*R20 Regulation* *Subject code: 3B3BA*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

## B.Tech III Semester Regular Examinations, February 2022

### PROBABILITY, NUMERICAL METHODS AND COMPLEX ANALYSIS

(ELECTRICAL & ELECTRONICS ENGINEERING)

*Maximum Marks: 70* Date:21.02.2022 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)

1 The mean and variance of a Binomial distribution are 2 and 8/5. What is the value of n.

2 If the variance of a Poisson variate X is 3, then find P (X = 0).

3 Define Type -I and Type-II errors.

4 Write the 95% confidence interval for the mean of the population, if S.D $\sigma = 2.61$ and mean of the sample is 3.4 with size of sample is 900.

5 Write the iteration formula to Obtain next iteration value for Regula-Falsi method?

6 Write the Newton-Raphson iteration formula?

7 Write the Newton's forward interpolation formula?

8 Write the Simpson's 1/3 rule to evaluate?

9 Write Cauchy's Reimann equations in cartesian form of f (z)= u+iv?

10 State Cauchy's Integral Theorem (Goursat theorem).

Part-B

Answer All the following questions. (5X10M=50Marks)

11 (a) Two dice are thrown. Let X assign to each point (a, b) in S the maximum of its numbers i.e., X (a, b) = max.(a, b). Find the probability distribution Also find the mean and variance of the distribution 5

(b) Suppose a continuous random variable X has the probability density function $f(x)= K (1-x^2)$ for $0 < x < 1$ and $f(x) = 0$ otherwise. Find (i) K (ii) Mean (iii) Variance 5

OR

12 In a normal distribution, 7% of the items are under 35 and 89% are under 63. Determine the mean and variance of the distribution. 10

13 (a) It is claimed that a random sample of 49 tyres has a mean life of 15200 km. This sample was drawn from a population whose mean is 15150 kms and a standard deviation of 1200 km. Test the significance at 0.05 level. 5

(b) The variance of a population is 2. The size of the sample collected from the population is 169. What is the standard error of mean. 5

OR

14 Samples of size 2 are taken from the population 1,2,3,4,5,6 without replacement.
Find i) The mean of the population
ii) Standard deviation of the population
iii) The mean of the sampling distribution of means
iv) The standard deviation of the sampling distribution of means 10

15 Find a real root of the equation $3x = \cos x + 1$ by bisection method 10

OR

16 Find a real root of the equation $x^3 - 2x^2 - 4 = 0$ using iteration method 10

17 Using Lagrange's formula calculate f ( 3 ) from the following table 10

| X | 0 | 1 | 2 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| f (x) | 1 | 14 | 15 | 5 | 6 | 19 |

OR

18 Evaluate $\int_0^1 \frac{1}{1+x}\, dx$
( i ) By Trapezoidal rule ( ii ) By Simpson's 1/3 rule 10

19 Show that $u(x, y) = e^{2x}(x \cos 2y - y \sin 2y)$ is harmonic function and also find its harmonic conjugate. 10

OR

20 Evaluate $\int_C \frac{z+4}{z^2+2z+5}\, dz$ where c is the circle 10
( i ) $|z| = 1$ ( ii ) $|z + 1 - i|$