



R20 Regulation

Subject code: 3B3BA

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech III Semester Supplementary Examinations, February 2024

PROBABILITY, NUMERICAL METHODS AND COMPLEX ANALYSIS

(EEE)

Maximum Marks: 70

Date:16.02.2024 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)

		CO	Bloom Tx
1	If a random variable has a Poisson distribution such that $P(X=1) = 2P(X=3)$ find mean of the distribution	CO1	L3
2	The mean and variance of the binomial distribution are 4 and $4/3$ respectively. Find $P(X \geq 1)$.	CO1	L3
3	Explain Point estimation – Interval estimation	CO2	L2
4	Define Type-I and Type-II errors.	CO2	L2
5	Define Algebraic equations and Transcendental equations.	CO3	L1
6	Construct the first approximation to the root lying between 0 and 1 of $x^3 - x^2 - 1 = 0$ by iteration method.	CO3	L3
7	Write Newton's backward difference formulae.	CO4	L1
8	Evaluate $\int_0^1 x^3 dx$ using the Trapezoidal rule, $h=0.2$	CO4	L5
9	State Cauchy- Riemann equations in polar form.	CO5	L2
10	Define Analytic function.	CO5	L1

Part-B

Answer All the following questions.

(10M X 5=50Marks)

11	A Discrete Random Variable X has the following Probability Distribution <table><tr><td>x</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr><tr><td>P(x)</td><td>0</td><td>K</td><td>2K</td><td>2K</td><td>3K</td><td>K²</td><td>2K²</td><td>7K²+K</td></tr></table> i) Determine K ii) Evaluate P(X<6),P(X≥6),P(0<X<5) and P(0≤X≤4) iii) Determine Mean and Variance	x	0	1	2	3	4	5	6	7	P(x)	0	K	2K	2K	3K	K ²	2K ²	7K ² +K	10M	CO1	L5
x	0	1	2	3	4	5	6	7														
P(x)	0	K	2K	2K	3K	K ²	2K ²	7K ² +K														
	OR																					

12	a) Find the mean and standard deviation of Normal distribution in which 7% of items are under 35 and 89% of items are under 63. b) Out of 800 families with 5 children each, how many would you expect to have (a) 3 boys and (b) 5 girls? Assume equal probabilities for boys and girls.	6M 4M	CO1	L3 L3										
13	a) The mean and the standard deviation of a population are 11,795 and 14054 respectively. If the sample size is 50, find a 95% confidence interval for the mean. b) If the population is 3,6,9,15,27 (i) List all possible samples of size 3 that can be taken without replacement from the finite population. (ii) Calculate the mean of each of the sampling distributions of means. (iii) Find the standard deviation of sampling distributions of means.	4M 6M	CO2	L3 L3										
OR														
14	a) An ambulance service claims that it takes on average less than 10 minutes to reach its destination in emergency calls. A sample of 36 calls has a mean of 11 minutes and a variance of 16 minutes. Test the claim at 0.05 level significance. b) A researcher wants to know the intelligence of students in a school. He selected two groups of students. In the first group there are 150 students with having mean IQ of 75 with an SD of 15 in the second group there are 250 students with having mean IQ of 70 with an S.D of 20. Test the claim at 0.05 level significance	5M 5M	CO2	L3 L3										
15	a) Find a real root of the equation $x \log_{10} x = 1.2$ by using by False position Method. b) Find a real root of the equation by using Bisection Method $x^3 - 5x + 3 = 0$	5M 5M	CO3	L3 L3										
OR														
16	a) Find a positive root of the equation by iteration method $3x = \cos x + 1$ b) Evaluate $\sqrt{28}$ to four decimal places by Newton's iterative method.	5M 5M	CO3	L3 L5										
17	Given the values: <table border="1"><tr><td>X</td><td>0</td><td>2</td><td>3</td><td>6</td></tr><tr><td>f(x)</td><td>-4</td><td>2</td><td>14</td><td>158</td></tr></table> Using Lagrange's formula for interpolation find the value of f(4)	X	0	2	3	6	f(x)	-4	2	14	158	10M	CO4	L3
X	0	2	3	6										
f(x)	-4	2	14	158										
OR														
18	Evaluate $\int_0^2 e^{-x^2} dx$ using (i) Simpson's $\frac{3^{th}}{8}$ rule (ii) Simpson's $\frac{1^{rd}}{3}$ rule taking $h=0.25$	10M	CO4	L5										
19	Prove that the function f(z) defined by $f(z) = \frac{x^3(i+1) - y^3(1-i)}{x^2 + y^2}$ ($z \neq 0$), $f(0) = 0$ is continuous and the Cauchy-Riemann equations are satisfied at origin.	10M	CO5	L5										
OR														

20	(a) Evaluate $\oint_c \frac{z^3 - \sin 3z}{(z - \frac{\pi}{2})^3} dz$ where c is the circle $ z =2$ using Cauchy integral formula.	5M	CO5	L5
	(b) Find the conjugate harmonic function of the harmonic function $u = x^2 - y^2$.	5M		L3