Group –A
(Compulsory)

1. Answer the following question　　　　　　　　　　　　　　　　1X10=10

    (i) Find nth derivative of e^{ax}

    (ii) State Euler's theorem

    (iii) Define Asymptotes.

    (iv)State Taylor's theorem.

    (v)State Leibnitz theorem.

    (vi) Define translation.

    (vii) Write the condition that general equation of 2nd degree $ax^2+2hxy+by^2+2gx+2fy+c=0$ represent an ellipse.

    (viii) Check type of conic section represented by the equation $12x^2-24xy+10y^2-25x+26y-14=0$.

    (ix) Define focal chord..

    (x) Find the equation of tangent to $y^2=4x$ at point (1,2)

2. Expand $\sin x$ using Maclaurine's theorem.　　　　　　　　　　　　　　5
3. Transform the equation $x^2+2\sqrt{3}xy-y^2=2a^2$ when axis is inclined to 30° with original axes.　　　5

Group –B
Answer any four

4. (a) Find nth derivative of $e^{ax}\sin bx$　　　　　　　　　　　　　　　　10

    (b) If $\log y=\tan^{-1}x$ Show that $(1+x^2)\,y_{n+2}+(2nx+2x-1)\,y_{n+1}+(n^2+1)\,y_n=0$　　　10

5. (a)If $u=\tan^{-1}\dfrac{x^3+y^3}{x-y}$. Prove that $x\dfrac{\partial u}{\partial x}+y\dfrac{\partial u}{\partial y}=\sin 2u$.　　　　　　　10

    (b) Show that the curve represented by $\left(\dfrac{x}{a}\right)^n+\left(\dfrac{y}{b}\right)^n=2$ for different values of n have a common

    tangent at the point (a,b). Find the equation of the common tangent.　　　　10

6. (a) Find the expression for the length of tangent and Normal in Cartesian system.　　　10

    (b) Find maximum and minimum value of $\sin x+\cos 2x$　　　　　　　　　**10**

7. (a)Find asymptotes of $x^3+y^3=3axy$　　　　　　　　　　　　　　　10

    (b) Find the angle through which the axes must be turned so that the expression $ax^2+2hxy+by^2$ may become an expression in which no terms involving xy　　　　　　　　10

8. (a) If $ax^2+2hxy+by^2$ and $a'x'^2+2h'x'y'+b'y'^2$ represent the same conic then prove that $a+b=a'+b'$　　　　　　　　　　　　　　10

    (b) Find the centre of the ellipse $2x^2+3y^2-4x+5y+4=0$　　　　　　　10

9. (a) Find equation on of tangent to general conic $ax^2+2hxy+by^2+2gx+2fy+c=0$　　10

    (b) Find the condition that the line $y=mx+c$ will touch $y^2=4ax$.　　　　　10