Generative AI Question Bank

1. What is Generative AI?
2. Key Applications of Generative AI with Use Cases
3. History and evolution of Generative AI:
4. Ethical Considerations and Challenges Associated with Generative AI
5. Basic Concepts of Probability and Statistics Essential for Understanding AI Models and Application of These Concepts in Generative AI
6. Concept of Data Distributions in Statistics
7. Significance of Data Distributions in AI and Machine Learning
8. Overview of Linear Algebra and Its Importance in AI
9. Importance of Linear Algebra in AI
10. Matrix Operations in AI
11. Design a workflow that uses Variational Autoencoders (VAEs) to compress and reconstruct high-dimensional data, such as images. Explain how the encoder, decoder, and latent space are involved in this process, and discuss how the model can be applied to data generation.
12. Apply the concept of Flow-based models to create a pipeline for generating realistic tabular data based on an existing dataset. Explain the steps involved in training the model, including data preprocessing, model selection, and performance evaluation.
13. Difference between Supervised and Unsupervised Learning
14. Text Generation Models and their working
15. Types of Text Generation Approaches:
16. Generative Pre-Trained Transformer (GPT) Model
17. Detailed Explanation of the GPT Architecture
18. BERT, Bidirectional Encoder characteristics
19. How does the Bidirectional Encoder Representations from Transformers (BERT) model improve upon unidirectional models like GPT for natural language understanding?
20. How transformer-based models have impacted tasks like summarization and dialogue systems. Provide an example of a task where a transformer model is applied.
21. Lang Chain Framework:
22. Sequence-to-Sequence Models:
23. Applications of language models:
24. Generative AI in Computer Vision (image generation, style transfer):
25. Apply the concept of Generative AI to design a pipeline for image style transfer. Describe the main components and steps involved in transferring the style from one image to another.

26. Using Generative AI, propose a system for medical image analysis in healthcare. How can this system be applied to automate the diagnosis of diseases using medical imaging data (e.g., X-rays, MRI scans)
27. Describe how Generative AI can be applied in the finance industry for automating financial predictions and detecting fraudulent activities. Apply your knowledge to propose a system that includes generative models for these tasks.
28. Describe the role of tokenization and part-of-speech (POS) tagging in Natural Language Processing pipelines.
29. You are tasked with building a chatbot for a customer service center. Explain the NLP techniques you would use to develop this system and how these techniques help achieve natural interaction.
30. Define Generative AI and provide illustrations to exihibit its Key Applications with use cases.
31. Illustrate the ethical challenges associated with Generative AI, including issues like deepfakes and data bias.
32. Elaborate on the History and evolution of Generative AI.
33. Give details on how Generative AI contributes to advancements in fields of Art and music.
    Describe the basic concepts of Probability and statistics that are essential for understanding AI Models and their applications in context of Generative AI.
34. Discuss a real world scenario where applying Unsupervised Learning would be more beneficial then Supervised Learning.
35. Give details about Neural Networks and also elaborate on their key components.
36. Illustrate how a Variational Autoencoder (VAE) encodes and decodes data.
37. Give details of how transformer-based models have advanced Natural Language Processing. Include their key components and Advantages.
38. Explain the working of Sequence to Sequence Models along with their applications.
39. Give differences between GANs and VAEs in terms of their architecture and use cases?
40. Discuss major applications of Generative AI in Healthcare and how they improve patient outcomes.
41. Explain how Generative AI can be applied in the finance industry for automating financial predictions and detecting fraudulent activities. Apply your knowledge to propose a system that includes generative AI models for these tasks.
42. Describe the role of tokenization and part-of-speech (POS) tagging in Natural Language Processing pipelines.

43. Give the fundamental difference between Generative AI and Discriminative AI models with suitable examples.
44. Discuss the evolution of Generative AI from traditional machine learning to modern deep generative models.
45. Elaborate the major applications of Generative AI in real-world domains such as art, design, and entertainment.
46. Illustrate the ethical challenges associated with Generative AI, including issues like deepfakes and data bias.
47. Use a probability distribution to design a simple generative model that can simulate coin toss outcomes. Explain your steps.
48. Apply linear algebra to explain how image pixels are transformed in a generator neural network.
49. Apply gradient descent to train a simple linear generative model for 1D data. Show the update formula.
50. Give the architecture of a Generative Adversarial Network (GAN) and the roles of the generator and discriminator.
51. Describe how a Variational Autoencoder (VAE) encodes and decodes data, highlighting the role of the latent space.
52. Illustrate how a transformer-based language model generates text from a given prompt.
53. Elaborate how evaluation metrics such as Fréchet Inception Distance (FID) and Inception Score are used to assess GAN performance.
54. Apply Generative AI to design a synthetic dataset for medical imaging. Explain the steps and precautions.
55. You are asked to compress and reconstruct MRI scans for a healthcare system.
56. Give details how Variational Autoencoders (VAEs) can be applied, and why they are better than traditional autoencoders for this task.
57. Discuss how AI can be responsibly used in financial services for risk assessment, and explain the challenges involved.
58. Give the difference between Generative AI and Conventional AI along with examples?
59. Elaborate on the different layers in a Neural Network?
60. List out the different types of Supervised Learning? Explain in brief.
61. Explain the different types of Generative AI models.
62. List out the different AI tools that enable users to create and experiment with generative models.
63. Elaborate the Transformer model and how does the Attention Mechanism work in it?
64. Illustrate the architecture and working of the BERT model.
65. Illustrate the Core Concepts in Linear Algebra for AI? Explain in detail.
66. Explain different types of Deep Learning Models?
67. Elaborate in detail the working of GAN.

68. Explain the Contributions of Generative AI in the field of Cyber Security?
69. Discuss the different challenges you have faced when deploying generative models in production environments, and how did you address them?
70. Elaborate on the ethical concerns surrounding Generative AI.
71. Explain how Generative AI can be helpful in following fields-
    Architecture
    Coding
    Music
    Content Creation