CHAPTER 05

LONG QUESTIONS AND ANSWERS (EXTRA)

Question 1: What is the Internet of Things (IoT), and how does it help in automating different areas of life?

Answer: Internet of Things (IoT) is a system that connects many devices through the internet so they can talk to each other or to people. It collects data from devices like sensors and stores it in the cloud. Then, it uses smart technologies like machine learning to analyze this data. IoT helps automate many things like homes, hospitals, traffic, and industries. For example, in smart homes, IoT can control lights and security automatically. This makes life easier and saves time and energy in daily tasks.

Question 2: What are the main components of an IoT system, and how do they work together?

Answer: An IoT system has five important parts. First, sensors or devices collect data from the environment, like temperature or movement. Second, the user interface lets people control and see information from the devices easily, like watching camera footage on a phone. Third, the cloud stores all the collected data safely and lets users access it anytime. Fourth, connectivity means the devices and cloud stay connected through the internet. Finally, data processing is where the cloud analyzes the data to make decisions or send alerts. Together, these parts make IoT smart and useful.

Question 3: What are the benefits of IoT in healthcare, and how do IoT devices help patients both inside and outside hospitals?

Answer: IoT in healthcare improves the quality of services for patients. In hospitals, smart beds with sensors watch the patient's vital signs like blood pressure, temperature, and oxygen levels in real time. If anything is wrong, the sensors alert the nurse or doctor quickly. Outside the hospital, patients can use wearable devices connected to doctors so they can be monitored remotely. This helps doctors respond faster to health problems and keeps patients safer. It also reduces the need to visit the hospital all the time, saving time and effort.

Question 4: How does IoT technology help in traffic monitoring and managing road safety in big cities?

Answer: IoT helps authorities monitor traffic jams and road safety in real time. Sensors and cameras on roads collect data about traffic flow, accidents, and vehicle problems. This information is sent to traffic control centers so they can take quick

action to clear jams or handle accidents. IoT also gives updates about weather conditions on roads, which helps drivers stay safe. Because of this technology, traffic moves more smoothly and drivers get alerts about problems early, reducing chances of accidents and long delays.

Question 5: What is Blockchain technology and why is it considered very safe for recording transactions? Explain its main features in simple words.

Answer: Blockchain is a special kind of digital record book that keeps growing with new transactions. It is shared and maintained by many users in a network instead of one central place. Once a transaction is added to the Blockchain, it is very hard to change or delete it. This makes it very safe for important data, like money transfers in Bitcoin. It also allows fast and easy transactions between people without needing banks. The main features of Blockchain are security, transparency, and decentralization, which means no single person controls the data.

Question 6: Describe some important applications of Blockchain technology and how they help in real life.

Answer: Blockchain is useful in many areas. In supply chain management, it helps track products in real time and stops data from being changed falsely. In healthcare, Blockchain protects patient data and helps with remote monitoring. It also protects copyrights of creative works like music and books by making illegal copying easy to track. Voting can become safer and more trustworthy with Blockchain, though it is still being researched. Lastly, cryptocurrency like Bitcoin runs on Blockchain, allowing secure online money exchange without banks. Overall, Blockchain makes processes more secure and transparent.

Question 7: What are the main benefits of cloud computing for businesses, and how does it help reduce costs and improve security?

Answer: Cloud computing helps businesses in many ways. It reduces costs because companies don’t need to buy expensive hardware or software; the cloud provider takes care of that. Maintenance and updates are also done by the cloud service, so businesses save time and money. Cloud computing improves security as big cloud providers follow strong security rules to protect data from cyber-attacks. Also, if data is lost, it can be recovered from backups stored safely in the cloud. Overall, cloud makes business work faster, safer, and cheaper.

Question 8: Explain some common uses of cloud computing in daily life and education.

Answer: Cloud computing is used for many things we use every day. One common use is file storage, where people save their photos, documents, and videos online and access them from anywhere with internet. It also helps back up important data safely so it is not lost. In education, cloud computing allows students and teachers to share course materials, videos, and quizzes online, making learning easy from home or anywhere. Platforms like Google Classroom and Khan Academy use cloud to teach students around the world. Cloud is also used for communication, social media, online shopping, and even gaming.

Question 9: Explain the difference between speech recognition and voice recognition. Write their main uses.

Answer: Speech recognition is a technology that listens to human speech and converts it into text or machine commands. Voice recognition, on the other hand, is used to identify a person by their voice pattern. Both technologies help in making human–computer interaction easier. They are used in dictation software, call centers, hospitals, and AI assistants like Siri and Alexa for faster and hands-free control.

