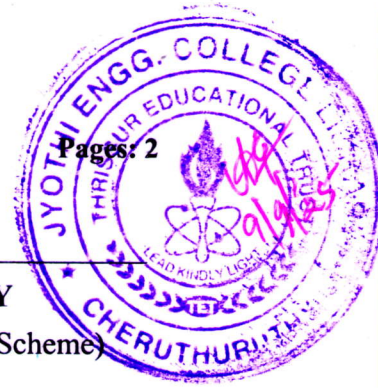Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

M.Tech Degree S1 (S,FE) (FT/WP) Examination August 2025 (2022 Scheme)

Course Code & Name:
221TCE100 PROBABILITY AND STATISTICS

Max. Marks: 60   Duration: 2.5 Hours

(Statistical tables are allowed)

PART A

Answer all questions. Each question carries 5 marks   Marks

1 The probability that a pen manufactured by a company will be defective is 0.1. If   (5)
12 such pens are manufactured, find the probability that exactly 2 pens will be
defective.

2 A random sample of size n=100 is taken from a population with σ=5.1. Given the   (5)
sample mean $\bar{x} = 21.6$. Construct a 95% confidence interval for the population
mean.

3 Write a brief note on ANOVA.   (5)

4 Compute Karl Pearson's coefficient of correlation between x and y from the   (5)
following observations.

x	1	2	3	4
y	1	4	9	16

5 Apply the method of semi-averages for determining trend of the following data   (5)
and estimate the sales for the year 2000.

Year	1993	1994	1995	1996	1997	1998
Sales(lakhs)	20	24	22	30	28	32

PART B

Answer any 5 questions. Each question carries 7 marks

6 In a test on 2,000 electric bulbs, it was found that the life of a particular make was   (7)
normally distributed with an average life of 2040 hours and a standard deviation
of 60 hours. Estimate the number of bulbs likely to burn for (i) more than 2150
hours (ii) less than 1950 hours (iii) more than 1950 but less than 2160 hours.

7   A group of boys and girls were given I Q test give the following results   (7)

	Sample size	mean	S D
Boys	18	124	12
Girls	14	121	10

Is the mean scores of boys significantly differ from that of girls? (use $\alpha = 5\%$)

8   A trucking company wishes to test the average life of each of the four brands of   (7)
tyres. The company uses all brands on randomly selected trucks. The records
showing the lives in thousands of miles of tyres are given in the following table
Test the hypothesis that the average life of each brand of tyres is the same use
$\alpha = 1\%$

Brand 1	Brand 2	Brand 3	Brand 4
20	19	21	15
23	15	19	17
18	17	20	16
17	20	17	18
	16	16	

9   Find a regression equation of y on x from the following data using the method of   (7)
least squares

x	1	2	3	4	5	6
y	6	4	3	5	4	2

10   Fit a linear trend to the following data by the least square method. Also estimate   (7)
the production for the year 1999.

Year	1990	1992	1994	1996	1998
Production	18	21	23	27	16

11   A car-hire firm has two cars, which it hires out day by day. The number of   (7)
demands for a car on each day is distributed as Poisson distribution with mean
1.5. Calculate the proportion of days on which neither car is used and the
proportion of days on which some demand is refused.

12   In 16 test runs, the gasoline consumption of an experimental engine has a standard   (7)
deviation of 2.2 gallons. Construct a 99% confidence interval for the population
variance.

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