H.T.No: | | | | | | | | | | |

Course Code: **201BS4T16**

ADITYA ENGINEERING COLLEGE (A)

B.Tech – IV Semester End Examinations Regular & Supple (AR20) – MAY 2024

PROBABILITY AND STATISTICS
(Common to CSE, IT, AIML & CSE(DS))

Time: 3 hours **Max. Marks: 70**

Answer ONE question from each unit
All Questions Carry Equal Marks
All parts of the questions must be answered at one place only

UNIT – I

1 a Mention the sources of secondary data. L2 CO1 [7M]

b Find mean for the following frequency distribution. L3 CO1 [7M]

x	10-25	25-40	40-55	55-70	70-85	85-100
f(x)	6	50	44	26	3	1

OR

2 a Describe the measure of central tendency. L2 CO1 [7M]

b Find the mode from the data given below. L3 CO1 [7M]

X	5	10	15	20	25
F	3	2	8	6	1

UNIT – II

3 a A consulting firm rents cars from three agencies, 30% from D, 20% from E and 50% from F agencies. If 10%, 15% and 5% of the cars have bad tires respectively from agencies D, E and F, what is the probability that a car with bad tires rented by the firm came from agency E? L3 CO2 [7M]

b A random variable X has the following probability function L2 CO2 [7M]

x	0	1	2	3	4	5	6	7	8
P(x)	$\frac{k}{45}$	$\frac{k}{15}$	$\frac{k}{9}$	$\frac{k}{5}$	$\frac{2k}{45}$	$\frac{6k}{45}$	$\frac{7k}{45}$	$\frac{8k}{45}$	$\frac{4k}{45}$

Determine i) value of k ii) mean iii) variance of the distribution.

OR

4 a Given that the switchboard of a consultant's office receives on the average 0.8 calls per minute. Find the probability that i) there will be at least 2 calls ii) at most 4 calls in a given minute. L3 CO2 [7M]

b If a random variable 'X' follows a normal distribution with mean 16.28 and standard deviation 0.12. Find the probabilities i) $P(16 < X < 16.5)$ ii) $P(X > 16.2)$. L2 CO2 [7M]

UNIT – III

5 a A population consists of 5,10,14,18,13,24. Consider all possible samples of size two which can be drawn without replacement. Find i) mean of the population ii) standard deviation of the population. iii)mean of sampling distribution of means iv) standard deviation of sampling distribution of means L3 CO3 [10M]

b Explain standard error of a statistic. L2 CO3 [4M]

(P.T.O)

OR

6 a A random sample of 400 items is found to have mean 82, S.D 18. Find the maximum error of estimation at 95% confidence interval. Find the confidence limits for the mean if $\bar{x} = 82$. L3 CO3 [7M]

b A random sample of 100 teachers in a large metropolitan area revealed a mean weekly salary of Rs.487 with a standard deviation of Rs.48.With what degree of confidence can we assert that the average weekly salary of all teachers in the metropolitan area is between 472 and 502. L3 CO3 [7M]

UNIT – IV

7 a A manufacturer of electric bulbs claims that the percentage of defectives in his product does not exceed 6. A sample of 40 bulbs is found to contain 5 defectives. Would you consider the claim justified? L3 CO4 [7M]

b The tensile strength of a new composite can be modeled as a normal distribution. A random sample of size 25 specimens has a mean of 45.3 and standard deviation of 7.9. Does this information tend to support or refuse the claim that the mean of the population is 40.5? L3 CO4 [7M]

OR

8 a The means of two large samples of sizes 1000 and 2000 members are 67.5 inches and 68.0 inches respectively. Can the samples be regarded as drawn from the same population of S.D 2.5 inches. L2 CO4 [7M]

b According to norms established for a mechanical aptitude test persons who are 18 years have an average weight of 73.2 with S.D 8.6 if 40 randomly selected persons have average 76.7 test the hypothesis $H0:\mu$ =73.2 against alternative hypothesis : μ >73.2. L3 CO4 [7M]

UNIT – V

9 a Fit a parabola of the form $y = a + bx + cx^2$ to the following data by the method of least squares. L2 CO5 [7M]

x	1	2	3	4	5	6	7
y	2.3	5.2	9.7	16.5	29.4	35.5	54.4

b Calculate the correlation coefficient and regression lines of X on Y and Yon X for the following data. L3 CO5 [7M]

X	1	5	3	2	1	1	7	3
Y	6	1	0	0	1	2	1	5

OR

10 a The equations of two regression lines obtained in a certain correlation analysis are $5x - 2y = 7$ and $5x - 8y = -17$. Find i) Coefficient of correlation ii) Means of X and Y. L2 CO5 [7M]

b Using method of least squares fit a curve of the form $y = ae^{bx}$ to the given data L2 CO5 [7M]

x	1	2	3	4	5
y	2.6	3.3	4.2	5.4	6.9

*****