B.A. DEGREE EXAMINATION NOVEMBER 2008
BRANCH IV – ECONOMICS
THIRD SEMESTER

COURSE   : MAJOR – CORE
PAPER   : MATHEMATICAL METHODS
TIME   : 3 HOURS   MAX.MARKS : 100

SECTION – A

ANSWER ALL QUESTIONS: (10 X 3 = 30)

1.   Write the equation to a straight line of gradient 2/3 and which makes negative intercept of 4 units on the y axis.
2.   Define Conic.
3.   Define Rectangular hyperbola.
4.   Find the equilibrium price and quantity from the given information $Q_s = -5 + 3p$
      $Q_d = 10 - 2p.$
5.   Find the limit for the following function
      $$\lim_{x \to 4} \frac{3x^2 - 5x}{x + 6}$$
6.   What is an inflection point?
7.   Find the second – order derivative $Y = (6x - 5)^3$
8.   Use implicit differentiation to find the derivative $\dfrac{dy}{dx}$
      $3y^5 - 6y^4 + 5x^6 = 55.$
9.   Find AC and MC from the given cost function $C = Q^3 - 3Q^2 + 15Q.$
10.   Find the first order partial derivative $Z = (5x^2 - 4y^2) \ (2x + 7y^3)$

SECTION – B

ANSWER ANY FIVE QUESTIONS   (5 X 6 = 30)

11.   When the price of a book is Rs.10 there will be no purchasers but it is thought, for every Rs.1 drop in price, 12 new purchasers will appear. Find the demand function.
12.   Points (1,10), (2,1) and (-7,0) are the vertices of an isosceles right angled triangle. Find the area of the triangle.
13.   Estimate the point elasticity of demand at the given price level for the demand function
      $$Q = 500 - 4P - P^2 \ at \ P = 10.$$
14.   Find the level of output at which profit is maximized from the given revenue and cost functions check the second-order condition also.
      $R = 600 - 5Q^2, C = 320 + 20Q.$
15.   Use implicit differentiation to find the derivative $\dfrac{dy}{dx}$ for $8x^3 - Y^2 = 45.$

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16.   Find the partial derivative for the following function $Z = \dfrac{7xy}{e^{2x+1}}$.

17.   What are the properties of Linearly Homogenous functions?

SECTION – C

ANSWER ANY TWO QUESTIONS   **(2 X 20 = 40)**

18.   (a) Find the intercepts on axes of X and Y for the given equation
            $2x - 4y - 3 = 0$ (2.5 Marks)
        (b) Find the equation of a straight line which makes a negative intercept of 4
             units on the X axis and passes through the point (2, 4.5) (2.5 Marks)
        (c) For the following function find (1) critical values (2) test for any inflection
             points (4) Evaluate the function at the critical values (5) Sketch the graph of
             the function at the critical values (5) Sketch the graph of the function
             $f(x) = -x^3 - 3x^2 + 24x + 32$ (15 Marks)

19.   A magazine has 4000 subscribers paying $.25 a year. A survey showed that there
       will be 100 new subscribers for every $.50 decrease in the price of the
       subscription. What rate should the magazine change to maximise revenue.

20.   The production function of a commodity is $Q = 40F + 3F^2 - \dfrac{F^3}{3}$ where Q is

       output and F is input.
       (i) Find the number of units of input required to give maximum output.
       (ii) Find the maximum value of marginal product.
       (iii)Verify that when AP is maximum, it is equal to marginal product.

21.   Given the function: $V = Ax^b y^c$: A, b and c are constants.
                a) Find the conditions under this is a linear homogeneous function
                b) Apply Euler's theorem if these conditions hold true.

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