

Goa Vidyaprasarak Mandal' s  
Gopal Govind Poy Raiturcar College of Commerce and Economics  
Farmagudi Ponda Goa

B.Com. (Semester II) Supplementary Examination  
( Old Course) May/June 2018

**MATHEMATICAL TECHNIQUES**

**Duration:- 2 Hours**

**Marks:-80**

**Q1 Attempt the following.**

**(4 x 5 = 20)**

- a) At what rate of compound interest would an amount double itself in 3 years?
- b) Find the slope of line segment AB , if A=(1,3) and B=(-2,5).
- c) If  $f(x) = 2x + 1$ ,  $2 \leq x \leq 5$  , what is the domain and range of  $f$  ?
- d) Find  $\frac{dy}{dx}$   
i)  $y = \frac{x-1}{x+3}$     ii)  $y = (2x + 4)(x - 1)$
- e) Show that the points A(-2,-4), B(2,3), and C(4,-1) are the vertices of a right angled triangle.

**OR**

**QI Attempt the following.**

**(4 x 5 = 20)**

- p) How many years will it take to double the sum of money invested at 12% p.a. simple interest?
- q) The centre of a circle is C=(-1,6) and one end of the diameter is A=(5,9) , find the co-ordinates of the other end B.
- r) If  $f(x) = 2x^2 - 3x + 2$ , find  $f(k)$  and  $f(k + 1)$ .
- s) Differentiate with respect to x  
i)  $y = \frac{2x - 1}{x + 2}$     ii)  $y = (2x^2 + e^x + 2)$
- t) Find the equation of the line passing through the points (2,1) and (4,3).

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

- a) Show that (3,-5), (4,3) and (11,-4) are the vertices of an isosceles triangle.
- b) Rs 5000 is invested at 6% simple interest per year. Find the amount after 1) 5 years ii) 6 months.
- c) Evaluate  $\lim_{x \rightarrow 2} \frac{x^2 - 4}{x^2 - x - 2}$
- d) Evaluate the following integrals:  
 i)  $\int (2x - 1)(x + 1)dx$     ii)  $\int \frac{x^2 + 2x + 1}{x} dx$
- e) The total cost function  $C = x^2 + x + 20$ . Find the average cost, marginal cost when  $x = 10$ .

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

- p) If A is (4, 5) and B(3,7), find the co-ordinates of the point which divides AB internally in the ratio 2:3.
- q) Find the future value of Rs. 100000 after 4 years if the compound interest rate is 8 % p.a.
- r) Given  $f(x) = x^2 + 1$ . Find  $x$  if  $f(x + 1) = f(x + 2)$ .
- s) Evaluate the following integrals:  
 i)  $\int \frac{x^2 + 3x + 2}{x} dx$     ii)  $\int x^2(2x + 1)dx$
- t) The amount of Rs.1,44,000 at 10% p.a. compound interest rate for 3 years equals the amount of a sum of money at 20 % p.a. compound interest rate for 2 years. Find the sum.

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

- a) Solve the following L.P.P. by graphical method.  
 Maximize  $Z = 45x + 55y$  subject to  
 .  $3x + 10y \leq 180$   
 .  $6x + 4y \leq 120$   
 .  $x \geq 0, y \geq 0$ .
- b) If  $f(x) = 3x + k$  and  $f(1) = 7$ , find  $k$  and  $f(4)$ .

- c) If the demand function is given by  $D = 15 - 4p - p^2$ , find the price elasticity of demand when  $p = 2$ .
- d) If  $z = x^2 + xy + y^2$ , find  $\frac{\delta^2 z}{\delta x^2}$  and  $\frac{\delta^2 z}{\delta y^2}$
- e) Differentiate with respect to x
- i)  $y = (x^2 + 3)(x + 1)$     ii)  $y = \frac{2x + 1}{x - 1}$

**OR**

**QIII Attempt the following.**

**(4 x 5 = 20)**

- p) Solve the following L.P.P. by graphical method.  
Minimize  $Z = 3x - 2y$  subject to
- .  $x + y \leq 5$
  - .  $x + 2y \leq 8$
  - .  $x \geq 0, y \geq 0$ .
- q) The supply function for a commodity is given by  $S = p^2 - 2p + 2$  where  $p$  is in thousand and  $S$  is in tons.. Find i) the supply when price is 5 and ii) the price when supply is 10.
- r) If  $z = 3x^2 + 2xy + 5y^2$  find  $x \frac{\delta z}{\delta x} + y \frac{\delta z}{\delta y}$ .
- s) A sum of money amounts to Rs.45,980 in 3 years and to Rs.48,640 in 4 years at a certain rate of simple interest. Find the sum and rate.
- t) Differentiate with respect to x
- i)  $y = e^x + x^3$     ii)  $y = \frac{x^2 - 1}{x + 1}$

**Q 4 Attempt the following.**

**(4 x 5 = 20)**

- a) Find the equation of the line passing through (3,2) having slope = 4.
- b) A sum of money is invested for 2 years at a certain rate. If it had been invested at a rate 3 % higher than the present rate, it would have given Rs.1,200 more as simple interest. Find the sum.
- c) Evaluate the integral  $\int_0^2 (4x^3 + 2x) dx$ .

- 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  $D = 5$ .

**OR**

**Q IV Attempt the following.**

**(4 x 5 = 20)**

- p) Find the equation of the line passing through (1,3) making an intercept of 6 on the Y axis.
- q) In how many years the interest on Rs. 5,000 at 9% will be equal to the interest on Rs. 3,000 for 6 years at 15% both the interests being simple interest?
- r) Find the value of  $\int_1^2 x(x-1)dx$ .
- 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 Rs.35.
- t) The cost function is given by  $C = 3x^3 + 5x^2 + 4$ . Find the average cost and marginal cost. Also find the average and marginal cost when  $x=6$ .

End