



R20 Regulation

Subject code: 3B3CA

**TKR COLLEGE OF ENGINEERING AND TECHNOLOGY**

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

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

**PROBABILITY & STATISTICS AND COMPLEX VARIABLE  
(ME)**

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 binomial distribution.	2M	1	L1
2	If the mean and variance of the binomial variate are 12 and 4 then write binomial distribution.	2M	1	L1
3	If $f(x) = k e^{-x/5}, x > 0$ is a probability density function then find k?	2M	2	L1
4	Write the probability density function of Normal distribution.	2M	2	L1
5	Define point estimation and interval estimation.	2M	3	L1
6	Define type II error.	2M	3	L1
7	Write the one assumption of student's t- test.	2M	4	L1
8	Define small sample.	2M	4	L1
9	Show that $u(x, y) = x^3 - 3xy^2$ is harmonic.	2M	5	L1
10	Find the value of $\oint_C \frac{e^z}{z-4} dz$ where C is $ z  = 2$	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	Let 'X' denote the sum of the two numbers that appear when a pair of fair dice is tossed. Determine the (i) Distribution function (ii) Mean and (iii) Variance	10M	1	L2
OR				
12	Out of 800 families with 5 children each how many would you expect to have (i) 3 boys (ii) 5 girls (iii) either 2 or 3 boys (iv) at least one boy ? Assume equal probabilities for boys and girls.	10M	1	L2
13	The cumulative distribution function for a continuous random variable 'x' is $F(x) = \begin{cases} 1 - e^{-2x} & , x \geq 0 \\ 0 & , x < 0 \end{cases}$ Evaluate (i) density function (ii) Mean (iii) Variance	10M	2	L2
OR				
14	Derive variance and mean of the Normal distribution.	10M	2	L2

15	A population consists of five numbers ,3,6,9,15and 27.Consider all possible samples of size three Which can be drawn with out replacement from this population. Find i) The population mean. ii) The standard deviation of the population.iii) The mean of the sampling distribution of means. iv) standard deviation of the sampling distribution of means.	10M	3	L2																																
OR																																				
16	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	3	L2																																
17	A random sample of 10 boys had the following I.Q's : 70,120,110,101,88,83,95,98,107,100. Do these data support the assumption of a population mean I.Q of 100	10M	4	L2																																
OR																																				
18	Use F test to test the significance difference variances of two diets. At 5% level of significance.	10M	4	L2																																
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td>DietA</td> <td>25</td> <td>32</td> <td>30</td> <td>34</td> <td>24</td> <td>14</td> <td>32</td> <td>24</td> <td>30</td> <td>31</td> <td>35</td> <td>25</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>DietB</td> <td>44</td> <td>34</td> <td>22</td> <td>10</td> <td>47</td> <td>31</td> <td>40</td> <td>30</td> <td>32</td> <td>35</td> <td>18</td> <td>21</td> <td>35</td> <td>29</td> <td>22</td> </tr> </table>					DietA	25	32	30	34	24	14	32	24	30	31	35	25	-	-	-	DietB	44	34	22	10	47	31	40	30	32	35	18	21	35	29	22
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DietB	44	34	22	10	47	31	40	30	32	35	18	21	35	29	22																					
19	Prove that the function $f(z)$ defined by $f(z) = \begin{cases} \frac{x^3(1+i)-y^3(1-i)}{x^2+y^2} & z \neq 0 \\ 0 & z = 0 \end{cases}$ is continuous and the C-R equations are satisfied at the origin yet $f'(0)$ does not exist.	10M	5	L2																																
OR																																				
20	Evaluate $\int_C \frac{1}{z^4(z+4)} dz$ where C is the circle $ z  = 2$	10M	5	L2																																