1. What is artificial intelligence?
    - Artificial intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think and learn like humans.
    - AI systems can be trained to perform tasks such as image recognition, speech recognition, decision-making, and language translation.
2. Why do we need artificial intelligence?
    - AI makes our work quite easy.
    - AI can automate repetitive tasks, freeing up humans to focus on more complex and creative work.
    - AI can also be cost-effective for a company or organization in the long run as it can perform tasks in a cheaper and more efficient way.

For the next series of questions create your own examples. Do not google. This is just to make you think. Explain each of the questions with the following blocks.

PROBLEM STATEMENT:

- There is a need to develop an AI-based system to automate the process of sorting waste materials at recycling centres.

Why do you need AI for that application?

- Currently, the sorting of waste materials at recycling is done manually, which can be time-consuming, and costly. Using AI in this application can increase the speed and accuracy of the sorting process, resulting in more efficient and cost-effective operations.

How can AI make it better?

- An AI-based system can be trained to recognize and sort different types of waste materials, such as paper, plastic, and metal, using image recognition and machine learning techniques. This can reduce the need for labour and increase the overall efficiency of the sorting process.

What do we need to accomplish it?

- To develop an AI-based waste sorting system, we would need a large dataset of images of different types of waste materials, along with the corresponding labels.

Where can this fail?

- AI-based systems can fail due to various reasons such as lack of data, poor quality of data, poor algorithm design, and lack of proper testing and tuning.

3. Can you think of an application in civil engineering where artificial intelligence can be used? Explain.
    - One application of artificial intelligence in civil engineering is in the analysis and design of structures, such as bridges and buildings. AI algorithms can be used to optimize structural layouts and configurations, considering factors such as weight, stress, and load-bearing capacity.
    - This can help engineers make more informed decisions and improve the overall efficiency and safety of structures.
    - AI can be used to analyze sensor data and predict when equipment or systems may fail, allowing for preventative maintenance to be scheduled before a failure occurs.

4. Can you think of an application in mechanical engineering where artificial intelligence can be used? Explain.
    - One application of artificial intelligence in mechanical engineering is in predictive maintenance for machinery and equipment.
    - AI algorithms can be used to analyse sensor data from machines and predict when maintenance or repairs may be needed. This can help prevent equipment failures and downtime and improve the overall efficiency and reliability of manufacturing processes.
    - Another application is in the design and optimization of mechanical systems and components. AI can be used to simulate and analyse different design options, considering factors such as weight, stress, and materials, to find the most efficient and cost-effective solution.

5. Can you think of an application in electrical engineering where artificial intelligence can be used? Explain.
    - AI algorithms can be used to analyse data from power generators, transmission lines, and distribution networks, to optimize the performance of the power grid.
    - This can include tasks such as predicting and preventing power outages, balancing supply, and demand and maximizing the integration of renewable energy sources into the grid. Another application is in the control and optimization of industrial processes, such as in the manufacturing and oil and gas industries.
    - AI can be used to monitor and control production processes, analyse sensor data, make predictions, and optimize equipment performance.
6. Can you think of an application in health care where artificial intelligence can be used? Explain. (Don’t use covid, use some other example)
    - One application of artificial intelligence in healthcare is in medical imaging, such as radiography, computed tomography (CT), and magnetic resonance imaging (MRI).

- AI algorithms can be used to analyze medical images and identify abnormalities or diseases, such as tumours, cysts, and fractures, which can help doctors make more accurate diagnoses. Another application is in drug discovery and development.
- AI can be used to analyze large amounts of data from scientific literature, genetic databases, and clinical trials, to identify potential new drugs and treatment options
- AI can also be used to assist in patient triage, enabling chatbots and virtual assistants to communicate with patients and provide them with information and guidance, as well as schedule appointments and follow-ups with healthcare professionals.

7. Can you think of an application in literature where artificial intelligence can be used? Explain.
    - One application of artificial intelligence in literature is in the field of natural language processing (NLP) and text analysis.
    - AI algorithms can be used to analyze large amounts of text data, such as books, articles, and reviews, to identify patterns, trends, and insights that can help researchers and authors better understand literary works, authors, and historical periods.
    - For example, AI can be used to identify themes, emotions, and relationships between characters in a book, or to analyze the style, structure, and influences of a particular author's works.

8. Can you think of an application in food making or food processing where artificial intelligence can be used? Explain.
    - In the area of food quality and safety.
    - AI algorithms can be used to monitor and analyze data from food processing equipment, packaging, and storage, to detect and predict potential food safety issues such as contamination, spoilage, and other quality issues.
    - This can help food manufacturers to improve the safety and quality of their products and to reduce the risk of foodborne illness.

9. Can you think of an application in the mining industry where artificial intelligence can be used? Explain.
    - One application of artificial intelligence in the mining industry is in the area of mineral exploration and resource evaluation.
    - AI algorithms can be used to analyze data from geological surveys, drilling, and other sources, to identify potential mineral deposits and to estimate the size and quality of the resources.
    - This can help mining companies to make more informed decisions about where to invest in exploration and to optimize the use of resources.

10. Can you think of an application in spacecraft where artificial intelligence can be used? Explain.
    - One application of artificial intelligence in spacecraft is in guidance, navigation, and control (GNC).
    - AI algorithms can be used to analyze sensor data and make real-time decisions about spacecraft trajectory, attitude, and propulsion, to optimize the performance and efficiency of the spacecraft.
    - This can include tasks such as rendezvous and docking, formation flying, and trajectory optimization.

11. Can you think of an application in seafloor exploration where artificial intelligence can be used? Explain.
    - One application of artificial intelligence in seafloor exploration is in the area of mapping and imaging.
    - AI algorithms can be used to analyze data from sonar, lidar, and other sensors, to create detailed maps and images of the sea floor and to identify potential areas of interest such as shipwrecks, mineral deposits, and underwater habitats.