There are **06 (six)** questions. Answer **06 (six)** questions. The symbols have their usual meanings. Marks of each question and corresponding CO and PO are written in the brackets.

1. (a) Explain the physical significance of the divergence and curl of a vector. (12) (CO1) (PO1)

   (b) Evaluate $\int_C \vec{F}.d\vec{r}$ where C is the closed curve formed by $y=2x^2$ and $y^2=32x$ and $F=(2x+y^2)i+(3y-4x)j$. (13) (CO1) (PO1)

2. (a) State and prove C... .... plane. (12) (CO2) (PO2)

   (b) Differentiate $f(z)=z^2-iz$ along the straight line parallel to $y=x$ (13) (CO2) (PO2)

3. (a) Obtain the formula to solve the equation $z^n=z_0$. Use this formula to find the roots of $z^8 = -16\sqrt{3} -16i$ and locate them graphically. (12) (CO1) (PO1)

   (b) Determine the region of the w plane into which the interior of the triangle x=1, y=1 and y= -2x+1 is mapped by the transformation $w= 5e^{\frac{i\pi}{3}} z - 2 + 4i$ (13) (CO2) (PO2)

4. (a) Derive Cauchy Riemann equations and find the polar form. (12) (CO1) (PO1)

   (b) Find the Taylor series expansion for the function $f(z)=\operatorname{cosec}^2 z$ about $z = \frac{\pi}{2}$. (13) (CO2) (PO2)

5. (a) State Cauchy's residue theorem. Find the residue of $f(z) = (z^2 - 2z)/(z^2 + 4)^3$ at all poles and hence evaluate the integral $\int_C f(z)dz$ where C is the circle $|z - i| = 2$ **(12) (CO1) (PO1)**

(b) From the following data find X when Y=6 **(13) (CO3) (PO12)**

X	2.3	2.5	3.9	3.6	4.1	3.2	1.4	1.1
Y	8.6	8.1	7.6	7.8.	7.4	6.6	5.2	6.1

6. (a) Explain Binomial distribution and Poisson's distribution. Fifteen percent of the tools produced in a certain manufacturing process turn out to be defective. Find the probability that in a sample of 12 tools chosen at random (i) more than ten (ii) at least two will be defective by using Poisson's distribution. **(12) (CO3) (PO12)**

(b) Find the area bounded by the normal curve and the horizontal axis. A manufacturer knows from experience that the resistance of resistors is normally distributed with mean 100 ohms and standard deviation 2 ohms. What percentage of resistors will have resistance between 99 ohms and 103 ohms? **(13) (CO3) (PO12)**