

ADITYA ENGINEERING COLLEGE (A)**PROBABILITY AND STATISTICS**
(Common to CSE & IT)**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 Define Data Science and write its applications. K2 CO1 [7M]
b Find the median for the following table K3 CO1 [7M]

Group	60-64	65-69	70-74	75-79	80-84	85-90
Frequency	3	6	9	10	8	7

OR

- 2 a The following frequency distribution showing the marks obtained by 50 students in statistics at a certain college. Find the arithmetic mean using step-deviation method. K3 CO1 [7M]

Marks	20-30	30-40	40-50	50-60	60-70	70-80	80-90
Frequency	1	5	12	15	9	6	2

- b Explain types of data. K2 CO1 [7M]

UNIT – II

- 3 a Three machines A, B and C produce respectively 50%, 30% and 20% of the total number of items of a factory. The percentage of defective output of these machines is 3%, 4% and 5% K3 CO2 [7M]

- i) If an item is selected at random, find the probability that the item is defective.
ii) Suppose an item is selected at random and is found to be defective. Find the probability that it was produced by machine A.

- b The probability density function of a variate X is K3 CO2 [7M]

X	0	1	2	3	4	5	6
P(X)	0	2k	2k	3k	k^2	$2k^2$	$7k^2+k$

Find i) k ii) mean

OR

- 4 a If a Poisson distribution is such that $3P(X=1)=2P(X=3)$ then find i) mean K3 CO2 [7M]
ii) $P(0 < X < 3)$
b In a Normal distribution, 7% of the items are under 35 and 89% of the items are under 63. Find mean and variance of the distribution. K3 CO2 [7M]

UNIT – III

- 5 a Samples of size 2 are taken from the population 3,6,9,15,27 without replacement. Find i) The mean of the population ii) The standard deviation of the population K3 CO3 [7M]
iii) Mean of sampling distribution of means iv) Standard deviation of sampling distribution of means.
b The mean and standard deviation of a population are 11,795 and 14054 respectively. If $n=50$, find 95% confidence interval for the mean. K2 CO3 [7M]

(P.T.O)

OR

- 6 a 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. K3 CO3 [7M]
- b What is the size of the smallest sample required to estimate an unknown proportion to within a maximum error of 0.06 with at least 95% confidence. K2 CO3 [7M]

UNIT – IV

- 7 a A manufacturer claimed that at least 95% of the equipment which he supplied to a factory conformed to specifications. An examination of a sample of 200 pieces of equipment revealed that 18 were faulty. Test his claim at 5% level of significance. K3 CO4 [7M]
- b Ten soldiers participated in a shooting competition in the first week. After intensive training they participated in the competition in the second week. Their scores before and after training are given as K3 CO4 [7M]

Scores before	67	24	57	55	63	54	56	68	33	43
Scores after	70	38	58	58	56	67	68	75	42	38

Do the data indicate that the soldiers have been benefited by the training?

OR

- 8 a From the following data, find whether there is any significant liking in the habit of taking Soft drinks among the categories of employees K3 CO4 [8M]

Employees

Softdrinks	Clerks	Teachers	Officers
Pepsi	10	25	65
Thumbsup	15	30	65
Fanta	50	60	30

- b Define the following K2 CO4 [6M]
- i) Hypothesis and types of hypothesis ii) Errors in Sampling

UNIT – V

- 9 a Fit a parabola to the following data K3 CO5 [7M]

x	1	2	3	4	5
y	10	12	8	11	14

- b Find the rank correlation coefficient for the following data: K3 CO5 [7M]

X :	68	64	75	50	64	80	75	40	55	64
Y :	62	58	68	45	81	60	68	48	50	70

OR

- 10 a Obtain the equations of two lines of regression for the following data. Also obtain the likely demand when the price is Rs.20. K3 CO5 [7M]

X	10	12	13	12	16	15
Y	40	38	43	45	37	43

- b Fit an exponential curve of the form $y = ae^{bx}$ to the following data K3 CO5 [7M]

x	1	5	7	9	12
y	10	15	12	16	21
