

Jaypee University of Information Technology, Waknaghat

Test-1 Examinations - February 2024

B.Sc. (Mathematics and Computing) - II Semester

Course Code/Credits: 22BS1MA212/4

Max. Marks: 15

Course Title: Fundamentals of Probability and Statistics

Course Instructors: RAD

Max. Time: 1 hour

- Note:** (a) ALL questions are compulsory.
(b) Scientific calculators are allowed.
(c) Marks are indicated against each question in round brackets.
(d) The candidate is allowed to make suitable numeric assumptions wherever required.

1. A sociologist conducted a survey of 20 adults. She wants to report the frequency distribution of the ages of the survey respondents from the raw age data: (3 Marks) [CO-1]

52	34	32	29	63	40	46	54	36	36
24	19	45	20	28	29	38	33	49	37

Construct a frequency table with 5 classes of class width 10 starting from lower limit 19.

2. The following table gives the frequency distribution of the number of orders received each day during the past 50 days at the office of a mail-order company. (3 Marks) [CO-1]

Number of Order (x)	1-10	11-20	21-30	31-40	41-50
Frequency (f)	8	14	12	9	7

- (a) Calculate (i) 1st quartile Q_1 (ii) 75th percentile P_{75} .
(b) What quantity of variation in order is explained by *quartile deviation*?
3. Answer the following questions: (3 Marks) [CO-1]
- (a) In a math class of 30 students, 17 are boys and 13 are girls. On a unit test, 4 boys and 5 girls made an 'A' grade. If a student is chosen at random from the class, what is the probability of choosing a girl or an 'A' grade student?
(b) A school survey found that 9 out of 10 students like pizza. If 3 students are chosen at random with replacement, what is the probability that all three students like pizza?
4. Answer the following questions: (3 Marks) [CO-2]
- (a) It is given that in a moderately skewed distribution, median = 10 and mean = 12. Using these values, find the approximate value of the mode.
(b) Find the possible range of median of a positively skewed distribution, if the values of mean and mode are 30 and 20 respectively.
5. By using *natural language processing* (NLP), you can detect spam e-mails in your inbox. Assume that the word 'offer' occurs in 80% of the spam messages in your account. Also let's assume 'offer' occurs in 10% of your desired e-mails. Suppose that 30% of the received e-mails are considered as a scam. (3 Marks) [CO-2]
- (a) Determine the probability of receiving an e-mail containing the word 'offer'.
(b) If you receive an e-mail which contains 'offer', what is the probability that it is spam?