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GOPAL GOVIND POY RAITURCAR COLLEGE OF COMMERCE AND ECONOMICS PONDA GOA
B.COM. CHOICE BASED CREDIT SYSTEM (SEMESTER - II)
EXAMINATION, APRIL/MAY 2023

COMMERCIAL ARITHMETIC

Duration: 2 hours **Marks: 80**

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

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

a. If A is (1,-2) and B is (4,b), find the possible values of b, so that d(AB)=5.

b. If f(x)= mx + 6 and f(1) =10 find the value of m.

c. Find $\frac{dy}{dx}$ for the following:

i) $y = \frac{2x-3}{x+2}$

ii) y = (x+3)(x -4)

d. Evaluate $\int (3x^2 - 2x + 5)dx$

e. If the total cost of x item is $C = 3x^3 + 5x^2 + 4$, find i) the average cost ii) marginal cost when 4 items are produced.

OR

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

p. Find a point on x -axis whose distance from (4,8) is 10 units.

q. If $f(x) = x^2 + 5x - 4$, the find x if f(x) = f(x+1).

r. Differentiate w.r.t. x

i) $y = 2x^3 - 2x + 5$ ii) $y = \frac{x+4}{x-1}$

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) $x^5 - 4x^3 + \frac{4}{x}$

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(1, –2) and B(-3,4). Also write the slope of the line.

b. 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.

c. The demand function is given by $p = 40 + 3D - 5D^2$. Find the revenue and marginal revenue when demand is 2 units.

d. If $z = 3x^5/y^4$, 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 = 3.

OR

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

p. Find the equation of line passing through (3,4) and the point of intersection of the lines $4x + 3y - 1 = 0$ and $3x - y + 9 = 0$.

q. Differentiate w.r.t. x

i) $y = x^2 + \sqrt{x}$ ii) $y = (x^2 - 5) / (x+3)$

r. If the demand function is given by $p=100 - 3D - D^2$, find the elasticity of demand when D= 5.

s. In a school having 405 students, the ratio between number of boys and girls is 7:2. If the number of girls are increased by 50, the ratio of boys to girls become 3:1, find the increase in the number of boys.

t. Evaluate $\int_1^2 (x+2)(x-1)dx$

Q.3 Attempt the following: **(5 X 4=20)**

a. Solve the following LPP by graphical method.

Maximise $Z = 800x + 100y$ 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 5 items produced.

c. Evaluate the $\lim_{x \to 2} \frac{(x^2 - 4)}{(x^2 - x - 2)}$

d. Examine the continuity at x=4 of the function

$f(x) = (x^2 - 16)/(x-4)$ for $x \neq 4$

$f(4) = 10$

e. A purchaser paid 7,80,000 on a car which cost 8,00,000. Find the rate percent of discount.

OR

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

p. 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.

q. Solve the following LPP by graphical method.

Minimise $Z = 2x + 3y$ such that

$x + y \leq 5$

$x + 2y \leq 8$

$x, y \geq 0.$

r. The midpoint of line segment joining (2m, 4) and (-2, 2n) is (1, 2m+1), find m and n.

s. Find the range of the following function

$f(x) = 4x + 5$ for $-5 \leq x \leq 7$

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

a. Find the equation of line parallel to $x - 2y + 1 = 0$ and having an intercept -2 on x – axis.

b. If the total cost of x item is $C = 50 + 15x - x^2$, find i) the average cost ii) marginal cost when 10 items are produced.

c. The ratio of the ages of a mother to that of her daughter is 7:3 today. After 5 years, the ratio would be 2:1. How old is the mother?

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=4.

e. Evaluate $\int_0^1 (3x^2 - 6x)dx$

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,-5) 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 total revenue function, if the marginal revenue function is given by $MR = 5 - 3x^2 - 4x^3$.

t. The sum of two numbers is 50 and their difference is 10. What is the ratio between the numbers?