Unit 10: Emerging technologies in Computer Science

Short Answer Questions:

1. **Define Artificial Intelligence (AI).**
   Artificial Intelligence (AI) is the branch of computer science that aims to create systems capable of performing tasks that typically require human intelligence. These tasks include reasoning, learning, problem-solving, understanding natural language, perception, and decision-making.

2. **What is the historical context and evolution of AI?**
   Conference, regarded as the origin of artificial intelligence as a discipline of research. The journey of AI has seen several key milestones:
   - **1950s-1960s:** Early AI research focused on problem-solving and symbolic methods.
   - **1970s-1980s:** The development of expert systems that mimicked human decision-making.
   - **1990s:** The rise of machine learning, where computers began to learn from data.
   - **2000s-:** Advances in deep learning, natural language processing, and robotics have significantly expanded AI's capabilities.
   - **2011s:** Voice assistant was used for voice command and voice recognition
   - **2023s-Present:** ChatGPT was introduced that is an AI-based model which is designed to understand human-like text-based input.

3. **Provide two examples of AI applications in healthcare.**
   Medical Imaging Diagnosis: AI models, such as those using deep learning, can detect abnormalities in X-rays, MRIs, or CT scans, assisting doctors in diagnosing diseases like cancer or brain tumors.

   Personalized Treatment Plans: AI systems analyze patient data to recommend customized treatment options based on genetics, lifestyle, and past medical history, improving treatment effectiveness.

4. **Explain the role of AI techniques in advancing machine learning models.**
   AI techniques help make machine learning models smarter and more accurate. They allow computers to learn from data, find patterns, and improve over time without being directly programmed. Techniques like neural networks and decision trees help machines make better decisions, like recognizing faces or predicting weather. This makes AI useful in real-life tasks like voice assistants and self-driving cars.

5. **Define the Internet of Things (IoT).**
   The Internet of Things (IoT) refers to a network of physical objects—such as sensors, devices, appliances, and vehicles—embedded with software, sensors, and connectivity that enables them to collect and exchange data over the Internet. IoT allows for real-time monitoring, automation, and smart decision-making across various sectors like smart homes, industrial automation, healthcare, and agriculture.

6. **Describe the significance of IoT in connecting devices and systems.**
   The Internet of Things (IoT) connects everyday devices like phones, lights, and refrigerators to the internet so they can work together, share data, and be controlled remotely. This makes life more convenient, saves time, and helps systems like smart homes and smart cities run more efficiently.

7. **What are the potential risks associated with AI and IoT?**
   Some risks include loss of privacy, cyberattacks, and over-reliance on machines. AI can make wrong decisions if not trained properly, and IoT devices can be hacked if not secured, which may lead to

personal data being stolen or misused.

8. **Discuss the societal impact of AI and IoT on daily life.**
   AI and IoT make daily life easier by automating tasks, improving healthcare, and increasing safety and convenience. For example, smart homes can adjust lighting and temperature automatically. However, they also change jobs, raise privacy concerns, and affect how people interact with technology.

9. **Explain the concept of algorithmic bias. Outline the importance of ethical considerations in AI and IoT.**
   Algorithmic bias happens when an AI system makes unfair or incorrect decisions because the data it was trained on is incomplete or biased. This can lead to discrimination in areas like hiring, lending, or law enforcement.

10. **Outline the importance of ethical considerations in AI and IoT.**
    Ethical thinking is important in AI and IoT to make sure these technologies are fair, safe, and respect people's rights. This means protecting privacy, avoiding discrimination, and making sure systems are used responsibly and for the benefit of everyone.