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# SATHYABAMA UNIVERSITY

(Established under section 3 of UGC Act,1956)

Course & Branch :B.E/B.Tech – Common to ALL Branches

Title of the Paper :Engineering Mathematics – III Max. Marks :80

Sub. Code 301-6C0032-6C0049

Time : 3 Hours

Date :05/11/2009

Session :FN

PART - A

(10 x 2 = 20)

Answer ALL the Questions

1. Find  $L\left[\frac{\sin at}{t}\right]$
2. State initial and final value theorem on Laplace transform.
3. Show that  $L(y) = \frac{1}{(s+1)(s^2+5s+6)}$  for the differential equation  
 $y'' + 5y' + 6y = e^{-t}$ ,  $y(0) = 0$ ,  $y'(0) = 0$
4. Solve  $\int_0^t y(t)dt = \sin t$
5. Show that  $w = z^2$  is analytic everywhere in the complex plane.
6. Find the image of  $|z|=2$  under the transformation  $w=z+2+i$
7. Evaluate  $\int_C \frac{z+1}{(z+2)(z+3)} dz$ , where  $C:|z|=1$
8. Find the poles of  $f(z) = \tan z$ .
9. Define level of significance.
10. Write any two uses of  $\chi^2$  test.

PART – B

(5 x 12 = 60)

Answer ALL the Questions

11. Find  $L\{te^{-t} \cos^2 t\}$

(or)

12. Find  $L^{-1}\left\{\frac{4}{(s^2+2s+5)^2}\right\}$  by using convolution theorem.

13. Solve  $y'' - 2y' + 2y = 0, y(0) = y'(0) = 1$  by using Laplace transform.

(or)

14. Solve  $\frac{dx}{dt} + 3x - 2y = 1, \frac{dy}{dt} - 2x + 3y = e^t$  given that  $x=0=y$  when  $t = 0$ .

15. Find the analytic function  $f(z) = u + iv$  if  $u = e^{x^2-y^2} \cos 2xy$ . Hence find  $v$ .

(or)

16. Find the bilinear transformation which maps the points  $z = 0, z = 1$  and  $z = \infty$  into the points  $w = i, w = 1$  and  $w = -i$

17. Find all possible Laurent's expansions of  $f(z) = \frac{4 - 3z}{z(1 - z)(2 - z)}$  about  $z=0$ .

(or)

18. Evaluate  $\int_0^{2\pi} \frac{\cos 3\theta}{5 + 4 \cos \theta} d\theta$  by using contour integration.

19. A random sample of 200 villages from a district Chennai gives the mean population per village at 485 with standard deviation of 50. Another sample of the same size from the same district gives the mean population per village at 510 with standard deviation 40. Is the difference between the mean values given by the samples statistically significant?

(or)

20. The following table gives the number of good and bad parts produced by each of the three shifts in a factory.

	Good parts	Bad parts
Day shift	960	40
Evening shift	940	50
Night shift	950	45

Test whether or not the production of bad parts is independent of the shift on which they were produced.