

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP/2024)

CLASS: BTECH
BRANCH: AIML

SEMESTER:
SESSION: SP/2024

SUBJECT: AI201 PROBABILITY AND STATISTICAL ANALYSIS

TIME: 02 Hours

FULL MARKS: 25

INSTRUCTIONS:

1. The question paper contains 5 questions each of 5 marks and total 25 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates
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- Q.1(a) What do you mean by "Population" and "Sample"? Explain the significance of samples. [2] CO BL
Q.1(b) The following is a sample of prices, rounded to the nearest cent, charged per gallon of standard unleaded gasoline in the San Francisco Bay area in June 1997. [3] CO1 2
3.88, 3.90, 3.93, 3.90, 3.93, 3.96, 3.88, 3.94, 3.96, 3.88, 3.94, 3.99, 3.98
Represent these data in
(a) a frequency table.
(b) a relative frequency line graph.
- Q.2(a) A total of 28 percent of males living in Nevada smoke cigarettes, 6 percent smoke cigars, and 3 percent smoke both cigars and cigarettes. What percentage of male smoke neither cigars nor cigarettes? [2] CO2 2
Q.2(b) The following are the percentages of ash content in 12 samples of coal found in proximity: [3] CO1 3
9.2, 14.1, 9.8, 12.4, 16.0, 12.6, 22.7, 18.9, 21.0, 14.5, 20.4, 16.9
Find the
(a) sample mean, and
(b) sample standard deviation of these percentages.
- Q.3 The sample mean of the annual salaries of a group of 100 accountants who work at a large accounting firm is \$130,000 with a sample standard deviation of \$20,000. If a member of this group is randomly chosen, what can we say about it? [5] CO2 3
a) the probability that his or her salary is between \$90,000 and \$170,000.
b) the probability that his or her salary exceeds \$150,000?
- Q.4 You ask your neighbor to water a sickly plant while you are on vacation. Without water will die with probability 0.8; with water it will die with probability 0.15. You are 90 percent certain that your neighbor will remember to water the plant. [5] CO2 4
(a) What is the probability that the plant will be alive when you return?
(b) If it is dead, what is the probability your neighbor forgot to water it?
- Q.5 Determine the mean and variance of the random variable X by having the following probability distribution. [5] CO2 3

X = x	1	2	3	4	5	6	7	8	9	10
P (x)	0.15	0.10	0.10	0.01	0.08	0.01	0.05	0.02	0.28	0.20

:20/02/2024:M