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

Q1. Answer briefly :

a) Find $L\{te^{2t}\sin 5t\}$.

b) Find $L^{-1}\left\{\frac{e^{-4s}}{s-4}\right\}$.

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, $z = f(x^2 - y^2)$.

f) Solve $\sqrt{p} + \sqrt{q} = 1$.

g) Write any one important property of analytic functions.

h) Give an example of a harmonic function.

i) Disucss Dirichlets conditions ?

j) Find the sine series of x^2 in $(0,1)$.

SECTION–B

Q2. Find the fourier series of $x \cos x$ in the interval $(-\pi, \pi)$.

Q3. Using the concept of Laplace equations, solve

$x'' + 9x = 6\cos 3t$ where $x(0) = 2$, $x'(0) = 0$.

Q4. Show that $J_n(x) = \frac{1}{\pi}\int_0^{\pi} \cos(n\theta - x\sin\theta)\, d\theta$

Q5. Solve, $x(y^2 - z^2)\, p + y(z^2 - x^2)\, q = z(x^2 - y^2)$

Q6. Determine the analytic function whose real part is $\log\sqrt{x^2 + y^2}$.

SECTION–C

Q7. Solve in series, $y'' + xy = 0$.

Q8. A tightly stretched string with fixed end points $x = 0$ and $x = l$ is initially at rest in its equilibrium position. If it is set vibrating by giving to each of its points a velocity $\mu x\,(l - x)$, find the displacement of the string at any distance x from one end at any time t.

Q9. Evaluate by contour integration, $\int_0^{\pi} \frac{\cos 3\theta}{5 - 4\cos\theta}\, d\theta$.

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.