Prabhu Jagatbandhu College

Internal Assessment [Mathematics, GE1/CC1]

Full Marks: 10 **Time: 30 Minutes**

Answer all Questions:

1. If the roots of the equation $x^3-3x^2-4=0$ are α, α, β then

(a) 2α+β=3, (b) α-β=3, (c) α+2β=3, (d) α=0

2. Rank of the matrix $\begin{pmatrix} 3 & 0 & 0 \\ 0 & 5 & 0 \\ 0 & 0 & -3 \end{pmatrix}$ is

(a) 1, (b) 2, (c) 3, (d) 0.

3. f(x) =x, 0<x<1

2-x, 1≤x≤2

$x-x^2/2$, x>2

Then, at x=2, f(x) is

(a) continuous but not derivable

(b) continuous and derivable

(c) neither continuous nor derivable

(d) none of these.

4. If $r = \sqrt{x^2 + y^2}$, then dr =

(a) $\frac{xdx + ydy}{\sqrt{x^2 + y^2}}$, (b) $\frac{xdx - ydy}{\sqrt{x^2 + y^2}}$, (c) $\frac{xdx + ydy}{x^2 + y^2}$, (d) $\frac{xdx - ydy}{x^2}$

5. If z=f(x,y) is differentiable and x=rcosθ, y=rsinθ then $\frac{\partial z}{\partial x}$ =

(a) $\cos\theta \frac{\partial z}{\partial r} - \frac{\sin\theta}{r} \frac{\partial z}{\partial \theta}$, (b) $\sin\theta \frac{\partial z}{\partial r} + \frac{\cos\theta}{r} \frac{\partial z}{\partial \theta}$, (c) $\cos\theta \frac{\partial z}{\partial r} + \frac{\sin\theta}{r} \frac{\partial z}{\partial \theta}$,

(d) $\cos\theta \frac{\partial z}{\partial r} - \frac{\cos\theta}{r} \frac{\partial z}{\partial \theta}$

6. The number of asymptotes of the curve $x^2+y^2-4x-4y=0$ is

(a) ∞ , (b) 1, (c) 4, (d) 0

7. The curvature of parabola $y^2=4ax$ at its vertex is

(a) a/2, (b) $a^{3/2}/2$, (c) $a^2/2$, (d) ∞.

8. The angle between the two straight lines represented by $5x^2-6xy+y^2$ is

(a) $\pi/4$, (b) $\tan^{-1}(1/3)$, (c) $\tan^{-1}(3/2)$, (d) $\tan^{-1}(2/3)$

9. $8/r=4-5\cos\theta$ is the polar equation of a

(a) ellipse, (b) circle, (c) parabola, (d) hyperbola

10. If x^2 is irrational then x

(a) may be rational, (b) is irrational, (c) may be imaginary, (d) nothing can be said.