

1. When collecting data, why is it sometimes better to conduct a sample survey than a census? 3
2. Define the following variable types: a) The indoor temperature b) The color of baseball cap worn by students c) weight d) satisfaction of a customer 4
3. What is the difference between a population and a sample in statistics? A school takes a poll to find out what students want to eat at lunch. 70 students are randomly chosen to answer the poll questions. What are the population, the sample and the variable of this study? 5
4. What is the relation between Arithmetic, Geometric and Harmonic Mean? Calculate Arithmetic, Geometric and Harmonic Mean of the following data: 5

Height (in)	Class Mark (X)	Frequency (f)
60-62	61	5
63-65	64	18
66-68	67	42
69-71	70	27
72-74	73	8

5. If you are given ordinal, ratio and nominal data then which types of central tendency do you choose for these data? Explain. 4

1. Why do we study Dispersion? What is the problem of Range? 4

2. Find the sample variance, sample standard deviation and coefficient of variation for the following data: 5

Size of orders X	20<30	31<40	41<50	51<60	61<70
No. of orders f	3	8	12	6	1

3. Does correlation and dependency mean the same thing? In simple words if two events have correlation of zero, does this convey they are not dependent and vice-versa? 3

4. Can single outlier decrease or increase the correlation with a big magnitude? Is Pearson coefficient very sensitive to outliers? 4

5. What's the difference between correlation and simple linear regression? 4

Rajshahi University of Engineering & Technology

Department: CSE Course: CSE 3107 CT: 3

B

1. Among two approaches for curve fitting which data type are suitable for them? Explain with example.
2. Fit a least square line for the following data.

X	1	2	3	4	5
Y	2	5	3	8	7

$$x^2 + y^2 = r^2$$

3. A die is rolled and a coin is tossed. What is the sample space of the problem? Find the probability that the die shows an odd number and the coin shows a head.

4. Among following events find out dependent and independent events?

$$\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$$

- vii) Robbing a bank and going to jail - Dependent
- viii) Owning a dog and growing your own herb garden. ..
- ix) Winning the lottery and running out of milk.

5. You toss a fair coin three times:

- a. What is the probability of three heads, HHH?
- b. What is the probability that you observe exactly one heads?
- c. Given that you have observed at least one heads, what is the probability that you observe at least two heads?

HHH, THT, HTT, TTT

7/8 1/7

7

B

Let X be a random variable with PDF given by

$$f(x) = \begin{cases} cx^2 & |x| \leq 1 \\ 0 & \text{otherwise} \end{cases}$$

a) Find the constant c .

b) Find $P(X \geq 12)$.

A biased die with six faces is rolled. The discrete random variable X represents the score on the uppermost face. The probability distribution of X is shown in the table below:

x	1	2	3	4	5	6
$P(X = x)$	a	a	a	b	b	0.3

Given that $E(X) = 4.2$, find the value of a and b .

When does binomial distribution become impractical? Let's say that 80% of all business startups in the IT industry report that they generate a profit in their first year. If a sample of 10 new IT business startups is selected, find the probability that exactly seven will generate a profit in their first year.

Why queuing theory is important for computer science? Explain with some example.

For Supermarket express lanes which queue configuration do you prefer? Explain with its benefit.

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Class Test #1
Dept. of CSE, RUET
Time: 20 minutes

30
23
8
100

1. Suppose the marks of 30 students of a subject are as follows

30 35 45 65 70 39 46 55 30 45 70 40 46 55 38 36 53 43 47 53 63
65 60 45 55 57 65 45 55 ____.

- Find the five-number summary of data
- Draw a box-and-whisker diagram.
- Find the 90th percentile.
- Find the median, mode, sample mean, and sample standard deviation?
- Which of above measures (sample mean, median and mode) do you feel is the best measure of central tendency of the data? Why?

Class Test #2
Dept. of CSE, RUET
Time: 30 minutes

A

1. Show graphically the approximate position of mean, median and mode when the distribution is (i) negatively skewed, (ii) positively skewed and (iii) symmetrical. 05

2. Which scale of measurement (ordinal, nominal, interval, and ratio) will you use to represent the following variables: 10

family size, religion, race, level of satisfaction, day temperature, length of schooling, happiness, age, room number, telephone number, opinion, hair colour, work status.

Which type of graphs and diagrams would be suitable for representing the above variables?

3. Find out the basic point of differences of interval level data and ratio type data. 05

Class Test 3
Dept. of CSE, RUET
Time: 20 minutes

1 a) State Bayes theorem and prove it. 10

b) A bag contains 4 red, 6 black and 7 white marbles. A marble is chosen at random from the bag. If the marble is not white, what is the probability that it is red? 5

c) Define sampling with replacement and sampling without replacement. Which one is better in your opinion?

$$P(A|B) = \frac{P(A \cap B)}{P(B)}$$
$$= \frac{1/17}{10/17} = \frac{1}{10}$$

to