***Gen AI Assignment Questions***

### **1. Introduction to Generative AI:**

* **Q1:** What is Generative AI? How does it differ from traditional AI models that focus on classification or regression tasks?
* **Q2:** Explain the key differences between **Generative AI** and **Discriminative AI** models. Provide examples of each.
* **Q3:** Describe the purpose and basic functioning of **Generative Adversarial Networks (GANs)**. What are the roles of the generator and discriminator in a GAN?
* **Q4:** What is a **latent space** in Generative AI? Explain how it is used to generate new data (e.g., images, text).
* **Q5:** Explain how **Variational Autoencoders (VAEs)** work. How are VAEs different from GANs, and what types of tasks are VAEs typically used for?

### **2. Applications of Generative AI:**

* **Q6:** What are some real-world applications of Generative AI? List at least four areas where generative models are applied and provide a brief description of each.
* **Q7:** How can Generative AI be applied in the field of healthcare? Provide two examples where it can be useful, such as in drug discovery or medical image generation.
* **Q8:** Explain how **text generation models** (e.g., GPT-3) can be used in content creation. Give an example of how these models can generate blog posts or social media content.

### **3. Popular Generative AI Models:**

* **Q9:** Describe the **GPT** (Generative Pre-trained Transformer) model. How does it generate human-like text, and what are its key applications?
* **Q10:** Explain how **Recurrent Neural Networks (RNNs)** can be used for generating sequences, such as text or music. How do RNNs handle sequential data differently from other models?
* **Q11:** What is **BERT** (Bidirectional Encoder Representations from Transformers), and how is it different from models like GPT-3 in the context of text generation?

### **4. Prompt Engineering and Control of Output:**

* **Q12:** Write a prompt for a language model to generate a 150-word description of a futuristic city. Explain the role of clarity and specificity in the prompt.
* **Q13:** How can **temperature** and **max tokens** be adjusted in a language generation model to control the creativity and length of the generated output? Provide examples of both adjustments.
* **Q14:** Write a prompt to generate a dialogue between two characters in a mystery novel. Provide guidelines in your prompt for tone and character development.

### **5. Evaluating the Output of Generative AI Models:**

* **Q15:** How would you evaluate the quality of text generated by a model like GPT-3? List at least three criteria you would consider when assessing its output.
* **Q16:** What are some common problems with generated content, such as **hallucinations** or **irrelevant responses**? How can these issues be minimized in prompt design?
* **Q17:** How can **feedback loops** be used to improve generative models? Explain how iterative testing and refinement of prompts can enhance the output.

### **6. 7. Hands-on Practice with Generative AI:**

* **Q18:** Write a prompt that will instruct a language model to summarize a research paper about machine learning. Include specific instructions to highlight the main points and avoid irrelevant details.
* **Q19:** Generate a list of ideas for a new mobile app using a language generation model. Provide at least five app ideas and explain how the model can generate creative suggestions.
* **Q21:** Generate a set of **product descriptions** for an e-commerce website using a language model. Evaluate the clarity, persuasiveness, and accuracy of the descriptions.