**Section 1: AI Concept & Basics (Q1–Q20)**

1. **What is Artificial Intelligence (AI)?**
Computer systems or machines that can think, decide, and learn like humans.
2. **Difference between AI and traditional programming?**
Traditional programming uses manually coded rules; AI learns rules from data.
3. **Main goal of AI?**
Problem-solving, decision-making, and automation.
4. **Main types of AI?**
Narrow AI, General AI, and Super AI.
5. **What is Narrow AI?**
AI designed for a specific task (e.g., chatbot, spam filter).
6. **What is General AI?**
AI that can solve any problem and think like a human (does not exist yet).
7. **What is Super AI?**
AI that surpasses human intelligence (future possibility).
8. **Main fields of AI?**
Machine Learning, Deep Learning, NLP, Computer Vision, Robotics.
9. **What is Computer Vision?**
AI that understands images/videos.
10. **What is Natural Language Processing (NLP)?**
AI that understands and processes human language.
11. **Difference between AI and automation?**
Automation is rule-based; AI is intelligence-based.
12. **What is training data in AI?**
Dataset used to train an AI model.
13. **What is a model in AI?**
Mathematical representation of learned patterns from data.
14. **What is AI model deployment?**
Putting a trained model into production for use.
15. **What is bias in AI?**
Unfair tendency in data or algorithms.
16. **How to reduce bias?**
Use balanced data and fair algorithms.
17. **What is AI ethics?**
Principles for responsible AI use.
18. **What is Explainable AI?**
AI that can explain how it made its decisions.
19. **Difference between accuracy and precision?**
Accuracy = percentage of correct predictions; Precision = correct positive predictions ratio.
20. **Future challenges of AI?**
Data privacy, bias, explainability, and job automation risks.

**Section 2: Machine Learning Basics (Q21–Q40)**

1. **What is Machine Learning (ML)?**
AI subfield that learns from data to make predictions.
2. **Main types of ML?**
Supervised, Unsupervised, Reinforcement Learning.
3. **What is Supervised Learning?**
Learning from labeled data.
4. **What is Unsupervised Learning?**
Learning patterns from unlabeled data.
5. **What is Reinforcement Learning?**
Learning from rewards/feedback.
6. **What is a classification task?**
Categorizing data into classes.
7. **What is a regression task?**
Predicting continuous values (e.g., price prediction).
8. **What is clustering?**
Grouping similar data points.
9. **What is overfitting?**
Model fits training data too well, fails on new data.
10. **What is underfitting?**
Model fails to capture data patterns.
11. **How to prevent overfitting?**
Regularization, cross-validation, dropout, etc.
12. **What is feature engineering?**
Improving model performance by refining data features.
13. **What is feature scaling?**
Making data ranges uniform (normalization, standardization).
14. **What is training and testing data?**
Training = learn patterns; Testing = evaluate model.
15. **What is cross-validation?**
Splitting data into multiple sets for testing.
16. **What is a confusion matrix?**
Table showing classification performance.
17. **What are precision, recall, and F1-score?**
Metrics for classification accuracy.
18. **What is ROC curve?**
Graphical representation of model performance.
19. **What is a hyperparameter?**
Parameter set before training (e.g., learning rate).
20. **What is hyperparameter tuning?**
Finding optimal hyperparameter values.

