R07

Code No: Z0125

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech I Year Examinations, May - 2018
MATHEMATICS-I
(Common to EEE, ME, ECE, CSE, CHEM, IT, BT)

Time: 3 hours **Max. Marks: 80**

Answer any five questions
All questions carry equal marks
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1.a) Define Exact and Integrating of differential equation.
b) Solve $(3xy-2y^2)dx+(x^2-2xy)dy$.
c) A body is heated to 105^0C and placed in air at15^0C. After 1 hr its temperature is 60^0C. How much additional time is required for it to cool to 37^0C? [16]

2. Solve $(D^2-4D+3)y=e^{-x}\sin^2 x+x^2+1$. [16]

3.a) State Rolle's theorem and explain its geometrical interpretation.
b) Examine the extreme value of $x^3+y^3=3axy,\ a>0$. [8+8]

4.a) Trace the curve of hypocycloid $x^{\frac{2}{3}}+y^{\frac{2}{3}}=a^{\frac{2}{3}}$, $a>0$.
b) Find the radius of curvature $r=a(1+\cos\theta)$ for any value of θ. [8+8]

5.a) Find the area of the region R which is bounded by x-axis and x = 2a and the curve $x^2=4ay$.
b) Evaluate $\iiint (x^2+y^2+z^2)dxdydz$ taken over the volume enclosed by the sphere $x^2+y^2+z^2=1$by transforming into spherical polar coordinates. [8+8]

6.a) Test the convergence of the series $\sum_{n=0}^{\infty}(-1)^n n^{\frac{1}{4}}$.
b) Test the convergence of the series $\frac{x}{1.2}+\frac{x^2}{2.3}+\frac{x^3}{3.4}+\frac{x^4}{4.5}+...$ [8+8]

7. Verify Stokes theorem for F=(x^2+y^2)i-2xyj taken around a rectangle bounded by the lines x = a, x= -a, y = 0 and y = b. [16]

8.a) Find Laplace transform of $\frac{1-e^t}{t}$.
b) Solve the integral equation $f(t)=at+\int_0^t f(u)\sin(t-u)du$, $t>0$, using Laplace transformation. [8+8]

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