Question 10: Explain any four applications of NLP in detail.

Answer: Natural Language Processing (NLP) has many practical uses in our daily life.

1. **Email Filtering:**

   NLP checks emails and separates **spam** from **important messages** by reading certain words or phrases.

2. **Text Prediction:**

   When we type a message, NLP predicts the **next word** using our typing patterns.

3. **Text Translation:**

   It helps to **translate text** from one language to another, such as from English to Urdu, while keeping the same meaning.

4. **Sentiment Analysis:**

   NLP understands the **mood** of a text like positive or negative, used in social media and reviews. These applications make our communication with technology easier and smarter.

Question 11: Explain in detail the different uses and applications of robots in various fields.

Answer: Robots are used in many different fields to make human life easier, safer, and more efficient.

- In **rescue operations**, robots help save lives during emergencies such as fires, earthquakes, and floods. They can search for trapped people, remove debris, and deliver food or medical supplies in dangerous places where humans cannot go safely.
- In **manufacturing industries**, robots are used for assembling, welding, painting, packaging, and transporting goods. They help increase production speed, maintain accuracy, and reduce the overall cost of operation. Robots can also do risky tasks that may cause injuries to humans.
- In **farming**, robots are used for planting, harvesting, spraying, and monitoring crops. They help farmers save time and money while improving the quality and quantity of the harvest. Drones and other robotic machines make it easier to observe large fields.
- In **space exploration**, robots play an important role by collecting soil samples, taking pictures, and repairing spacecraft. Since they do not need food, water, or oxygen, they can work in extreme conditions where humans cannot survive.
- In **healthcare**, robots assist surgeons in performing precise operations, disinfect hospital rooms, deliver medicines, and move heavy items. They are also used to treat patients in unsafe environments, such as during the COVID-19 pandemic.

Overall, robots are becoming an essential part of our daily lives. They help increase efficiency, reduce human effort, and perform tasks in situations that are too dangerous or difficult for humans.

Question 12: Explain Bias in AI with examples.

Answer: Bias in AI means the unjust or unequal treatment by AI systems.

Because AI gets trained on data provided by humans, it can learn human prejudices and reflect them in its decisions.

Any bias, incompleteness, or one-sidedness in the data will result in biased outcomes from the AI.

Examples:

1. Amazon Hiring Bias (2015): Amazon's AI recruitment tool started favoring men over women because it was trained on resumes mostly submitted by men in the past.

2. Bias in Face Recognition: Most AI-powered face recognition systems misidentify individuals with darker skin, which can lead to injustice in investigations of crimes.

Question 13: Describe the unethical uses of Artificial Intelligence.

Answer: There exist several ways in which AI could be used poorly-things that will be unethical and injurious to people and society. These will cause violation of privacy, misinformation, and insecurity.

Examples of Unethical Uses:

1. Privacy Breaches:

AI systems can store and misuse personal data, leading to privacy violations.

2. Social Manipulation and Misinformation:

AI may spread fake news or propaganda on social media to alter public opinion.

3. Cybersecurity Threats:

Hackers use AI tools in order to perform cyberattacks, steal data, or get personal information.

4. Financial Market Manipulation:

AI systems can be used to manipulate the stock market and create economic instability.

5. Deepfake Videos:

The AI-generated fake videos can harm reputations and spread misinformation.

Question 14: Discuss the effects and solutions to biased and unethical AI.

Answer:

Effects:

1. Injustice and Discrimination: Some groups are treated unfairly.

2. Loss of Trust: In the absence of such regulations, people will find it difficult to place their trust in an AI technology.

3. Privacy violation: Personal data is misused or leaked.

4. Social Manipulation: AI is used to influence opinions and behaviour.

Solutions:

1. Fair & Transparent data: Train AI on unbiased and varied data sets.

2. Ethical Rules: Strict application of AI ethics policies

3. Human Supervision: Humans must oversee AI decisions.

4. Explainable AI: AI systems should be able to explain their reasoning.

5. Periodic Auditing: Regularly audit AI algorithms for bias and fairness.

Question 15: Explain the responsibilities of AI system designers.

Answer: AI system designers have many important duties when creating artificial intelligence. They must make sure that AI systems are fair and do not show bias toward any group of people. They need to protect the privacy of users so that personal information is not shared or misused. Designers should also follow ethical values and make sure AI does not harm anyone. Their goal should be to create AI that benefits humanity and improves the quality of life. **Finally,** AI systems should be built in a way that people can trust them and use them safely in the future.

THE END