



**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR  
(AUTONOMOUS)**

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**QUESTION BANK (DESCRIPTIVE)**

**Subject with Code: Generative AI (25CS5817)**

**Course & Branch: M.Tech - CSE**

**Year & Sem: I/II**

**Regulation: R25**

**UNIT-I**

**Foundations of AI & Generative Models**

| Q.No | Question                                                     | BL/CO     | Marks |
|------|--------------------------------------------------------------|-----------|-------|
| 1    | Discuss mathematical foundations of generative modeling.     | [L3][CO1] | 10M   |
| 2    | Evaluate role of data quality in generative models.          | [L5][CO1] | 10M   |
| 3    | a) Compare discriminative and generative models.             | [L4][CO1] | 6M    |
|      | b) What is a generative model? Give examples.                | [L1][CO1] | 4M    |
| 4    | a) Explain the structure of an Artificial Neural Network.    | [L2][CO1] | 6M    |
|      | b) Describe activation functions in ANN.                     | [L2][CO1] | 4M    |
| 5    | a) Compare supervised and unsupervised learning.             | [L4][CO1] | 5M    |
|      | b) Explain bias-variance tradeoff with examples.             | [L3][CO1] | 5M    |
| 6    | Evaluate importance of Generative AI in modern applications. | [L5][CO1] | 10M   |
| 7    | Discuss probabilistic foundations of generative models.      | [L3][CO1] | 10M   |
| 8    | a) Explain backpropagation algorithm with derivation.        | [L3][CO1] | 6M    |
|      | b) Explain overfitting.                                      | [L2][CO1] | 4M    |
| 9    | Explain transfer learning and its significance.              | [L2][CO1] | 10M   |
| 10   | Design an ANN model for classification problem.              | [L6][CO1] | 10M   |

**UNIT-II**

**Advanced Neural Architectures for Generative AI**

| Q.No | Question                                                | BL/CO     | Marks |
|------|---------------------------------------------------------|-----------|-------|
| 1    | Explain VAE architecture with mathematical formulation. | [L3][CO2] | 10M   |
| 2    | Explain GAN architecture and training process.          | [L3][CO2] | 10M   |
| 3    | Compare RNN, LSTM, and Transformer models.              | [L4][CO2] | 10M   |
| 4    | Analyze scalability of Transformer models.              | [L4][CO2] | 10M   |
| 5    | a) Explain vanishing gradient problem.                  | [L2][CO2] | 5M    |
|      | b) Analyze LSTM architecture with gates.                | [L4][CO2] | 5M    |
| 6    | Explain pre-training strategies in transformers.        | [L3][CO2] | 10M   |
| 7    | Explain Transformer architecture in detail.             | [L3][CO2] | 10M   |
| 8    | Evaluate limitations of LSTM networks.                  | [L5][CO2] | 10M   |
| 9    | Analyze encoder-decoder mechanism in VAE.               | [L4][CO2] | 10M   |
| 10   | Evaluate advantages of Transformers over RNNs.          | [L5][CO2] | 10M   |

**UNIT-III**  
**Large Language Models & Prompt Engineering**

| Q.No | Question                                                                              | BL/CO     | Marks |
|------|---------------------------------------------------------------------------------------|-----------|-------|
| 1    | Explain GPT architecture and working.                                                 | [L3][CO3] | 10M   |
| 2    | Discuss prompt engineering techniques for controlling model output. Provide examples. | [L2][CO3] | 10M   |
| 3    | Compare GPT and BERT architectures.                                                   | [L4][CO3] | 10M   |
| 4    | a) Compare zero-shot, one-shot, and few-shot learning with examples.                  | [L4][CO3] | 6M    |
|      | b) Evaluate ethical issues in LLMs.                                                   | [L5][CO3] | 4M    |
| 5    | Design a chatbot using GPT.                                                           | [L6][CO3] | 10M   |
| 6    | Design prompt strategies for generating creative and accurate responses.              | [L6][CO3] | 10M   |
| 7    | Evaluate hallucination issues in LLMs.                                                | [L5][CO3] | 10M   |
| 8    | Explain transformer-based LLMs.                                                       | [L3][CO3] | 10M   |
| 9    | Explain pretraining and fine-tuning in Large Language Models with suitable examples.  | [L3][CO3] | 10M   |
| 10   | Design a GPT-based chatbot for customer support. Explain architecture and workflow.   | [L6][CO3] | 10M   |

**UNIT –IV**

**Multi-Agent Systems and Generative AI Applications**

| Q.No | Question                                                                   | BL/CO     | Marks |
|------|----------------------------------------------------------------------------|-----------|-------|
| 1    | Evaluate collaboration techniques in multi-agent systems.                  | [L5][CO4] | 10M   |
| 2    | Explain frameworks such as AutoGen, CrewAI, and HuggingGPT.                | [L3][CO4] | 10M   |
| 3    | Design a multi-agent system for content generation or research assistance. | [L6][CO4] | 10M   |
| 4    | Design an autonomous research assistant using MAS.                         | [L6][CO4] | 10M   |
| 5    | Analyze conflict resolution strategies among agents.                       | [L4][CO4] | 10M   |
| 6    | Discuss the role of MAS in financial systems.                              | [L2][CO4] | 10M   |
| 7    | Analyze applications of MAS in healthcare systems.                         | [L4][CO4] | 10M   |
| 8    | Discuss different types of agents with examples.                           | [L2][CO4] | 10M   |
| 9    | Explain the architecture of Multi-Agent Systems (MAS) and its components.  | [L3][CO4] | 10M   |
| 10.  | Explain orchestration of LLM agents.                                       | [L3][CO4] | 10M   |

**UNIT –V**

**Frameworks, Multimodal Applications & Ethics LangChain Framework**

| Q.No | Question                                                                              | BL/CO     | Marks |
|------|---------------------------------------------------------------------------------------|-----------|-------|
| 1    | Explain the LangChain framework and its components in building LLM applications.      | [L3][CO5] | 10M   |
| 2    | Describe Retrieval-Augmented Generation (RAG). Explain its architecture and workflow. | [L2][CO5] | 10M   |
| 3    | Explain vector databases and indexing techniques used for efficient retrieval.        | [L2][CO5] | 10M   |
| 4    | Analyze multimodal generative AI systems and their architecture.                      | [L4][CO5] | 10M   |
| 5    | Evaluate ethical issues in generative AI such as bias, fairness, and misuse.          | [L5][CO5] | 10M   |
| 6    | Evaluate legal implications of AI technologies.                                       | [L6][CO5] | 10M   |
| 7    | Design a RAG-based knowledge retrieval system.                                        | [L6][CO5] | 10M   |
| 8    | Analyze techniques used in video generation.                                          | [L3][CO5] | 10M   |
| 9    | Explain image generation using GANs and VAEs.                                         | [L4][CO5] | 10M   |
| 10   | Analyze embeddings and their role in semantic understanding.                          | [L4][CO5] | 10M   |

