

GOVT. COLLEGE OF COMMERCE AND ECONOMICS
BORDA - MARGAO
B.Com (Semester-II) April 2019
CC 8: Commercial Arithmetic II

Time duration: 2 hrs

Max Marks: 80

Instructions :

1. All questions are compulsory.
2. Figures to the right indicate marks.
3. Graph papers will be supplied on request.

1) Attempt the following.

(4 × 5 = 20)

a) Find the distance between the points (-2,5) and (3,4).

b) If $f(x) = 2x^2$ and $g(x) = 4x-3$ find $f(g(x))$ and $g(f(x))$.

c) Evaluate $\lim_{x \rightarrow 5} \frac{x^2 - 4x - 5}{x - 5}$

d) Differentiate the following functions with respect to x

i) $x^3 \log x$

ii) $8^x - 5x^{-3} + \frac{7}{x} - \frac{1}{2} x^{\frac{1}{2}}$

e) Two numbers are in the ratio 1:2. If 7 is added to both, their ratio changes to 3:5. Find the two numbers.

OR

I. Attempt the following.

(4 × 5 = 20)

A) Find the coordinates of the point P which divides the line AB internally in the ratio 3:2 where A = (3, 4), B = (6, 8).

B) If $f(x) = 7x$ and $g(x) = x^2 + 18$, find $f(g(x))$ and $g(f(x))$.

C) Examine the continuity of the following function at $x = 3$

$$f(x) = \begin{cases} x^3 + x - 9 & , \quad -6 \leq x \leq 3 \\ \frac{x^2 + 1}{2} & , \quad 3 < x < 7 \end{cases}$$

D) Differentiate the following functions with respect to x

a. i) $\frac{5x^3 + 1}{2x + x^6}$

ii) $11^x + x^{-7} + 4$

E) Find the fourth proportional to 5, 8, 15.

2) Attempt the following.

(4 × 5 = 20)

a) Evaluate the following integrals

i) $\int (7x^2 + x)(1 - 5x)dx$

ii) $\int \left(\frac{xe^x - 1 + 2x^9}{x} \right) dx$

b) Show that the points (3,5) (4,3) and (11,-4) are vertices of an isosceles triangle.

c) The total cost in thousands of rupees for the daily production of an item is $C = 40 + 10x - x^2$. Find

i. The average cost.

ii. The marginal cost when 5 units are produced.

d) Divide Rs.1162 among A, B, C in the ratio 35 : 28 : 20.

e) Find the equation of the line passing through (1,6) and (-5,0).

OR

II. Attempt the following.

(4 × 5 = 20)

A) Evaluate the following integrals

a. i) $\int (7x^2 + x)(1 - 5x)dx$

ii) $\int \left(\frac{xe^x - 1 + 2x^9}{x} \right) dx$

B) Show that the points (3,6), (9,0) and (-1,2) are the vertices of a right angled triangle.

C) The demand function for a commodity is given by $p = 30 + 12x - 4x^2$. Find

i. The Total Revenue function

ii. The Marginal Revenue function, when $x = 4$

D) Find the mean proportional of 0.08 and 0.18.

E) Find the equation of the line passing through the point (7,4) and perpendicular to the line having slope 2.

3) Attempt the following.

(4 × 5 = 20)

- a) Find the equation of the line which passes through the point of intersection of lines $3x - y = 1$ and $5x + 3y = 11$ and having slope 5.
- b) Verify if $f(x) = 4x + 3x^2 - 2$ is increasing or decreasing at the points $x = -1$ and $x = 1$.
- c) The demand function for a commodity is $6x^2 - 20x + 15$ find the consumer's surplus at $x = 1$.
- d) The demand function is given by $D = 15 - 4p - p^2$. Find the elasticity of demand with respect to the price when $p = 3$.
- e) Find the value of 28% of $450 + 45\%$ of 280 .

OR

III. Attempt the following.

(4 × 5 = 20)

- A) Find the equation of the line making intercepts 4 and -7 on the x and y axes respectively.
- B) Show that the $x^5 - 5x^4 + 5x^3 - 1$ curve has a maximum when $x = 1$ and a minimum when $x = 3$.
- C) The demand function for a commodity is $3x^2 + 2x + 9$. Find the consumer's surplus at $x = 1$.
- D) If the demand function is given by $D = 8p^3 - p^2 + 10$. Find the elasticity of demand with respect to the price when $p = 2$.
- E) If Rs. 2800 is $\frac{2}{7}\%$ of the value of a house, find the worth of the house.

4) Attempt the following. .

(4 × 5 = 20)

- a) Maximize $z = 45x + 55y$ subject to $3x + 10y \leq 180$, $6x + 4y \leq 120$, $x \geq 0$, $y \geq 0$.
- b) If the supply function for a commodity is $p = 3x^2 + 8x - 7$. Find the producer's surplus at $x = 3$.
- c) A manufacturer can sell x items at a price $p = 330 - x$ each. The cost of producing x item is Rs ($x^2 + 10x + 12$). Find the number of items to be sold so that the manufacturer can make maximum profit.
- d) Find the second order partial derivatives of $f(x,y) = x^2y + xy^2 - 4x - 5y + 1$
- e) The list price of an article is Rs 120. If 6% discount is allowed, find what amount will the buyer pay.

OR

IV. Attempt the following. .

(4 × 5 = 20)

- A) Maximize $z = 50x + 100y$ subject to $2x + 6y \leq 60$, $5x + 2y \leq 50$, $x + y \leq 12$, $x \geq 0$, $y \geq 0$.
- B) If the supply function for a commodity is $p = x^2 + x - 1$, find the producer's surplus at $x = 1$.
- C) The total cost function is $C = x^2 - 100x + 15$ where x is the number of units produced. Find the value of x for which the cost is minimum.
- D) Find the second order partial derivatives of $f(x,y) = x^4 + y^4 - 4xy + 15$.
- E) A customer purchases a machine priced Rs. 9850 for Rs. 9062. Calculate the rate of discount.