**Q1.** Which of the following statements best differentiates between batch gradient descent and stochastic gradient descent?  
 A. Batch uses one data point at a time; stochastic uses the entire dataset  
 B. Batch is always faster than stochastic  
 C. Stochastic uses one data point at a time; batch uses the entire dataset  
 D. Both use mini batches by default

**Q2.** What is the primary advantage of using dropout in a neural network?  
 A. It speeds up training  
 B. It improves the optimizer performance  
 C. It reduces overfitting by randomly ignoring neurons  
 D. It increases model complexity

**Q3.** Which activation function is most used in the output layer for binary classification problems?  
 A. ReLU  
 B. Softmax  
 C. Sigmoid  
 D. Tanh

**Q4.** Why is ReLU preferred over sigmoid in hidden layers of deep networks?  
 A. Sigmoid never saturates  
 B. ReLU gives faster convergence and avoids vanishing gradients  
 C. ReLU works only for classification  
 D. Sigmoid gives better gradients

**Q5.** A model has high training accuracy but low testing accuracy. This indicates:  
 A. Underfitting  
 B. Overfitting  
 C. Good generalization  
 D. High bias

**Q6.** A hospital wants to automate the classification of X-ray images as either ‘Pneumonia’ or ‘Normal’.

* How would you frame this as a problem using building blocks of AI?
* Mention the type of architecture you'd use and justify your choice.

**Q7.** A car manufacturing company wants to detect manufacturing defects based on images of components. Design an end-to-end AI pipeline for this task.

**Q8.** You are given a dataset of car mileage (km per liter) based on features like engine size, weight, and fuel type. How will you approach this as an AI problem, and which metrics will you use to evaluate your model?

**Q9.** Give 4 differences between a Convolution Neural Network and a regular Artificial Neural Network

**Q10.** A code to generate a synthetic data is provided to you which showcases Employee Performance Dataset where we simulate 1,000 employees with features like age, department, years of experience, performance score, salary, training hours etc.

Visualize the following KPIs and gather insights from it:

* Generate a visualization of distribution of experience and find out how many employees fall under 0-5 years of experience.
* Out of several unique department categories, find:
  + which department provides highest salary and
  + which department provides lowest salary

Q11. Using the indian\_food.csv dataset provided, visualize the following:

* Count of vegetarian and non-vegetarian consumers using bar graph
* Count of unique dishes in this dataset
* Count of unique flavored dishes in this dataset