**Section 3: Deep Learning (Q41–Q60)**

1. **What is Deep Learning?**
ML subset using multi-layer neural networks.
2. **What is a neural network?**
Model inspired by the brain’s neurons.
3. **What is a neuron (perceptron)?**
Small unit processing input to output.
4. **What is an activation function?**
Decides output of a neuron mathematically.
5. **Popular activation functions?**
ReLU, Sigmoid, Tanh, Softmax.
6. **What is a feedforward neural network?**
Data flows in one direction.
7. **What is backpropagation?**
Algorithm to update weights using errors.
8. **What is a CNN (Convolutional Neural Network)?**
Neural network for image processing.
9. **What is an RNN (Recurrent Neural Network)?**
Neural network for sequence data.
10. **What is an LSTM (Long Short-Term Memory)?**
Advanced RNN for long-term dependencies.
11. **What is batch size?**
Number of samples per training iteration.
12. **What is an epoch?**
One complete pass of training data.
13. **What is gradient descent?**
Optimization algorithm to minimize errors.
14. **What is learning rate?**
Step size in gradient descent.
15. **What is dropout?**
Disabling random neurons to prevent overfitting.
16. **What is transfer learning?**
Using pre-trained models for new tasks.
17. **What is a GAN (Generative Adversarial Network)?**
AI model that generates new data.
18. **What is an autoencoder?**
Neural network for data compression and reconstruction.
19. **Hardware requirements for deep learning?**
GPU/TPU, high RAM, fast storage.
20. **What is dataset augmentation?**
Transforming data to create new samples.

**Section 4: NLP (Natural Language Processing) (Q61–Q80)**

1. **What is NLP?**
AI that understands and processes human language.
2. **Main NLP tasks?**
Tokenization, POS tagging, NER, sentiment analysis.
3. **What is tokenization?**
Splitting text into words or sentences.
4. **What is stemming?**
Reducing words to root form.
5. **What is lemmatization?**
Reducing words to dictionary form.
6. **What are stop words?**
Common words removed in text processing.
7. **What is Bag of Words (BoW)?**
Representing text as word frequency.
8. **What is TF-IDF?**
Measuring word importance in a document.
9. **What is word embedding?**
Representing words as numeric vectors.
10. **Popular word embeddings?**
Word2Vec, GloVe, FastText.
11. **What is a language model?**
Predicts word sequences.
12. **What is an n-gram model?**
Sequence of n continuous words.
13. **What is sentiment analysis?**
Detects sentiment (positive/negative) in text.
14. **What is NER (Named Entity Recognition)?**
Identifies entities like names, places, dates.
15. **What is POS tagging?**
Assigns part of speech to words.
16. **What is machine translation?**
Translates from one language to another.
17. **What is speech-to-text?**
Converts speech into text.
18. **What is text-to-speech?**
Converts text into speech.
19. **How is NLP used in chatbots?**
Understands queries and generates responses.
20. **What is a large language model (LLM)?**
NLP model trained on massive datasets (e.g., GPT, BERT).

**Section 5: AI Tools, Frameworks & Applications (Q81–Q100)**

1. **Popular AI frameworks?**
TensorFlow, PyTorch, Keras, Scikit-learn.
2. **What is TensorFlow?**
Open-source machine learning library.
3. **What is PyTorch?**
Flexible deep learning framework.
4. **What is Keras?**
High-level API for deep learning.
5. **What is Scikit-learn?**
Python library for machine learning.
6. **What is OpenCV?**
Computer vision library.
7. **What is Hugging Face Transformers?**
NLP pre-trained model library.
8. **What is Google AI Platform?**
Cloud platform for AI model development and deployment.
9. **What is AWS SageMaker?**
Amazon’s ML training and deployment service.
10. **What is Azure Machine Learning?**
Microsoft’s AI model development service.
11. **Example of AI in healthcare?**
Disease detection, medical imaging.
12. **Example of AI in finance?**
Fraud detection, credit scoring.
13. **Example of AI in retail?**
Recommendation systems, inventory management.
14. **Example of AI in manufacturing?**
Predictive maintenance, quality control.
15. **Example of AI in transportation?**
Self-driving cars, traffic prediction.
16. **Example of AI in education?**
Personalized learning, automated grading.
17. **Why is AI model monitoring important?**
Detects performance degradation.
18. **What is MLOps?**
Combining ML development and operations.
19. **What is Edge AI?**
Running AI computations on devices instead of cloud.
20. **Future AI trends?**
Explainable AI, federated learning, AI regulation, human-AI collaboration.