Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Aerospace Engg.) (2012 Onwards)/(ANE) (Sem.–3)

MATHEMATICS – III

Subject Code : AM-201

M.Code : 60537

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 contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Attempt the following :

a. Find $L\{e^{-2t} \sin 2t\}$.

b. Find $L^{-1}\left\{\frac{e^{-2s}}{s-2}\right\}$

c. What is the value of $J_{n-1}(x) + J_{n+1}(x)$ in terms of $J_n(x)$?

d. Write the complete solution of a differential equation when the roots of the indicial equation are distinct and differ by an integer.

e. Form the partial differential equation from, $z = xf_1(x+t) + f_2(x+t)$.

f. Solve $pq = p + q$.

g. Write any one property of analytic functions.

h. Give an example of a harmonic function.

i. What are Dirichlets conditions?

j. Find the sine series of x in $(0, 2)$.

SECTION-B

2. Find the Fourier series of e^{-x} in the interval $(0, 2\pi)$.

3. Using the concept of Laplace equations, solve

$x'' + 2x' + 5x = e^{-t} \sin t$, where $x(0) = 0$, $x'(0) = 1$.

4. Show that $J_n(x) = \frac{1}{\pi}\int_0^{\pi} \cos(n\theta - x\sin\theta)\, d\theta$

5. Solve, $(x^2 - y^2 - z^2)p + 2xyq = 2xz$.

6. Determine the analytic function whose imaginary part is $\cos x \cosh y$.

SECTION-C

7. Solve in series, $x\,y'' + y' - y = 0$.

8. A string is stretched and fastened to two points l apart. Motion is started by displacing the string in the form y = a sin $\frac{\pi x}{l}$ from which it is released at time $t = 0$. Show that the displacement of any point at a distance x from one end at time t is given by, $y(x,t) = a\sin\frac{\pi x}{l}\cos\frac{\pi ct}{l}$

9. Evaluate by contour integration $\int_0^{2\pi} \frac{\cos 2\theta}{5 + 4\cos\theta} d\theta$.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.