

Chapter 1: Introduction to Emerging Technologies

Objective Type Questions.

1. Choose the correct option.

a. 3D holography is central to which of the following industry?

- i. 2-dimensional image      ii. 1-dimensional image  
iii. 3-dimensional image      IV. Scanned image

b. An augmented reality-based application can combine physical world to the:

- i. Virtual world      ii. Normal world      iii. Fake world      IV. Old world

c. 3D Printers are commonly used for

- i. Paper printing      ii. Prototyping      iii. Scanning      IV. Displaying

d. Artificial Intelligence is a branch of computer science that aims to create

- i. Computer systems      ii. Holograms      iii. Fast systems      IV. Intelligent system

e. Humanoid Robots are used to perform which of the following activities?

- i. Humans      ii. Animal's      iii. Trees      iv. Children only

f. Biometrics is the measurement of \_\_\_\_\_.

- i. Weather conditions      ii. Human body characteristics  
iii. Computer speed      iv. Electricity flow

g. \_\_\_\_\_ being a tech pioneer has become a leading name in the world of electric self-driving cars.

- i. Tesla      ii. Volkswagen Group      iii. BYD      iv. Rivian

h. The world's first smartphone created by IBM was named \_\_\_\_\_.

- i. Mario      ii. David      iii. Simon      IV. Gates

i. 1<sup>st</sup> Generation computer processor was developed by \_\_\_\_\_.

- i. Dell      ii. Intel      iii. Sony      iv. Samsung

j. The mobile phone was introduced in \_\_\_\_\_.

- i. 1980s      ii. 1940s      iii. 1900s      iv. 2010s

Answer the following questions:

Q1. What is robotics? Describe its various types.

Ans. Robotics is a branch of technology that deals with physical robots. Robotics is a combination of engineering, technology, and computer science. It involves design, construction, operation, and use of robots. The goal of Robotics is to design machines that can help and assist humans.

Types of robots:

**Pre-Programmed Robots:** Do simple, repeated jobs in factories, like a robot arm that welds car doors.

**Humanoid Robots** – Look and act like humans. They can walk, talk, or carry things. Example: Sophia the robot.

**Autonomous Robots** – Work on their own without people. Example: Mars Rover.

**Tele-operated Robots** – Controlled by humans from far away. Example: Delivery drone.

**Augmenting Robots** – Augmenting robots either enhance existing human capabilities or replace capabilities a person may have lost. For example, a robotic prosthetic arm for someone who has lost an arm.

**Q2. Describe Artificial Intelligence in detail.**

Ans. Artificial Intelligence is a field of computer science that aims to create systems that can mimic human intelligence and their ability to make decisions. The advantage of having such a robust system is that it reduces the chances of human error, making processes more efficient. Examples of AI applications include self-driving cars, virtual reality, augmented reality, 3D holograms, 3D printing, etc.

**Q3. Differentiate between augmented and virtual reality.**

	<b>Augmented Reality (AR)</b>	<b>Virtual Reality (VR)</b>
<b>1</b>	The system augments the real-world scene.	Completely immersive virtual environment.
<b>2</b>	AR is 25% virtual and 75% real.	VR is 75% virtual and 25% real.
<b>3</b>	AR requires upwards of 100 Mbps bandwidth.	VR requires at least a 50 Mbps connection.
<b>4</b>	No AR headset is needed.	Some VR headset devices are needed.
<b>5</b>	It is used to enhance both real and virtual worlds.	It is used to enhance fictional reality for gaming world.

**Q4. Explain the ways robotics is useful for people.**

Robotics is useful to people in various ways:

1. They help to perform complex tasks with greater efficiency and fewer errors.
2. They can automate various monotonous tasks without exhausting, unlike humans.
3. They can help to improve productivity and reduce costs.
4. Since they are accurate in the ways they perform tasks, they reduce the amount of waste.

**Q.5 What were the first robots in history and how did they work?**

Ans. Before the word “robot” was invented, people made machines that worked like robots.

**The Flying Pigeon (400–350 BCE):**

A Greek scientist named Archytas made a wooden bird. It worked with steam and could fly about 200 meters. It is considered the first robot in history.

**The Automatic Maid (3rd Century BCE):**

Another inventor, Philo, made a life-sized doll. When someone put a cup in its hand, it would automatically pour a mix of wine and water into it.

### **Q.6 What important developments in robotics took place in the 20<sup>th</sup> century?**

In the 20th century, robots changed from simple ideas into real machines that could be programmed.

#### **The First Human-like Robot (1939):**

Elektro was made by the Westinghouse company. It was more than 2 meters tall. It could walk when someone spoke to it, say about 700 words, move its head and arms, and even smoke cigarettes. People were amazed by it at a big fair in New York.

#### **The First Industrial Robot (1956/1961):**

Unimate was the first robot arm that could be programmed. It was invented by George Devol. In 1961, it was used in a car factory to lift hot metal parts. It is considered the first real modern robot used in industry.

### **Short Questions/Answers**

#### **Q. 1 What is the origin of the word 'robot', and how are robots described in the story?**

Ans. The word "robot" comes from the Czech word *robota*, meaning "forced labor" in 1921. It was first used in the play *Rossum's Universal Robots* (R.U.R.). In the story, robots are man-made machines that later turn against the humans who created them.

#### **Q.2 Write down the names of different types of ports?**

- Ans.1. USB Port  
2. Type C port  
3. HDMI port  
4. SATA  
5. PCI express port A

#### **Q. 3 How many I/O ports are there in a computer system?**

Ans. I/O ports are generally of two main types:

1. Input ports (for devices like keyboard, mouse)
2. Output ports (for devices like monitor, printer)

#### **Q.4 What is actuator?**

Ans. An actuator is a part of a machine that makes it move or work. It acts like muscles in the body and helps machines move parts.