lambda) X_2, \lambda$ in R is also an optimal solution

C. $\lambda X_1 + (1 + \lambda) X_2, 0 \leq \lambda \leq 1$ is also optimal solution

D. $\lambda X_1 + (1-\lambda)X_2, 0 \leq \lambda \leq 1$ is also optimal solution

Answer: D

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5. The optimal value of the objective function is attained at the points

A. on X-axis

B. on Y-axis

C. which are at the corner-points of the feasible region

D. Which are at the points of intersection of the inequation with Y-axis

Answer: C

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6. The solution of inequality $x \geq 0$ is

A. half plane on the left of Y-axis

B. half plane on the right of Y-axis including Y-axis

C. half plane on the right of Y-axis excluding Y-axis

D. half plane on the right of Y-axis and above X-axis

Answer: B

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7. Solution set of the inequality $y \leq 0$ is

A. half plane below X-axis, excluding the points on X-axis

B. half plane above X-axis

C. half plane below X-axis, including the points on X-axis

D. half plane above X- axis, including the point X-axis

Answer: C

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8. The solution set of the inequalities $x \geq 0$ and $y \leq 0$ is

A. First quadrant

B. Second quadrant

C. Third quadrant

D. Fourth quardant

Answer: D

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9. The region represents by the inequalities $x \geq 6, y \geq 3, 2x + y \geq 10, x \geq 0, y \geq 0$ is

A. unbounded

B. a polygon

C. bounded region

D. exterior of a triangle

Answer: A

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10. If an LPP admits optimal solution at two consecutive vertices of a feasible region, then

A. the required optimal solution is at the midpoint of line joining these two points

B. the optimal solution occurs at every point on the line joining these two points

C. the L.P.P under consideration is not solvable

D. the L.P.P under consideration must be reconstructed

Answer: B

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11. The feasible region of an L.P.P is always

A. a closet set

B. an unbounded set

C. a bounded set

D. a convex polygon

Answer: D

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12. The minimum value of the linear objective function x = 5x + 2y subjected to $10x + 2y \geq 20, 5x + 5y \geq 30, x \geq 0, y \geq 0$ is

A. 10

B. 15

C. 20

D. 25

Answer: B

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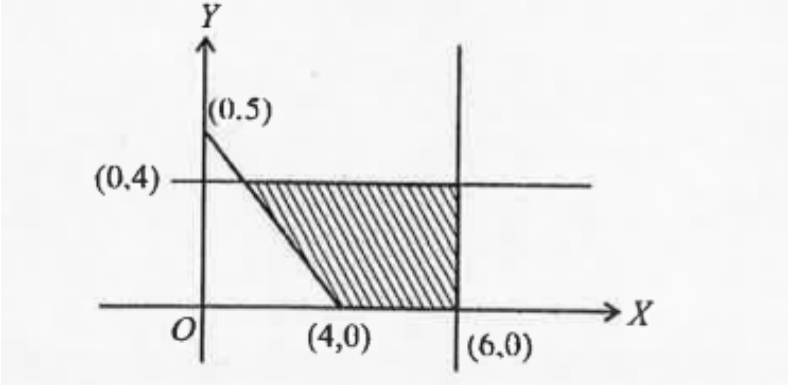
13. The shaded region in the following figure is the solution set of the inequations,



