



R20 Regulation

Subject code: 3B3BA

# TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

## B.Tech III Semester Supplementary Examinations, December 2025

### PROBABILITY, NUMERICAL METHODS AND COMPLEX ANALYSIS (EEE)

Maximum Marks: 70

Date: 15.12.2025

Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
  2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
  3. Part B consists of 5 Units. Answer any one full question from each unit.
  4. Each question carries 10 marks and may have a, b, c, d as sub questions.

#### Part-A

All the following questions carry equal marks (10X2M=20 Marks)		Marks	CO	BTL
1	Define Poisson distribution.	2M	1	L1
2	If K is a constant, then what is the value of E(9X+K)?	2M	1	L1
3	What is mean by level of significance?	2M	2	L1
4	Define Alternative Hypothesis.	2M	2	L1
5	Write the Newton Raphson method.	2M	3	L1
6	Find the positive root of $x^4 - x - 10 = 0$ by Iteration.	2M	3	L1
7	Prove that i) $\nabla = \frac{\Delta}{1+\Delta}$ ii) $\mu = \frac{1}{2}(E^{\frac{1}{2}} + E^{-\frac{1}{2}})$	2M	4	L1
8	Write the formula for Simpson's 3/8 rule.	2M	4	L1
9	Define Analytic Function.	2M	5	L1
10	Define Harmonic Function.	2M	5	L1

#### Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	A continuous random variable has the probability function $f(x) = \begin{cases} K x e^{-\lambda x} & \text{for } x \geq 0, \lambda > 0 \\ 0 & \text{otherwise} \end{cases}$ Determine (i) k (ii) Mean (iii) Variance	10M	1	L2
OR				
12	1000 students has written an examination the mean of left is 35 and standard deviation is 5. Assuming the distribution to be normal find (i) How many students to marks lie between 25 and 40. (ii) How many get more than 40 (iii) How many students get below 20	10M	1	L2
13	A researcher wants to know the intelligence of students in a school. He selected two groups of students. In the first group there 150 students having mean IQ of 75 with a S.D. of 15 in the second group there are 250 students having mean IQ of 70 with S.D. of 20.	10M	2	L2
OR				

14	An ambulance service claims that it takes on the average less than 10 minutes to reach its destination in emergency calls . A sample of 36 calls has a mean of 11 minutes and the variance of 16 minutes. Test the claim at 0.05 level of significance.	10M	2	L2												
15	Using Bisection method, find a +ve real root of the equation $x = e^{-x}$ , correct to 3 decimals.	10M	3	L2												
OR																
16	Find a positive root of $x^3 - x - 10 = 0$ upto 4 decimal places accuracy by N-R method.	10M	3	L2												
17	Assuming that the following values of 'y' belong to a polynomial of degree 4, compute the next three values.	10M	4	L2												
<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>x</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>y</td> <td>1</td> <td>-1</td> <td>1</td> <td>-1</td> <td>1</td> </tr> </table>					x	0	1	2	3	4	y	1	-1	1	-1	1
x	0	1	2	3	4											
y	1	-1	1	-1	1											
OR																
18	Evaluate $\int_0^1 \frac{1}{1+x} dx$ (i) by Trapezoidal rule and Simpson's 1/3 rule (ii) using Simpson's 3/8 rule	10M	4	L2												
19	If $u + v = e^x (\cos y + \sin y)$ then find the analytic function $f(z)$ .	10M	5	L2												
OR																
20	State and prove Cauchy's integral theorem.	10M	5	L2												