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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) Discuss 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

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

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.**