A. $5x + 4y \geq 20, x \geq 6, y \geq 4, x \geq 0, y \geq 0$

B. $5x + 4y \geq 20, x \leq 6, y \leq 4, x \geq 0, y \geq 0$

C. $5x + 4y \leq 20, x \leq 6, y \leq 4, x \leq 0, y \geq 0$

D. $5x + 4y \geq 20, x \geq 6, y \leq 4, x \geq 0, y \geq 0$

Answer: B

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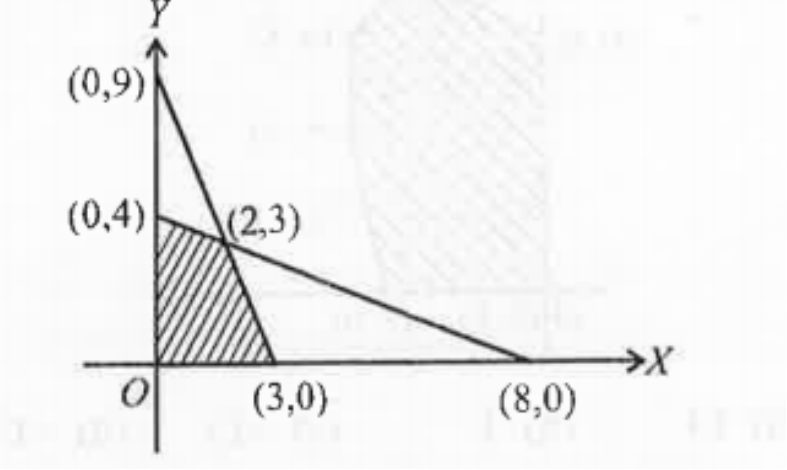
14. The shaded region in the following figure is the solution set of the inequations,



A. $3x + y \geq 9, x + 2y < 8, x \geq 0, y \geq 0$

B. $3x + y \leq 9, x + 2y > 8, x \geq 0, y \geq 0$

C. $3x + y \leq 9, x + 2y < 8, x \geq 0, y \geq 0$

D. $3x + y = 9, x + 2y > 8, x \geq 0, y \geq 0$

Answer:

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15. The maximum value of linear objective function z = 40x + 50y subjected to $3x + y \leq 9, x + 2y < 8, x \geq 0, y \geq 0$ is

A. 220

B. 240

C. 260

D. 230

Answer: D

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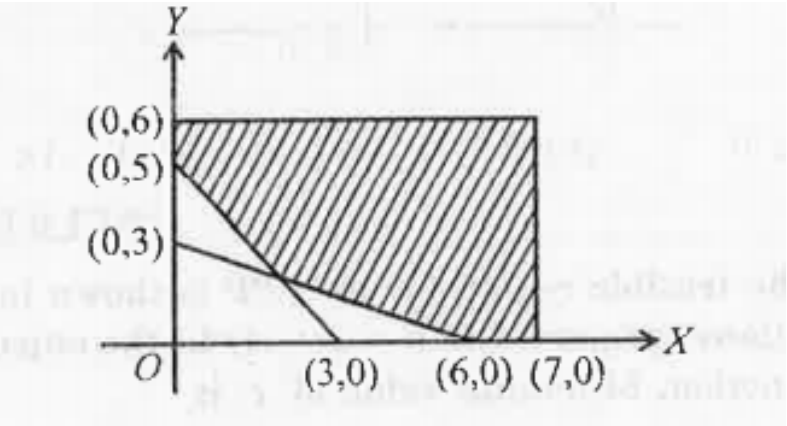
16. The shaded region in the following figure is the solution set of the inequations,



A.

$$x + 2y \leq 6, 5x + 3y \geq 15, x \leq 7, y \leq 6, x, y \geq 0$$

B.

$$x + 2y \geq 6, 5x + 3y \leq 15, x \leq 7, y \leq 6, x, y \geq 0$$

C.

$$x + 2y \geq 6, 5x + 3y \geq 15, x \leq 7, y \leq 6, x, y \geq 0$$

D.

$$x - 2y \geq 6, 5x - 3y \geq 15, x \leq 7, y \leq 6, x, y \geq 0$$

Answer: C

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17. Maximum value of set z = 3x +2y subjected to $0 \leq x \leq 3, 0 \leq y \leq 3, x + y \leq 5, 2x + y \geq 4$, is

A. 10

B. 11

C. 12

D. 13

Answer: D

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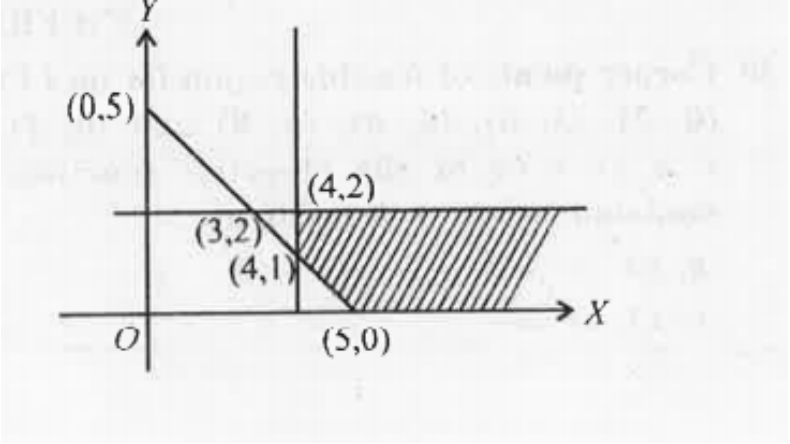
18. The shaded region in the following figure is the solution set of the inequations,



