

TMA-301

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Printed Pages : 4

Paper Code & Roll No. to be filled in your Answer Book

Roll No.

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B. Tech. II Year (III Sem.)

Odd Semester Examination-2015

Mathematics III

Time : 3 Hrs.]

[Max. Marks :100

Unit I

Answer Any Four (4×5=20)

1.1 Show that the function $e^x (\cos y + i \sin y)$ is analytic function.

1.2 Construct the analytic function $f(z)$ of which the real part is $e^x \cos y$.

1.3 Evaluate by Cauchy's integral formula $\int_C \frac{dz}{z(z + \pi i)}$,

where C is $|z + 3i| = 1$

1.4 Expand $f(z) = \frac{1}{(z+1)(z+3)}$ in Laurent series valid for $1 < |z| < 3$

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1.5 Find the residue $\frac{z^3}{z^2-1}$ at $z = \infty$.

Unit II

Answer Any Four (4×5=20)

2.1 To show that the first moment about origin for binomial distribution is mean np .

2.2 Find the straight line that best fits the following data:

$x:$	1	2	3	4	5
$y:$	14	27	40	55	68

2.3 Find the Pearson's coefficients $\beta_1, \beta_2, \gamma_1, \gamma_2$ for Poisson distribution.

2.4 Find out the kurtosis of the data given below:

Class Interval	0-10	10-20	20-30	30-40
Frequency	1	3	4	2

2.5 If $r_{12} = 0.25, r_{13} = 0.35, r_{23} = 0.45$ then find $R_{2,13}$ (Multiple correlation coefficient)

Unit III

Answer Any Two (2×10=20)

3.1 If the variance of Poisson distribution is 2, find the probability for $r=1,2,3,4$ from the recurrence relation of the Poisson distribution. Also find $P(r \geq 4)$

3.2 If x and y are two independent normal variates with mean m_1 and m_2 , variance σ_1^2 and σ_2^2 respectively then prove that $x+y$ is also normally distributed with mean m_1+m_2 and variance $\sigma_1^2 + \sigma_2^2$.

3.3 In experiment on pea breeding, Mendal obtained the following frequencies of seeds:

Round and Yellow	Wrinkled and Yellow	Round and Green	Wrinkled and Green	Total
315	101	108	32	556

Theory predicts that the frequencies should be in proportions 9:3:3:1. Examine the correspondence between theory and experiment. (χ^2 : 3 degree of freedom at 5% level of significance is 7.815.)

Unit IV

Answer Any Two (2×10=20)

4.1 Find the root of $x - e^x = 0$ using Regula falsi method correct to five decimal places.

4.2 To show that $x^{(-n)} = \frac{1}{(x+n)^{(n)}}$. The interval of differencing being unity.

4.3 To prove that $\Delta + \nabla = \frac{\Delta}{\nabla} - \frac{\nabla}{\Delta}$

Unit V

Answer Any Two (2x10=20)

5.1 Solve the following equation by Gauss Seidel method

$$20x + y - 2z = 17, 3x + 20y - z = -18, 2x - 3y + 20z = 25$$

5.2 Show that $\int_0^1 \frac{dx}{1+x} = \log 2 = 0.69315$ use Simpson's 1/3 rule

5.3. Use Runge - Kutta method , find the solutions of the differential equation $\frac{dy}{dx} = 3x + \frac{y}{2}$ with $y(0) = 1$ at $x = 0.1$

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Answer Any Two (2x10=20)