Applications of Computer Science

Question No 1: What is Internet of Things (IoT)?
Answer: IoT is a network of devices connected to each other and the internet. It helps machines and people communicate and share data. IoT automates tasks in homes, industries, healthcare, and more.

Question No 2: What are the main parts of an IoT system?
Answer: IoT has five main parts: sensors/devices, user interface, cloud, connectivity, and data processing. These parts work together to collect, send, and use data smartly.

Question No 3: What role do sensors play in IoT?
Answer: Sensors collect information from the surroundings, like temperature or light. Some devices, like smartphones, have many sensors to gather different data types.

Question No 4: How do users interact with IoT devices?
Answer: Users control IoT devices through a user interface. For example, a person can watch home security cameras or get alerts about intruders using a simple app or web page.

Question No 5: What is the function of the cloud in IoT?
Answer: The cloud stores all the data collected by IoT devices. It processes this data and lets users access it anytime from anywhere.

Question No 6: How do IoT devices send data to the cloud?
Answer: IoT devices use networks like Wi-Fi, Bluetooth, or cellular to send data to the cloud. This connectivity allows devices to stay linked and share information quickly.

Question No 7: What is data processing in IoT?
Answer: Data processing means analyzing the raw data collected by IoT devices. Technologies like AI and analytics help turn data into useful decisions or actions.

Question No 8: What is the main Use of IoT Wearables?
Answer: IoT wearables primarily serve health and fitness monitoring purposes. For example, fitness trackers track physical activities like steps, calories burned, and sleep patterns. Medical wearables, however, extend these capabilities to monitoring vital signs such as heart rate, blood pressure, and blood glucose levels continuously. This data can be sent remotely to healthcare providers to monitor chronic conditions or trigger alerts during emergencies, enabling timely intervention. For instance, a diabetic patient can get alerts when blood glucose falls outside safe levels.

Question No 9: How do Smart Beds Help in Hospitals?

Answer: Smart beds are equipped with sensors to monitor patient movements, weight distribution, and vital signs in real-time. They help prevent bedsores by alerting staff when repositioning is needed and improve patient comfort and safety. Data collected by smart beds can be integrated into hospital management systems for faster diagnosis and personalized care adjustments. For example, during surgeries or recovery, smart beds can alert nurses if patients attempt to move unsafely, enhancing fall prevention.

Question No 10: How does IoT improve traffic management?

Answer: IoT devices like cameras, sensors, and connected traffic lights collect real-time data on vehicle flow, congestion, and accidents. Traffic management systems use this data to adapt traffic light patterns dynamically to reduce wait times and avoid bottlenecks. Emergency vehicles can get priority green lights for quicker movement. Smart parking sensors guide drivers to available parking spaces, reducing unnecessary traffic searching. Cities like Barcelona and Singapore have implemented such smart traffic systems to improve urban mobility.

Question No 11: What is one benefit of IoT in hotels?

Answer: IoT enables hotels to personalize guest experiences by automatically adjusting room temperature, lighting, and entertainment based on guest preferences stored in their profiles. Energy consumption can be optimized by turning off devices when not in use or when rooms are unoccupied. This leads to cost savings and enhances guest satisfaction. For example, smart mini-bars track consumption and automatically update billing. Predictive maintenance systems detect potential equipment failures early and schedule repairs to avoid service interruptions.

Question No 12: How does IoT Helps Factories?

Answer: In factories, IoT sensors track machine performance, detect anomalies, and predict maintenance needs, which minimizes downtime and extends equipment life. Automated systems manage inventory levels and supply chains in real-time, improving efficiency and reducing waste. IoT also enhances quality control by continuously monitoring environmental conditions and production parameters. Smart factories can remotely control machinery and optimize energy usage, contributing to cost savings and sustainability.

Question No 13: What is Difference Between Smart Grid and Traditional Grid?

Answer: A traditional power grid delivers electricity without much real-time feedback or automated control. In contrast, a smart grid integrates IoT and communication technologies to monitor electricity flow, demand, and supply in real-time. It can adjust distribution dynamically, detect faults early, and integrate renewable energy sources smoothly. Smart grids offer improved reliability, efficiency, and resilience, helping to reduce power outages and energy waste.

Question No 14: How does Smart Farming Helps Farmers?

Answer: Smart farming uses IoT sensors to gather precise data on soil moisture, nutrient levels, crop health, and weather. Farmers use this information to optimize irrigation, fertilization, and pest control, reducing resource use and costs while improving yields. For example, drones with IoT sensors can monitor large farms, identifying stressed plants early so farmers can take targeted action. Smart farming also supports automated machinery, enhancing planting and harvesting efficiency.

Question No 15: What is the main Advantage of a Smart Home?

Answer: The main advantage of a smart home is automation and convenience. Residents can control lighting, heating, security cameras, door locks, and appliances remotely via smartphones or voice commands. Smart homes improve energy efficiency by adjusting systems based on occupancy and usage patterns. Enhanced security features, such as motion sensors and alerts, provide peace of mind. This automation reduces manual effort and can lower utility bills, making daily living more comfortable and sustainable.

Question No 16: What is blockchain technology?

Answer: Blockchain is a digital database that keeps records of transactions in a secure and unchangeable way. It stores data in blocks linked together like a chain, and this database is shared across many computers on a network.

Question No 17: How does blockchain help supply chains?

Answer: Blockchain helps track products in real-time as they move from one place to another. It makes the process transparent and safe because the information cannot be easily changed or deleted.

