

SATHYABAMA UNIVERSITY

(Established under section 3 of UGC Act, 1956)

Course & Branch: B.E/B.Tech – Common to ALL Branches (Except to Bio Groups & 2005 EEE Batch)

Title of the paper: Engineering Mathematics - III

Semester: III

Max. Marks: 80

Sub.Code: 301(2003/2004/2005) 6C0032 (2006/2007) Time: 3 Hours

Date: 03-11-2008

Session: FN

PART – A

(10 x 2 = 20)

Answer All the Questions

1. Prove that $L[e^{-at}] = \frac{1}{s+a}$ Provided $s + a > 0$.
2. State Convolution theorem.
3. Solve $\frac{dy}{dx} - y = e^t$, $y(0) = 1$.
4. Solve $y + \int_0^t y dt = t^2 + 2t$.
5. Examine the analyticity of the function $f(z) = z^2$.
6. Show that the function $u = 2xy + 3y$ is harmonic and find its conjugate.
7. State the Cauchy's Integral theorem.
8. Expand $f(z) = \sin z$ in a Taylor series about $z = \frac{\pi}{4}$.
9. What is difference between population and sample?
10. Write down the probability density function of χ^2 – distribution.

PART – B

(5 x 12 = 60)

Answer All the Questions

11. Find $L^{-1} \left[\frac{s}{(s+1)^2 (s^2+1)} \right]$.

(or)

12. Verify the initial and final value theorem for the function $f(t) = 1 + e^{-t}(\sin t + \cos t)$.

13. Solve $\frac{d^2 y}{dt^2} + 2 \frac{dy}{dt} + 5y = 0$, where $y = 2, \frac{dy}{dt} = -4$ at $t = 0$.

(or)

14. Find y which satisfies the equation $\frac{dy}{dt} + 4y + 5 \int_0^t y dt = e^{-t}$ when $y(0) = 0$.

15. Determine the analytic function whose real part is

$$u = x^3 - 3xy^2 + 3x^2 - 3y^2 + 1.$$

(or)

16. Find the bilinear transformation which maps the point $-2, 0, 2$ into the points $w = 0, i, -i$ respectively.

17. Using Cauchy's integral formula, find the value of $\int_C \frac{z+4}{z^2+2z+5} dz$.

Where C the circle $|z+1-i| = 2$.

(or)

18. Evaluate $\int_0^{2\pi} \frac{d\theta}{5-4\sin\theta}$.

19. A sample of 26 bulbs gives a mean life of 990 hours with a S.D of 20 hours. The manufacturer claims that the mean life of bulbs is 1000 hours. IS the sample not up to the standard?

(or)

20. The number of automobile accidents per week in a certain community are as follows: 12, 8, 20, 2, 14, 10, 15, 6, 9, 4. Are these frequencies in agreement with the belief that accident conditions were the same during this 10 week period?