GOVT. COLLEGE OF COMMERCE AND ECONOMICS
BORDA – MARGAO.
B. Com (Semester - II), April 2018
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.

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

a) Show that the points $(-1,2)$, $(3,-1)$ and $(2,6)$ are the vertices of an isosceles right angled triangle.

b) If $f(x)=4x^2-3x$ and $g(x)=7x$, find $f(g(x))$ and $g(f(x))$

c) Evaluate $\lim_{x\to 2}\frac{x^3+x^2-12}{x^3-x^2-x-2}$

d) Differentiate the following functions with respect to x
i) $(x^3+5)(3x-2)$ ii) $\frac{1}{(x^3-5x^2+10x)^3}$

e) The combined cost of a cycle and a watch is Rs. 20,000. If their cost are in the ratio 15:10, find the cost of the cycle and the watch.

OR

I. v) Find the coordinates of the points on the x axis which are at a distance of 10 units from $(3,-6)$. **(5 x 4=20)**

w) If the demand function is given by $D=25-4p+p^2$, find the elasticity of demand with respect to the price when $p=8$.

x) Examine the continuity of $f(x)=\begin{cases}\frac{x^2-9}{x+3} & , -5\le x<-3\\ x+1 & , -3\le x\le 1\end{cases}$

at the points -5 and -3 .

y) Differentiate the following function with respect to x

i) $\frac{x+10}{x-9}$ ii) $x^{-1}+\frac{1}{\sqrt{x}}+6^x+e^x$

z) The daily incomes of A and B are in the ratio of 4:3 and their expenditures are in the ratio of 3:2. If they each save Rs. 600 at the end of the day, find their daily income.

2. Attempt the following: (5 x 4=20)

a) Evaluate the following integrals

i) $\int x^2(x+5)dx$ ii) $\int\frac{(x+3)e^x-(x+3)x^3}{x+3}dx$

b) $A=(-2,-1)$, $B=(3,-2)$ represent a diameter of a circle. Find the coordinates of the centre of the circle.

c) A firm produces x tons of an item at the total cost

$C(x)=\frac{1}{10}x^3-9x^2+85x+17$.

Find i) The average cost

ii) The marginal cost when 10 tons of an item are produced.

d) What number should be added to each of the numbers 5, 9 and 15 so that the resultant numbers may be in continued proportion.

e) Find the equation of the line passing through the points $(3,4)$ and $(-1,2)$.

OR

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

v) Evaluate the following integrals

i) $\int_0^1(x^2+2x)dx$ ii) $\int_{-1}^2(3x^3+2x^2-1)dx$

w) Show that $A(3,1)$, $B(-1,9)$ and $C(4,-1)$ are collinear points.

x) The demand function for a commodity is given by $p=20-2D^2$.

Find (i) the total revenue function,

(ii) the marginal revenue function,

(iii) marginal revenue when $D=2$

y) Find the mean proportional of 3 and 1083.

z) Find the equation of the line passing through the point (1,2) and parallel to a line having slope -5.

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

a) Find the equation of a line, joining the origin and the point of intersection of the lines $x+y=5$ and $x-y=1$

b) Verify if the curve $x^2-2x-3=0$ is increasing or decreasing at the points $x=3$ and $x=-1$

c) The demand function for a commodity is $p=30+2x-3x^2$. Find the Consumer's Surplus at $x=3$

d) If the demand function is given by $D=25-4p+p^2$. Find the elasticity of demand with respect to the price when $p=8$

e) The expenditure on food for a family was Rs. 20,000 per month. It increased to Rs. 25,000 per month. Find the percentage increase in expenditure on food.

OR

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

v) Find the equation of a line which passes through the point of intersection of the lines $x+2y-3=0$ and $3x+4y-5=0$ and which is perpendicular to the line $x-3y+5=0$

w) The sensex is given by the function $f(x)=x^3-48x+5$, where x represents the factor creating the rise or fall in the sensex. Find for what values of x the sensex is (i) increasing (ii) decreasing.

x) The demand function for a certain commodity is $p=16-4x$. Find the consumer's surplus at $x=3$

y) If the demand D is given by $D=12+4p-p^2$, p being the price, find the price elasticity of Demand when $p=3$.

z) A man donates 3% and spends 90% of his monthly income. If he saves Rs. 5000, find his monthly income.

4. Attempt the following: (5 x 4=20)

a) Maximise $z = x + y$ subject to $x + 2y \leq 8$, $3x + 2y \leq 12$, $x \geq 0$, $y \geq 0$.

b) If the demand function is $p = 25 - 2x$ and the supply function is $p = 4x - 2x$, find the Producer's Surplus.

c) A manufacturer finds that the total cost of producing x units daily is Rs. $(x^2 + 2x + 5)$ and the price is Rs. $(30 - x)$ per unit. Find the output x which maximizes the profit.

d) Find the second order partial derivatives of the function $f(x, y) = x^3 + 9x^2y^2 - y^3$.

e) A manufacturer gives a discount of 10% on the goods sold. He further gives 10% discount, if payment is made in cash immediately. Find the purchase price of the article, whose marked price is Rs. 1,000.

OR

IV. Attempt the following: (5 x 4=20)

v) Maximise $z = 6x + 4y$ subject to $2x + 3y \leq 30$, $3x + 2y \leq 24$, $x + y \geq 3$, $x \geq 0$, $y \geq 0$.

w) If the demand function is $p = 21 - 6x - 3x^2$ and the supply function is $p = 9x^2 + 2x + 1$, find the Producer's Surplus.

x) A firm produces an output of x tons at a total cost $C = x^3 - 4x^2 + 7x$. Find the output at which the average cost is the least.

y) Find the second partial derivatives of $f(x, y) = 2x^3 - 6x^2y + 7xy^2 - 3y^3$ at $(1,2)$

z) A publisher sells 80 books of Business Mathematics for Rs. 6,144. If the list price of the book is Rs. 96, calculate the rate of trade discount.