

PART A -

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* Theoretical Foundations

(Q.1). What is statistical distributions?

Ans. A distributions shows how data values are spread and the probability of different outcomes.

(Q.2) What is a Q-Q plot and why it is used?

Ans. A Q-Q plot compares dataset quantiles with a theoretical distributions to check if data follows that distributions.

(Q.3) Difference between Discrete and Continuous distributions?

Ans. • Discrete: Countable outcomes (eg, dice roll).

• Continuous: Infinite outcomes in a range (eg, height).

(Q.4) What is Bernoulli Distribution?

Ans It models one trial with two outcomes: Success (1) or failure (0). Example: One coin toss.

(Q.5) What is Binomial Distribution?

Ans It models the number of successes in independent Bernoulli trials. Example: head in 10 coin tosses.

(Q.6). Explain Log-Normal Distribution?

Ans. If the log of data is normally distributed then the data follows log-normal. Used for income, stock prices.

(Q.11)

(Q.7) Explain Power Law Distribution?

Ans. A heavy-tailed distribution where small events are common and large events are rare.
Example : Earthquake magnitudes.

Ans.

(Q.8). What is Box-Cox transformation?

Ans. A transformation applied to data to make it more normal-like and stabilize variance.

(Q.9). Explain Poisson Distribution with an example.

Ans. It models the probability of a certain number of events in fixed time/Space. Example : Number of emails received per hour.

(Q.10) What is Z-Score Probability?

Ans. It tells how many Standard Deviation a value is from the mean and is used to calculate probabilities in a normal distribution.

(Q.11) Differentiate Probability Density Function (PDF) and Cumulative Distribution Function (CDF).

Ans. PDF (Probability Distribution Function).

It Shows the probability density at a value of a continuous variable. The area under the PDF curve gives the probability for a range and the total area = 1, Example : normal distribution bell curve.

→ CDF (Cumulative Distribution Function).

It Shows the probability that a variable is less than or equal to a value. It is the area under the PDF up to that point, always changes between 0 and 1, and form an S-shaped curve.