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### Exam Tasks.

#### PART A - Theory (Short Questions)

(Q.1) Define Mean, Median, Mode with an example in the context of employee salaries?

Ans. Mean (Average): Sum of all salaries ÷ number of employees.

- Median (Middle Value): The salary in the middle when data is arranged.

- Mode (Most frequent salary): The salary that occurs most often.

(Q.2) Differentiate between Range and Variance with examples?

Ans. Range : Difference between highest and lowest values

for eg) [20, 25, 30, 40] → Range = 40 - 20 = 20

Variance : Measure of how spread out the data is from the mean.

(eg). [20, 25, 30, 40] → Variance is calculated as average of squared difference from the mean.

(Q.3). What is the difference between Normal distribution and Poisson Distribution?

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Ans. Normal Distribution : Bell-shaped curve, continuous data, mean = median = mode  
 eg : Employee height or exam scores

Poisson Distribution : Discrete data, counts of events in a fixed time/space

(eg). Number of customer call per hour.

(Q.4) Explain Skewness and give one workplace related example?

Ans Skewness : Shows if data leans more towards left or right

• Positive Skew (Right Skew) : Few employees earn very high salaries, pulling average up.

• Negative Skew (Left Skew) : Few employees earn very low salaries, pulling average down.

(eg). If most employees earn 30K-40K but a CEO earn 1M, salary data is positive skewed.

(Q.5) Define Conditional Probability and explain how it applies in promotions?

Ans. Probability of event A happening given that event B has already happened.

$$(\text{formula}) \rightarrow P(A|B) = P(A \cap B) / P(B).$$

Example in Promotion : Probability of being promoted (A) gives the employee has high performance ratings (B).

(Q.6) Explain Independent vs Mutually Exclusive Events with example?

Ans. Independent Events : One event does not affect the other.

(eg). Employee being late and company stock price goes up.

→ Mutually Exclusive Events : Both cannot happen at same time.

(eg). Employee is either promoted or not promoted in a year.

(Q.7) What does Bayes Theorem helps us in real world decision making?

Ans. It helps to update probability when new information is available

formula :  $P(A|B) = [P(B|A) * P(A)] / P(B)$

(eg). Instead HR can use Bayes theorem to calculate probability that an employee will quit given they already showed low engagement signs.

(Q.8). Write a short note on PCA (Principal Component Analysis) in simple words.

Ans. PCA is a technique to reduce dimensions in data while keeping the most important information.

- It combines many features into fewer "principal components."

(eg). Instead of analyzing 100 employees' performance metrics, PCA reduces them to 2-3 key factors for easy visualization.