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GOPAL GOVIND POY RAITURCAR COLLEGE OF COMMERCE AND ECONOMICS, PONDA - GOA

B.COM. (SEMESTER II) EXAMINATION (NEW COURSE), APRIL 2019

MATHEMATICAL TECHNIQUES

Duration:- 2 Hours **Marks:-80**

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Q1 Attempt the following. **(4 x 5 = 20)**

a) If `4,000 amounts to ` 5200 at simple interest in 3 years, find the rate of interest.

b) Find a point on x-axis whose distance from (7,5) is 13 units.

c) If f(x) = x^2 +3x - 4, find$x$ if f(x+1) = f(x+2).

d) Find the derivative of y w.r.t x in the following

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

e) Find the equation of line having slope -2 and passing through the point (3, -4).

OR

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

p) In what time will the interest on ` 5000 at 9% be equal to the interest on ` 3000 for 6 years at 15%, both the interests being simple interest?

q) Show that the points A(2,2), B(3,4), and C(4,1) are the vertices of a right angled triangle.

r) If $f(x) = x^2 + 5x + 7$, solve the equation $f(x) = f(x+1)$.

s) Differentiate with respect to x

i) $y = \frac{3x+5}{5x-7}$

ii) $y = x^3 - 2x + e^x$

t) Find the equation of the line parallel to the line 3x -y = 4, and passing through the point (1,2).

Q2 Attempt the following. **(4 x 5 = 20)**

a) Find the equation of line passing through the point of intersection of the line 2x+ y = 3 and x-3y =12 and through the point (1,3).

b) Find the amount received when sum of ` 500 is invested at 12% per annum for 2 years, if the interest is compounded i) annually ii) half yearly.

c) Examine the continuity at x=4 of the function

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

$f(4)=9$

d) Integrate the following w.r.t. x

i) $(x+3)(x-2)$ ii) $\frac{x-3}{x}$

e) The total cost is given by $C=x^2+5x+200$, where x is the number of units manufactured. Find the total cost , average cost and marginal cost when x=1.

OR

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

p) A(x,5) and B(- 4,y) are the end point of a segment and C(2,-1) is the midpoint. Find x and y.

q) Find the amount and the compounded interest on ` 1,500 for 4 years at the rate of 10% p.a.

r) A function f is defined as

$f(x) = x+1$ for $-1 \leq x < 1$

$= x$ for $1 \leq x \leq 2$

Discuss the continuity of f at x=1.

s) Integrate the following

$$\int (x+4)(2x-3)dx$$

t) What sum of money will amount to ` 73,502.58 in 3 years at 7% p.a. compound interest?

Q3 Attempt the following. **(4 x 5 = 20)**

a) Solve the following L.P.P. by graphical method.
Maximize $Z = 50x + 100y$ subject to

$x + 6y \leq 30$

$x + y \leq 12$

$x \geq 0, y \geq 0.$

b) If $f(x) = 100 + 10x - 2x^2$ then find the value of x, when $f(x)$ is minimum.

c) If $D=25-3p-p^2$ is a demand function, find elasticity of demand when p= 3.

d) If $u = x^3 + x^2y + y^3$, prove that

$$x\frac{\delta u}{\delta x} + y\frac{\delta u}{\delta y} = 3u.$$

e) Differentiate with respect to x

i) $y = (x^3 + 4)(1 + e^x)$

ii) $y = \frac{x-2}{x+1}$

OR

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

p) Solve the following L.P.P. by graphical method.
Minimize $Z = 4x + 2y$ subject to
$x + 3y \geq 3$
$2x + y \geq 2$
$x \geq 0, y \geq 0.$

q) The supply function for a commodity is given by $y = 20 - 3x - 3x^2$ where y is demand and x is price. Find the price elasticity of supply when x=3.

r) If $z = x^2 - y^2$, show that $x\frac{\delta Z}{\delta x} + y\frac{\delta Z}{\delta y} = 2z$.

s) A sum of money amounts to ` 45,980 in 3 years and to `48,640 in 4years at a certain rate of simple interest. Find the sum and rate.

t) The demand function for a commodity is given by $p = 45 - 3x - 4x^2$. Find the consumers surplus when x=4.

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

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

b) A sum of money is invested for 2 years at a certain rate. If it had been invested at a rate 2 % higher than the present rate, it would have given ` 1,300 more as simple interest. Find the sum.

c) Evaluate the integral $\int_1^3 (1 - 2x)dx.$

d) Find the total revenue function and demand function, if the marginal revenue function is given as $MR = 7 - 4x$.

e) The demand function for a commodity is $p = 20 - 2D - D^2$. Find the consumers surplus when $D = 3$.

OR

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

p) Find the equation of the line passing through two points A(5,-1) and B(3,2).

q) Find the compound interest on `10,000 for 8 years at 5% per annum. Also find the amount after 8 years.

r) Find the value of $\int_0^3 x(x + 1)dx$

s) The supply function for a commodity is $p = q^2 + 10$. Find the producers surplus when the price per unit of the commodity is ` 35.

t) The marginal cost function for producing x items is given by $MC = 3x^2 + 5x - 4$. Find the total cost function and the average cost function if the fixed cost is `1000.

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