



Date: 14-11-2017  
Time: 01:00-04:00

Dept. No.

Max. : 100 Marks

**PART – A**

**Answer ALL the questions:**

**(10x2=20 Marks)**

1. Define Riemann Integrable Function.
2. Define Upper Integral.
3. Define Improper Integral.
4. Define Gamma Integral.
5. Define variance-covariance matrix.
6. Find  $\int (2+x)^3 dx$
7. Solve  $(D^2 - 4D + 3)y = 0$
8. Find  $L[\sin^2 2t]$
9. Write the conditions for consistency for a system of equations.
10. State Cayley – Hamilton’s theorem.

**PART – B**

**Answer any FIVE questions:**

**(5x8=40 Marks)**

11. Evaluate using fundamental theorem of calculus  $\int_1^2 x^3 dx$

12. Find the mean and variance of gamma distribution.

13. Solve  $(D^2 - 6D + 9)y = e^{3x}$

14. Obtain the inverse laplace transform of  $\frac{2+4s}{s^2+4s+3}$

15. Find the eigen values of  $\begin{bmatrix} a & h & g \\ 0 & b & 0 \\ 0 & 0 & c \end{bmatrix}$

16. Show that the characteristic function of the rational numbers in  $[0,1]$  is not Riemann integrable.

17. Find all the characteristic vectors of the matrix  $\begin{bmatrix} 3 & 2 \\ 2 & 3 \end{bmatrix}$

18. Find the m.g.f of  $f(x) = \begin{cases} e^{-x}, & x > 0 \\ 0, & x < 0 \end{cases}$

**PART - C**

**Answer any TWO questions:**

**(2x20=40 Marks)**

19. If  $f \in R[a, b]$  and  $a < c < b$ , then  $f \in [a, c]$ ,  $f \in R[a, b]$  and  $\int_a^b f = \int_a^c f + \int_c^b f$

20. Derive the MGF of normal distribution. Hence find its mean and variance.

21. Solve  $(x^2 D^2 - 2XD - 4)y = x^2 + 2 \log x$

22. Show that the system of equations  $x-3y-8z=-10$ ,  $3x+4y-4z=0$ ,  $2x+5y+6z=13$  are consistent and solve them.

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