A. $x, y \geq 0, x + y \geq 5, x \geq 4, y \leq 2$

B. $x, y \geq 0, x + y \leq 5, x \geq 4, y \leq 2$

C. $x, y \geq 0, x + y \geq 5, x \leq 4, y \leq 2$

D. $x, y \geq 0, x + y \geq 5, x \geq 4, y \geq 2$

Answer: A

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19. The minimum value of z = 6x + 4y subjected to $2x + 3y \leq 30, 3x + 2y \leq 24, x + 4y \leq 3, x, y \leq 0$

A. occur at only one point

B. occur at two points only

C. occur at infinite number of points

D. does not occur at any point

Answer: C

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20. The region represented by the inequations $2x + 3y \leq 18, x + y \geq 10, x \geq 0, y \geq 0$ is

A. unbounded

B. a polygon

C. bounded region

D. null region

Answer: D

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21. Optimization of the objective function is a process of

A. maximizing the objective function

B. minimizing the objective function

C. maximizing or minimizing the objective function

D. none of these

Answer: C

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22. The corner points of the feasible region determined by the system linear constraints are (0,10), (5,5), (15,15), (0,20). Let Z = px+ qy, where p,

$q > 0$, condition on p and q so that the maximum of Z occurs at both the points (15,15) and (0,20) is

A. p = q

B. p = 2q

C. q = 2p

D. q = 3p

Answer: D

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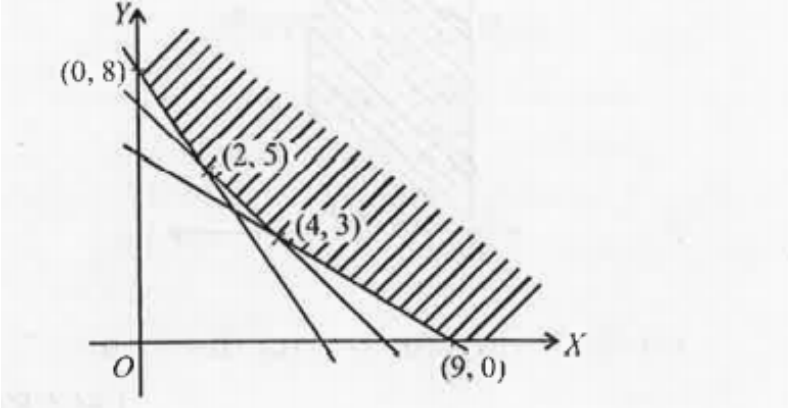
23. Feasible region (shaded) for a LPP is shown in the following figure



A. (0,8)

B. (2,5)

C. (4,3)

D. (9,0)

Answer: B

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24. The corner points of the feasible region determined by the system of linear constraints are (0,0), (0,40), (20,40), (60, 20), (60, 0). The objective function is Z = 4x + 3y. Compare the quantity in column in A and column B. Column A= Maximum of Z Column B= 325

