College Name: _____

Student Name: _____ Seat No: _____

Copy No: _____

Date: June 7, 2016   **Max Marks: 50**
Max Time: 1.45 Hrs

Attempt any **Five Questions**, all carry equal marks of 07.

Q.No.1. Solve the complex equation and determine the value of x and y.

$$\frac{(x+yi)}{i} = (7 + 9i)$$

Q.No.2. Find the equations of tangent and normal of the curve $9x^2 - 25y^2 = 225$ at $\left(10, 3\sqrt{3}\right)$

Q.No.3. Write down the steps to calculate the extreme values. Determine the maximum and minimum point on the curve $f(x) = x^3 - 9x^2 + 15x + 3$. Also draw the graph.

Q.No.4. The total cost of producing q units of a certain product is described by the function

$$C = 100,000 + 1,500q + 0.2q^2$$

Where C is the total cost stated in dollars. Determine the number of units of q that should be produced in order to minimize the average cost per unit.

Q.No.5. To evaluate $\displaystyle\int_{2}^{4} \frac{xdx}{x^2 - 1}$

Q.No.6. A hospital blood bank is conducting a blood drive to replenish its inventory of blood. The hospital estimates that blood will be donated at a rate of $d(t)$ pints per day, where

$$d(t) = 500e^{-0.4(t)}$$

and t equals the length of the blood drive in days. If the goal of the blood drive is 1000 pins, when will the hospital reach its goal.

Q.No.7. Use integration by parts to determine $\displaystyle\int x^3 e^{2x} dx$

Q.No.8. Solve the differential Equation $y\dfrac{dy}{dx} = x\left(y^4 + 2y^2 + 1\right)$ at $x = -3$, $y = 1$

Q.No.9. Maximize the Profit $P = 7x_1 + 8x_2 + 10x_3$ by using simplex method.

$$2x_1 + 3x_2 + 2x_3 \leq 1000$$
Subject to $\quad x_1 + x_2 + 2x_3 \leq 800$
$$x_1, x_2, x_3 \geq 0$$

END OF SUBJECTIVE PAPER