

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(2009-2010 Batches) (Sem.-1)

ENGINEERING MATHEMATICS-I

Subject Code : AM-101

Paper ID : [A0111]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C. have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. Write briefly :
- a) Under what condition or conditions, a curve is symmetrical in the opposite quadrants?
 - b) Find the area bounded by the parabola $y^2 = 4x$ and its latus rectum.
 - c) State Euler's theorem on homogeneous functions.
 - d) If $x = r \cos \theta$, $y = r \sin \theta$, show that, $\frac{\partial r}{\partial x} = \frac{\partial x}{\partial r}$.
 - e) State Taylor's series for a function of two variables.
 - f) Find the equation of the sphere in which the end points of one of the diameters, are $(2, -3, 1)$ and $(3, -1, 2)$.
 - g) Define a gamma function.
 - h) State root test for the convergence of a positive term series.
 - i) Solve the equation $x^4 = -1$.
 - j) Give an example of an oscillatory series.

SECTION-B

2. Find the radius of curvature at the vertex of the cycloid, $x = a(\theta + \sin \theta)$;
 $y = a(1 - \cos \theta)$.
3. Find the area of the curve $r^2 = a^2 \cos \theta$.
4. If $u = x \log xy$, where $x^3 + y^3 + 3xy = 1$, find $\frac{du}{dx}$.
5. Discuss the extreme values of, $x^3 - y^2 - 7x^2 + 4y + 15x - 13$.

SECTION-C

6. Find the equation to the right circular cone whose vertex is at (2,-3,5), axis makes equal angles with the coordinate axes, and the vertical angle is measured to be 60° .
7. Evaluate $\iiint xyz \, dz \, dy \, dx$ over the volume enclosed by three coordinate planes and the plane, $x + y + z = 1$.
8. Test the convergence of the series, $x(\log 1)^p + x^2(\log 2)^p + x^3(\log 3)^p + x^4(\log 4)^p + \dots$
9. If $\tan (x + iy) = \sin (u + iv)$, prove that, $\sin 2x \cot u = \sinh 2y \coth v$.