Session -1

1. What is the main purpose of calculating expected value in probability theory?
   1. To determine the likelihood of an event occurring
   2. **To measure the central tendency of a random variable's outcomes**
   3. To identify the joint probabilities of multiple events
   4. To calculate the variance of a probability distribution
2. What does Bayes' Theorem allow us to do in probabilistic reasoning?
   1. Calculate the expected value of a random variable
   2. **Determine the probability of an event given prior knowledge and new information**
   3. Measure the variability of a probability distribution
   4. Compute the joint probabilities of multiple events
3. If two events A and B are independent, what is the relationship between their joint probability P(A and B) and their individual probabilities P(A) and P(B)?
   1. P(A and B) = P(A) + P(B)
   2. **P(A and B) = P(A) × P(B)**
   3. P(A and B) = P(A) - P(B)
   4. P(A and B) = P(A) / P(B)
4. Two events A and B have joint probability P(A and B) = 0.2. If the probability of event A is P(A) = 0.6 and the probability of event B is P(B) = 0.4, what can be said about the events A and B?
   1. They are mutually exclusive events.
   2. They are independent events.
   3. They are complementary events.
   4. **They are dependent events.**

 Session -2

       5. Which of the following best describes a discrete random variable?

1. A variable that can take on any value within a given range.
2. **A variable that can only take on specific, countable values.**
3. A variable that represents continuous outcomes.
4. A variable that is unrelated to probability distributions.

    6. What does the probability mass function (PMF) represent for a discrete random variable?

1. The cumulative probability of the variable taking on a specific value.
2. The average value of the variable over a range of values.
3. **The probability associated with each possible value of the variable.**
4. The rate of change of the variable with respect to probability.

        7. Which condition is necessary for a binomial experiment?

1. The experiment involves continuous outcomes.
2. **Each trial in the experiment has a constant probability of success.**
3. The number of trials in the experiment is unlimited.
4. The outcomes of each trial are dependent on previous trials.

        8. In a binomial distribution, what does the binomial probability formula calculate?

1. The expected value of the random variable.
2. The standard deviation of the random variable.
3. **The probability of a specific number of successes in a fixed number of trials.**
4. The total number of possible outcomes in the experiment.

Session - 3

1. What distinguishes Continuous Probability Distributions from Discrete Probability Distributions?
   1. **Continuous distributions can take on any value within a range, while discrete distributions have specific individual values.**
   2. Continuous distributions are only used in engineering, while discrete distributions are used in finance.
   3. Continuous distributions are easier to calculate than discrete distributions.
   4. Continuous distributions are only applicable to theoretical models, while discrete distributions are used in practical applications.
2. Which of the following is an example of a Continuous Uniform Distribution?
   1. Rolling a fair six-sided die.
   2. Measuring the height of students in a classroom.
   3. **Selecting a random value between 1 and 100.**
   4. Counting the number of defective items in a production batch.
3. How is the probability calculated in a Continuous Probability Distribution?
   1. By summing the probabilities of all individual outcomes.
   2. **By calculating the area under the Probability Density Function (PDF) curve using integration.**
   3. By dividing the mean by the standard deviation.
   4. By using the mode of the distribution.
4. What does a Probability Density Function (PDF) represent in a Continuous Probability Distribution?
   1. The exact probabilities of individual outcomes.
   2. **The area under the curve, which represents the probability of a range of outcomes**.
   3. The mean of the distribution.
   4. The standard deviation of the distribution.

Session - 4

1. Which of the following scenarios is best modelled using a Poisson distribution?
   1. Flipping a fair coin
   2. **Counting the number of emails received per hour**
   3. Rolling a six-sided die
   4. Selecting a card from a deck of cards

1. What is the key characteristic of a Bernoulli distribution?
   1. It models continuous random variables.
   2. **It has a single parameter, p, representing the probability of success.**
   3. Its probability mass function (PMF) is given by f(x) = λ^x \* e^(-λ) / x!, where λ is the rate parameter.
   4. It is used to model the number of occurrences of an event in a fixed interval.

1. The Cumulative Distribution Function (CDF) of a random variable:
   1. Represents the probability mass function (PMF) of the variable.
   2. Gives the probability that the random variable is exactly equal to a certain value.
   3. **Provides the probability that the random variable is less than or equal to a certain value.**
   4. Is only applicable to continuous distributions.
2. A company receives an average of 6 customer complaints per day. What type of distribution is most appropriate for modelling the number of complaints received in a day?
   1. Bernoulli distribution
   2. Normal distribution
   3. **Poisson distribution**
   4. Exponential distribution