Roll No.

Vidya Vikas Mandal's
Shree Damodar College of Commerce & Economics, Margao-Goa
FY B.Com, Semester-II, Supplementary Examination June 2023
Commercial Arithmetic –II (CC 8)

Max Marks: 80

Duration: 2hrs

Instructions:

1) **Start each question on fresh page.**
2) **Figures to the right indicate maximum marks.**
3) **Non programmable calculator is allowed.**
4) **Graph paper can be used wherever applicable**

Q 1) Attempt the following questions. **5X4=20**

a) Find the distance between the points P (3,-5) and Q (6,-2) ?

b) Evaluate the following $\int_0^1 (e^x + 2x + 1)\, dx$.

c) The total cost function is given by $C = 2x^3 - 15x^2 + 24x + 50$. Find the value of x for which the total cost is decreasing ?

d) The demand function for a commodity is given by $P = 16 - \frac{D^2}{4}$. Find the total revenue and the marginal revenue when D=1 ?

e) Arun was drawing a salary of Rs 6000 per month . He got a 25% rise in his salary .One year later his salary was reduced by 10% by way of deduction from his loan .Find his new salary ?

OR

Q I) Attempt the following questions. **5X4=20**

i) If 32 is added to 80% of a number , the result is the number itself .Find the number.

ii) Two numbers have their annual incomes in the ratio 5:3 .If they save Rs.2400 and Rs.2000 respectively .Find their incomes.?

iii) Given $Z = x^2 + y^2 - 5$, find $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial y}$ at the point (1,3).

iv) Evaluate $\lim_{x \to 2} \frac{x^2-4}{(x^2-x-2)}$

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v) Solve the following linear programming problem by graphical method

$$\text{Max } Z = 3x + 5y$$

s.t $\quad x + 2y \leq 20$

$\quad x + y \leq 15$

$\quad y \leq 6$

$\quad x \geq 0$ and $y \geq 0$

Q 2) Attempt the following questions. **5X4=20**

a) Two vertices of a triangle are (- 1,4) and (5,2). If the Centroid of a triangle is (5,4). Find the third vertex.

b) Find the equation of the line having y- intercept 3 and parallel to line 3x- 2y = - 4 .

c) Show that the function $f(x) = 2x^3 - 15x^2 + 36x + 5$ has a maximum when x = 2 and minimum at x = 3. Find the minimum and maximum value of the function .

d) Evaluate $\int (x-2)(x+7)dx$

e) Ajay purchased a book for Rs. 1250 and sold it for Rs.1100 . Find the loss percent?

OR

Q II) Attempt the following questions. **5X4=20**

i) The listed price of a dressing table at a store is Rs 17800 on which a regular discount of 20% is given. Due to partial damage , an additional discount of 20% is given . How much did the buyer purchase it for ?

ii) The ages of Rita and Meeta are in the ratio 5:7 and the difference between their ages is 12 years .Find the present ages of Rita and Meeta ?

iii) The supply function for a commodity is $P = x^2 + 5x + 4$ where x is the quantity supplied . Find the producers surplus when the price is 10.

iv) The average cost manufacturing x items is given by $AC = 1 + 60x - 9x^2 - 2x^3$. Find x for which the average cost is a) increasing b) decreasing .

v) If (a ,1) ,(2 ,-3) and (1 ,-5) are collinear points . Find the value of a ?

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5X4=20

Q 3) Attempt the following questions.

a) Show that the points (0,0), (5,5) and (-5,5) are the vertices of a right angled triangle .

b) Solve the following linear programming problem by graphical method

Max Z = x + y

s.t $x+2y \leq 8$

$3x + 2y \leq 1$ $\quad x \geq 0$ and $y \geq 0$

c) A function is defined as

$f(x) = x^2 - 4 \quad 0 \leq x \leq 2$

$= 3x + 2 \quad 2 \leq x \leq 4$

$= x^2 - 1 \quad 4 \leq x \leq 6$

Discuss the continuity of f(x) at x = 2 and x = 4.

d) If the marginal cost function for a product is $f(x) = 15x^2 + 6x + 4$ and the fixed cost is Rs 200. Find the total cost and average cost function.?

e) Father is four times as old as his son today. After 20 years he would be as twice as old as his son. How old is the father ?

OR

Q III) Attempt the following questions. **5X4=20**

i) Rina and Bina are two partners in a firm sharing the profit in the ratio 4:5 .If the firm earns a profit of Rs 14130 in 2010, Calculate the amount of profit to be received by each partner?

ii) The midpoint of a line segment joining (2a ,4) and (-2 ,2b) is (1, 2a+1) .Find the value of a and b .

iii) The supply function of a commodity is $p = x^2 + 10$. Find the producers surplus when price per unit of the commodity is Rs 35?

iv) If $f(x,y) = 2x^3 - 11x^2y + 3y^3$, Show that $x\frac{\partial f}{\partial x} + y\frac{\partial f}{\partial y} = 3f(x,y)$

v) Find the derivative of the following $y = 5x^2 \log x$

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Q 4) Attempt the following questions. **5X4=20**

a) If y= log x +5 , find $\frac{dy}{dx}$, $\frac{d^2y}{dx^2}$ and $\frac{d^3y}{dx^3}$

b) Evaluate $\int (x^6 - \frac{3}{x^2} + \frac{2}{x} + \frac{1}{\sqrt{x}} + 11)\, dx$

c) If the marginal demand for a certain commodity is MD= 3- 2p with demand D=14 at p=2 Find the demand function at p=1 and p=3 ?

d) The line segment joining A(2,3) and B(6,-5) is intersected by y-axis at point K. Find the ratio in which K divides AB . Also write down the ordinate of point K .

e) The selling price of 20 articles is equal to the cost price of 25 articles .Find the gain or loss percent?

OR

Q IV) Attempt the following questions. **5X4=20**

i) John buys a bike for Rs 60,000 and sells it at Rs 75000 with 25% discount .Find his gain or loss percent ?

ii) At present , a fathers age is thrice that of his son .6 years ago his age was four times that of his son. What will be the ratio of their ages after 6 years ?

iii) Differentiate the following w.r.t x , $y = 2\sqrt{x} + 4^x - 3x^2 + \log x$

iv) Show that the point (0,-2) ,(3,1) (0,4) and (-3,1) are the vertices of a square using distance formula .

v) The supply function for a commodity is $p = x^2 + 5x + 4$ where x is the quantity supplied. Find the producers surplus when the price is 10.