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GOPAL GOVIND POY RAITURCAR COLLEGE OF COMMERCE AND
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**B.COM. CHOICE BASED CREDIT SYSTEM (SEMESTER - II)
REPEAT (TRUNCATED) EXAMINATION, MAY 2023**

COMMERCIAL ARITHMETIC

Duration: 2 hours

Marks: 80

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- Instructions:**
1. Attempt all questions
 2. Figures to the right indicate full marks.

Q.1 Attempt the following: (5 X 4=20)

- a. Find a point on x -axis whose distance from (4,8) is 10 units.
- b. If $f(x) = ax - 6$ and $f(3) = 12$ find a.
- c. Find $\frac{dy}{dx}$ for the following:
 - i) $y = \frac{2x+5}{x-1}$
 - ii) $y = (2x-3)(x+3)$
- d. Evaluate $\int (3x^2 - 6x + 7)dx$.
- e. If $f(x) = x^2 + 5x - 4$, the find x if $f(x) = f(x+1)$.

OR

Q.I Attempt the following: (5 X 4=20)

- p. The equation of line is $3x + 4y = 6$, find the slope of the line.
- q. Given that $f(x) = f(x+1)$ and $f(x) = x^2 + 5x + 7$, find the value of x.
- r. Differentiate w.r.t. x
 - i) $y = 3x^2 + 2x + 1$
 - ii) $y = \frac{x-2}{x-1}$
- s. Show that the points A(5,4), B(2,3) and c(1,0) are the vertices of an isosceles triangle.
- t. Integrate the following w.r.t. x

- i) $3x^2 - 2x + e^x$
 ii) $(x^2 - x - 12)/(x - 4)$

Q.2 Attempt the following:

(5 X 4=20)

- a. Find the equation of line passing through A(2, -5) and B(4,3). Also write the value of slope.
 b. If A(4,5) and B(3,-2), find the co-ordinates of the point which divide segment AB externally in the ratio 4:3.
 c. The demand function is given by $p = 30 + 6D - D^2$. Find the revenue and marginal revenue when demand is 5 units.
 d. If $z = x^2/y$, show that $x \frac{\partial z}{\partial x} + y \frac{\partial z}{\partial y} = z$
 e. If $D = 25 - 3p - p^2$ is a demand function, find the elasticity of demand when $p = 2$.

OR

Q.II Attempt the following:

(5 X 4=20)

- p. Find the equation of line passing through (1,2) and parallel to the line $4x + 3y - 1 = 0$.
 q. Differentiate w.r.t. x
 i) $y = x^3 + \sqrt{x}$ ii) $y = (x^2 + 3)/(x-1)$
 r. If the demand function is given by $p = 100 + 3D - D^2$, find the elasticity of demand when $D = 10$.
 s. The demand function for a commodity is $p = 90 - 2x - x^2$. Find the consumer's surplus when $p = 5$.
 t. Evaluate $\int_1^3 (x - 3)(x + 1) dx$

Q.3 Attempt the following:

(5 X 4=20)

- a. Solve the following LPP by graphical method.

Maximise $Z = 600x + 200y$ such that

$$4x + 6y \leq 120$$

$$10x + 3y \leq 180$$

$$x_1, x_2 \geq 0.$$

- b. If the total cost of x items is $C=45 + 12x - x^2$, find total cost and marginal cost of 10 items produced.
- c. Evaluate the lim $\lim_{x \rightarrow 2} \frac{(x^2 - 4)}{(x^2 - x - 2)}$
- d. If $M(4,-5)$ and $N(3,2)$, find the co-ordinates of the point which divide segment MN externally in the ratio 2:3.
- e. Find the equation of line passing through $(1,2)$ and the point of intersection of the lines $4x + 3y - 1 = 0$ and $3x - y + 9 = 0$.

OR

Q. III Attempt the following:

(5 X 4=20)

- p. If $A(2,-3)$ and $B(3,2)$, find the co-ordinates of the point which divide segment AB internally with equal ratio.
- q. Solve the following LPP by graphical method.
Minimise $Z = 2x - y$ such that
$$x + y \leq 5$$
$$x + 2y \leq 8$$
$$x, y \geq 0.$$
- r. The midpoint of line segment joining $(2a, 4)$ and $(-2, 2b)$ is $(1, 2a+1)$, find a and b .
- s. Find the range of the function
 $f(x) = 3x^2 + 4$ for $-4 \leq x \leq 3$.
- t. If the total cost of x item is $C = 50 + 16x - x^2$, find the average cost and marginal cost when 15 items are produced.

Q.4 Attempt the following:

(5 X 4=20)

- a. Show that $A=(2,2)$, $B=(-2,4)$ and $C=(2,6)$ are the vertices of isosceles triangle ABC .

- b. If the total cost of x item is $C = 100 + 25x - x^2$, find i) the average cost
ii) marginal cost when 15 items are produced.
- c. The sum of two numbers is 50 and their difference is 10. What is the ratio between the numbers?
- d. The marginal cost $MC = 3x^2 + 4x + 5$. Find the cost function, if the fixed cost is 100. Also find the value of cost function at $x=10$.
- e. Evaluate $\int_0^1 (x^2 - 6x + 7) dx$.

OR

Q.IV Attempt the following:

(5 X 4=20)

- p. Show that $A(1,2)$, $B(0,-5)$ and $C(3,-4)$ are the vertices of a right angled triangle.
- q. Find the equation of line passing through $(4,3)$ having slope -3 .
- r. If $z = 2x^3 - 11x^2y + 3y^3$, show that $x \frac{\partial z}{\partial x} + y \frac{\partial z}{\partial y} = 3z$.
- s. Find the producer's surplus at $x = 3$, if the supply function is $p = 6x - 7$.
- t. Evaluate $\int_0^2 \frac{x-5}{x} dx$.