A. The quantity in column B is greater

B. The quantity in column A is greater

C. The two quantities are equal

D. The relationship can not be determined on the basis of the information supplied

Answer: A

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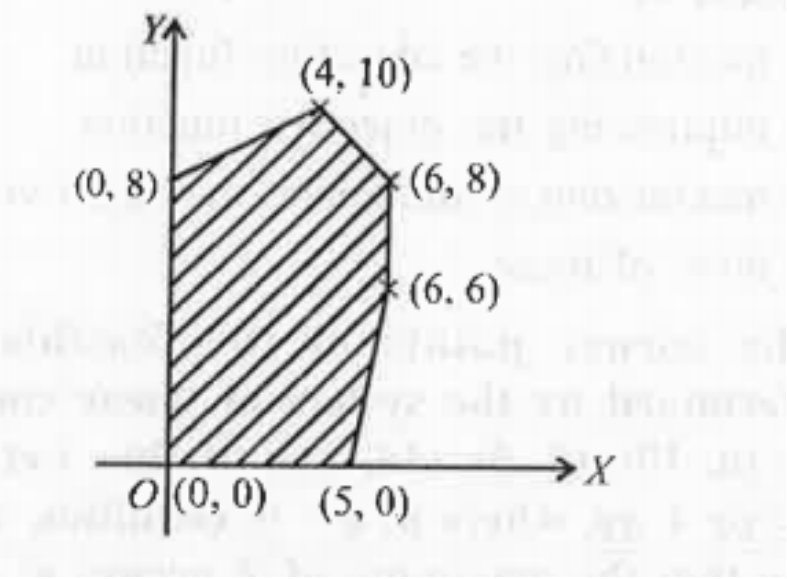
25. The feasible solution for a LPP is shown in the following figure. Let Z=3 x-4 y be the objective function. Minimum of Z occurs at



A. (0,0)

B. (0,8)

C. (5,0)

D. (4,10)

Answer: B

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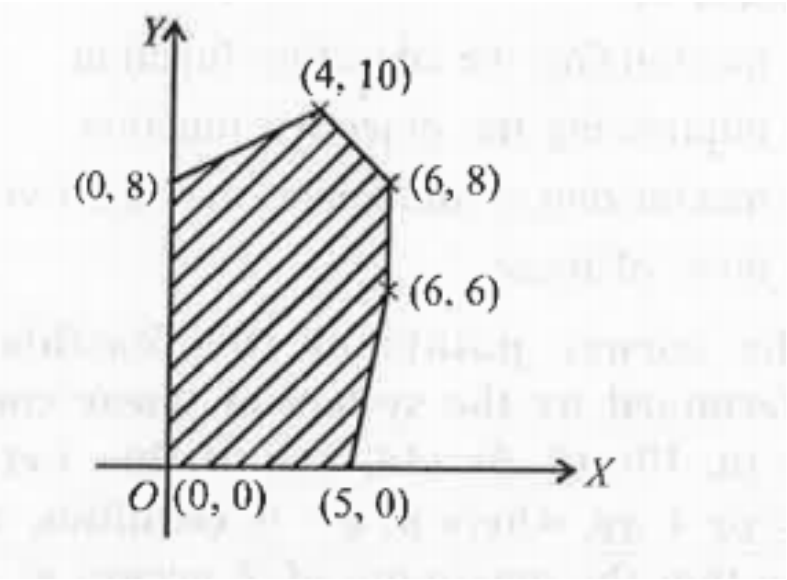
26. The feasible solution for a LPP is shown in the following figure. Let Z=3 x-4 y be the objective

function. Minimum of Z occurs at



A. (5,0)

B. (6,5)

C. (5,0)

D. minus 46

Answer: A

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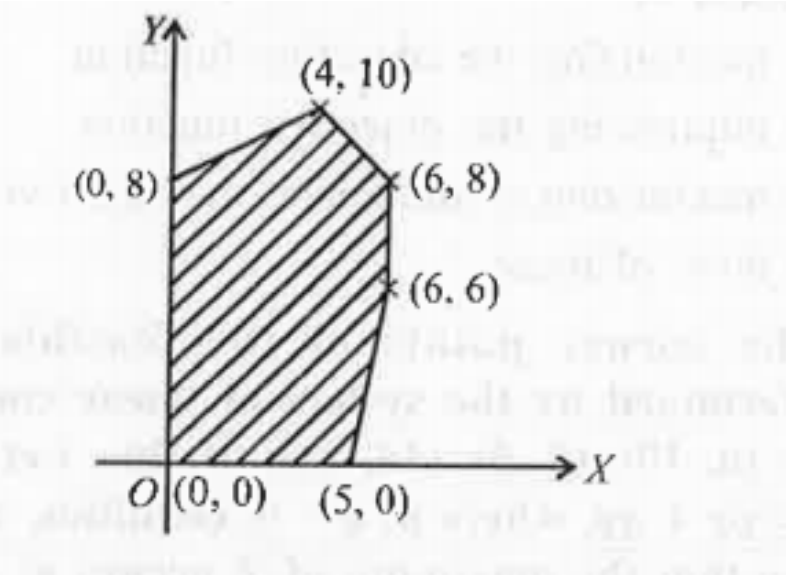
27. The feasible solution for a LPP is shown in the following figure. Let Z=3 x-4 y be the objective function. (Maximum value of Z+ Minimum value of Z) is



