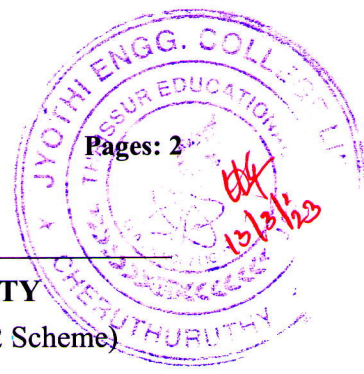


Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
First Semester M.Tech Degree Examination December 2022 (2022 Scheme)



**Discipline: CIVIL ENGINEERING**

**Course Code & Name: 221TCE100 PROBABILITY AND STATISTICS**

Max. Marks: 60

Duration: 2.5 Hours

**PART A**

*Answer all questions. Each question carries 5 marks*

Marks

- 1 The incidence of an occupational disease in an industry is such that the workmen have a 20% chance of suffering from it. What is the probability that out of six workmen, 4 or more will suffer from it? (5)
- 2 Differentiate between one tailed and two tailed test. (5)
- 3 In an experiment to determine the effect of nutrition on the attention span of elementary school students, a group of students were randomly assigned to each of three meal plans. Their attention span (in minutes) were recorded during a morning reading period and are as shown below. - (5)

Meal plan↓	I	II	III	IV	V
No BF	9	8	10		
Light BF	15	14	13	18	12
Full BF	12	10	14	13	

Construct the ANOVA table and check whether there is any significant difference between the means of attention span of these three groups.

- 4 Find the line of regression of Y on X from the data, (5)

X	2	4	6	8
Y	3	7	5	10

- 5 Find the moving averages of length 4 for the following data: (5)

Day	1	2	3	4	5	6	7	8	9	10	11	12	13
No.of units	45	46	48	47	58	58	51	52	53	45	51	61	62

**PART B**

*Answer any 5 questions. Each question carries 7 marks*

- 6 A sample of 100 dry battery cells tested to find the length of life has a mean of (7)

12 hours with a standard deviation of 3 hours. Assuming the data to be normally distributed, what percentage of battery cells is expected to have life for (i) more than 15 hours (ii) less than 6 hours and (iii) between 10 and 14 hours.

- 7 A random sample of 10 boys had the following IQ: (7)

70, 120, 110, 101, 88, 83, 95, 98, 107, 100. Do these data support the assumption of a population mean IQ of 100? Test at 5% level of significance.

- 8 The following table gives the scores obtained by five students in four different (7)

forms A, B, C and D of a standardised reading achievement test.

student→ form↓	1	2	3	4	5
A	75	73	59	69	84
B	83	72	56	70	92
C	86	61	53	72	88
D	73	67	62	79	95

Treating the students as blocks, perform an ANOVA to test at 1% level whether it is reasonable to treat four forms as equivalent.

- 9 Find the coefficient of correlation between X and Y from (7)

X	60	62	64	66	68	70	72
Y	61	63	63	63	64	65	67

- 10 Fit a linear trend by the method of least squares and calculate the trend values (7)  
from the data:

year	1997	1998	1999	2000	2001	2002	2003
sales(In lakhs)	125	128	133	135	140	141	143

- 11 The length of time for one person to be served at a cafeteria is a random variable (7)  
following exponential distribution with mean of 4 minutes. Find the probability  
that a person is served in less than 3 minutes on at least 4 of the next 6 days.

- 12 The refractive indices of 20 pieces of glass selected from a shipment have a (7)  
variance of  $1.2 \times 10^{-4}$ . Construct 95% confidence interval for the population  
standard deviation.

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