Question No 18: Why is blockchain useful for voting?

Answer: Blockchain makes voting safer and more private by using encryption. It helps prevent fraud and makes the voting process faster and more trustworthy.

Question No 19: What is blockchain technology?

Answer: Blockchain is a safe digital database that stores and shares information about transactions. It is very hard to change or delete the data once it is added, so it is trusted for important records.

Question No 20: How does blockchain help in healthcare?

Answer: Blockchain keeps patient data secure and stops fraud by making it easy to track health records. Hospitals and research centers use it to keep information private and safe.

Question No 21: What is the role of blockchain in cryptocurrency?

Answer: Blockchain is used to record and manage digital money like Bitcoin. It helps people send and receive money directly and quickly, without needing a bank or other middlemen. All transactions are safe and transparent.

Question No 22: How does blockchain help protect copyright?

Answer: Blockchain makes it easy to prove who owns music, videos, or books on the internet. It helps stop people from copying or downloading others' work without permission.

Question No 23: What is cloud computing?

Answer: Cloud computing means getting IT services like servers, storage, or software via Internet. You do not need to install or manage physical devices yourself. It is used in offices, homes, and schools for easy access and collaboration.

Question No 24: Explain quick access in cloud computing.

Answer: Data and applications stored in the cloud can be used anywhere through Internet. Devices like mobiles and laptops allow employees to work remotely. This increases work speed and efficiency.

Question No 25: Write any two benefits of Cloud Computing.

Answer:

- Cost Reduction – saves money on hardware and maintenance.
- Quick Access – allows users to access files from anywhere using the Internet.

Question No 26: How does cloud computing support automation of tasks?

Answer: Cloud automates things like data backup and software updates. This frees employees for important work. Businesses save time and improve productivity.

Question No 27: What is Cloud Gaming?

Answer: Cloud gaming allows users to play games through the Internet without downloading them. Games run on cloud servers and stream to any device. **Examples** include Xbox Cloud Gaming and Amazon Luna.

Question No 28: How does Cloud Computing help in Communication?

Answer: Cloud tools like Zoom and Microsoft Teams allow online meetings and chats. They make communication fast, secure, and cost-effective. Useful for both business and education sectors.

Question No 29: Give two uses of cloud computing in daily life.

Answer: People use cloud storage for saving pictures and documents. Students and teachers use education platforms for classes online. Online shopping and gaming also use cloud services.

Question No 30: What is the main purpose of speech recognition?

Answer: Speech recognition converts spoken words into text or commands.
It helps control devices without using hands.
It is useful for disabled people and improves convenience.

Question No 31: What is the main difference between Speech Recognition and Voice Recognition?

Answer: Speech Recognition understands *what* is being said, while Voice Recognition identifies *who* is speaking.
Speech Recognition is for typing and control, and Voice Recognition is for security and authentication.

Question No 32: What does NLP stand for?

Answer: NLP stands for **Natural Language Processing**.

Question No 33: How does NLP help in email filtering?

Answer: It checks the content of emails to sort them into important, social, or spam categories.

Question No 34: What is Sentiment Analysis?
Answer: It is a method used by NLP to find whether a text is positive, negative, or neutral in emotion.

Question No 35: What is robotics?
Answer: Robotics is the study and creation of machines (robots) that can perform tasks automatically, often like humans.

Question No 36: How are robots used in manufacturing industries?
Answer: Robots are used in factories for tasks like assembling, welding, painting, and packing. They help increase production speed and reduce costs.

Question No 37: Why are robots useful in healthcare?
Answer: Robots help doctors perform surgeries more accurately, clean hospital rooms, and deliver medicines, making hospital work safer and faster.

Question No 38: What is Artificial Intelligence?
Answer: AI, or Artificial Intelligence, is the branch of computer science concerned with giving machines the power to think, learn, and decide like human beings.

Question No 39: What is Bias in AI?
Answer: Bias in AI refers to injustice or partiality in AI decisions based on considerations of race, gender, age, and other personal attributes.

Question No 40: How does bias enter an AI system?
Answer: Bias in an AI system enters through incomplete, incorrect, and unfair training data, or when the human element designing it inadvertently builds that feature into the system design.

Question No 41: Give an example of bias in AI.
Answer: In 2015, Amazon's hiring algorithm was found to prefer male candidates over females because it was trained on resumes mostly submitted by men.

Question No 42: What is meant by unethical use of AI?
Answer: Unethical use of AI refers to the use of artificial intelligence in a manner that is considered morally or socially wrong, including violations of privacy, dissemination of misinformation, and hacking.

Question No 43: Give two examples of unethical use of AI.
Answer:

1. Privacy breaches: leaking personal or sensitive data.
2. Deepfake videos: creating fake videos to mislead people.

Question No 44: What is a Deepfake video?
Answer: Deepfake videos are AI-generated fake videos that make it seem as though a person said or did something that never happened.

Question No 45: What consequences do biased AI systems have?
Answer: Biased AI systems lead to injustice, discrimination, privacy loss, and damage to public trust.

Question No 46: How do we prevent bias or unethical use of AI?
Answer: Fair data usage, reliance on ethical rules, human oversight, and regular auditing of the AI systems.

Question No 47: What is the main responsibility of an AI system designer?
Answer: The main responsibility of an AI system designer is to make sure that AI works fairly, safely, and helps people without harming anyone.

Question No 48: Why should AI system designers protect user privacy?
Answer: They should protect user privacy so that personal information stays safe and is not shared or misused by anyone.

THE END