A. 13

B. 1

C. -13

D. -17

Answer: D

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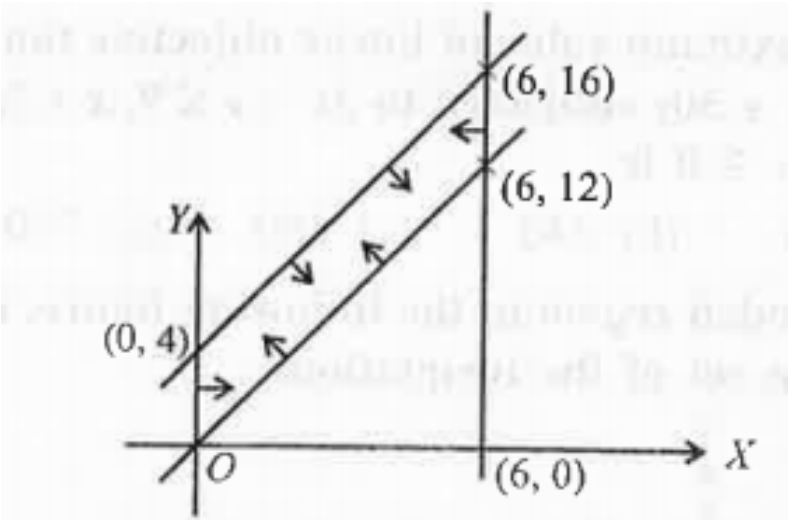
28. The feasible region for an LPP is shown in the following figure. Let F=3 x-4 y be the objective

function. Maximum value of F is



A. 0

B. 8

C. 12

D. minus 18

Answer: C

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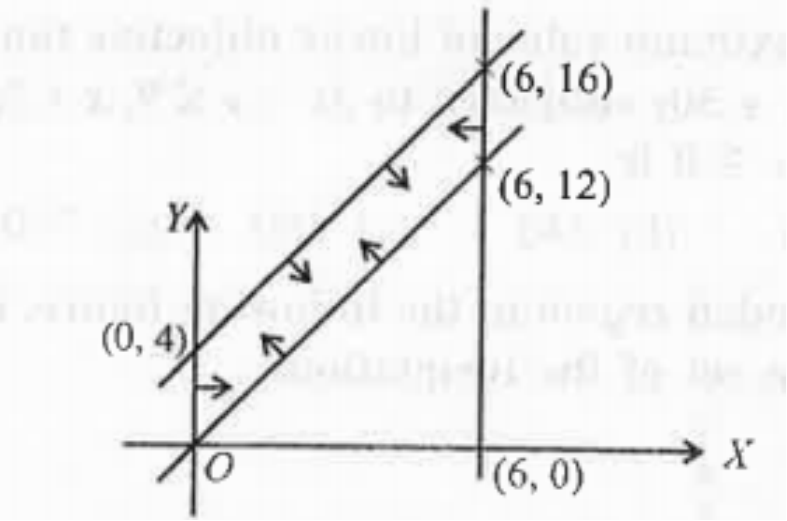
29. The feasible region for an LPP is shown in the following figure. Let F=3 x-4 y be the objective function. Minimum value of F is



A. 0

B. minus 16

C. 12

D. minus 46

Answer: D

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30. Corner points of feasible region for an LPP are (0,2),(3,0),(6,0),(6,8) and (0,5). Let F=4 x+6 y be the objective function. The minimum value of F occur at

A. (0,2) only

B. (3,0) only

C. the mid point of the line segment joining the points (0,2) and (3,0) only

D. any point on the line segment joining the points (0,2) and (3,0)

Answer: D

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31. In the equation 33 Maximum of F - Minimum of F =

A. 60

B. 49

C. 42

D. 18

Answer: A

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32. Corner points of the feasible region determined by the system of linear constraints are $(0, 3), (1, 1)$ and $(3, 0)$. Let $z = px + qy$, where $p, q > 0$. Condition on p and q so that the minimum of z occurs at (3, 0) and (1, 1) is

A. p = 2q

B. p = -q/2

C. p = 3q

D. $p = q$

Answer: B

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