# INTRODUCTION TO AI

## Q&A of INTRODUCTION TO ARTIFICIAL INTELLIGENCE

**Q. What do you mean by Intelligence?**
**A.** Intelligence is the ability to acquire and apply knowledge and skills to deal with the situations

**Q. Who purposed the theory of multiple intelligence?**
**A.** A Psychologist Howard Gardener

**Q. Explain the types of Intelligence with suitable examples.**
**A.** There are nine types of intelligence based on skills as

1. Intrapersonal Intelligence
2. Spatial Intelligence
3. Naturalistic Intelligence
4. Musical Intelligence
5. Logical-Mathematical Intelligence
6. Existential Intelligence
7. Interpersonal Intelligence
8. Bodily-Kinesthetic Intelligence
9. Linguistic Intelligence

**Q. Define the term Decision Making.**
**A.** Decision making is the process of identifying and picking a final choice from an available set of choices, after carefully assessing the available options.

**Q. What do you mean by Artificial Intelligence (AI)?**
**A.** An Artificial Intelligence is a technology by which we can develop the intelligent machines that behaves like humans. It means AI machines can learn from their surround, think on it and act just like humans.

**Q. Give a few examples around you which are not AI.**
**A.** As we know, any machine that has been trained with data and can make decisions/predictions on its own can be termed as AI machines. Therefore, machines like

automatic washing machines or
Remote control devices like AC, fans, Smart TV, toys cars etc.

are not to be as AI enabled machine as these devices works on pre-defined set of instructions.

**Q. Explain the domains of AI with suitable examples?**
**A.** The three domains of AI are

1. Data Science (eg. weather prediction, salary prediction etc.)
2. Computer Vision (CV) (eg. facial recognition, image searchin shopping webs like Amazon, QR codes, Google lens, Snapchat filters, expression detection)

3. Natural Language Processing (NLP) (eg. Digital assistants like Alexa, Google Assitant, Siri, cortona, etc. and Language Translators like Google Translator, Microsoft Translator etc.)

**Q. Give examples of AI application that use nearly all domains of AI.**
**A.** Humanoid robot like **Sophia** (first humanoid robot), **Manav** (India's first humanoid robot) etc.

**Q. How NLP (Natural Language Processing) is different from NLU (Natural Language Understanding)?**
**A.** Natural Language Processing (NLP) breaks down the language into small and understable chunks that are possible for machines to understand. It focuses on processing the text in a literal sense, like what was said.
Whereas, Natural Language Understanding (NLU) is a subfield of Natural Language Processing. It focuses on extracting the meaning or hidden intent of the sentence.It helps to analyzes the data to determine its actual meaning.

## IMPORTANT QUESTIONS ON ARTIFICIAL INTELLIGENCE

### Two (02) Mark Question

**Q. 1. What do you understand by linguistic Intelligence?**
**A.** Linguistic intelligence means intelligence to understand and interpret human natural language and try to extract meaning out of it.

OR

Linguistic Intelligence refers to the ability of an individual to understand both written and spoken language and the additional ability to write and speak the language too.

OR

This is the intelligence of language and communication. It includes the ability to speak, articulate, and express, and convey one's thoughts and feelings to the outside world in one or more languages. This can be at an oral and written level. It also includes the ability to listen to and to understand other people.

**Q. 2. What do you understand by Interpersonal Intelligence?**
**A.** Understanding human emotions, feelings and influenced by them is known as interpersonal intelligence.

OR

Interpersonal intelligence is the ability to communicate with others by understanding other people's feelings, being influenced by the person.

OR

Interpersonal intelligence refers to the ability of a person to relate well with people and manage relationships. It enables people to understand the needs and motivations of those around them, which helps strengthen their overall influence.

OR

Interpersonal intelligence refers to the ability to understand social situations and the behavior of other people.

**Q. 3. Define Artificial Intelligence.**

**A.** A machine is artificially intelligent when it can accomplish tasks by itself - collectdata, understand it, analyze it, learn from it, and improve it. i.e. When a machine possesses the ability to mimic human traits, i.e., make decisions, predictthe future, learn and improve on its own, it is said to have artificial intelligence.

**Q. 4. Mention two types of machines which have evolved with time.**

**A.** Television/Mobile Phones/ Ceiling Fans/ Microwave ovens/ Headphones / Speakers/Harvesters/ Refrigerators/Air Conditioners etc.

**Q. 5. What do you understand by mathematical and logical reasoning?**

**A.** A person's ability to regulate, measure, and understand numerical symbols, abstractionand logic. i.e. Reasoning is based on previous established facts. To establish a new fact or truth one hasto put it to the test of reasoning. If the new fact coincides with the previously establishedfacts, it is called logical or rational. It is the ability of a person to regulate, measure and understand numerical symbols, abstraction and logic.

**Q. 6. Mention four examples of artificially intelligent applications in our smartphones.**

**A.** Phone Smart Lock / Snapchat filter / Shopping websites / Netflix / YouTube / FaceDetection / Google Maps / Emotions recognition / Google assistant / Natural languagerecognition / image detection / beauty filters etc.

**Q. 7. How does a machine become Artificially Intelligent?**

**A.** A machine becomes intelligent by training with data and algorithm. AI machines keepupdating their knowledge to optimize their output. OR Machines also become intelligent once they are trained with some information which helps them achieve their tasks. AI machines also keep updating their knowledge to optimize their output.

**Q. 8. Mention four examples of machines that are not AI but confused with AI.Or**
**Mention four examples of machines that are smart but not AI.**

**A.** Automatic gates in shopping malls / remote control drones/ a fully automatic washing machine/ Air Conditioner/ Refrigerator/ Robotic toy cars/ Television etc.

**Q. 9. How does learning and adapting help an AI machine in improvising itself?**

**A.** An artificially intelligent machine collects real time data and tries to figure out newpatterns in it. Machines learn in a similar way human being; by supervision or by observation and respond according to past experiences in similar scenarios. A machinelearns from its mistakes. The more the machine gets trained on data, the more accurateresult it gives.

For example: Any virtual assistant initially trained with few basic instructions, but with time, the machine captures the data fed by the user, may be the wake-up time of the user,sleeping time, dinner time and so on. Later in time, the machine gives reminders of similar things on the basis of data and adapts these new commands.

**Q. 10. Pick the odd one out and justify your answer:**

**a. Snap Chat Filter**

**b. Face Lock in Phone**

**c. Chatbot**

**d. Image search Option**

**A.** Chatbot, as it is NLP based, the other three are Computer vision based.

**Q. 11. Explain how AI works in the following areas (any two):**

**a. Google Search Engine**

**b. Voice Assistants**

**c. E-commerce websites**

**A. a. Google Search Engine:** With the help of AI, Google Search Engine has been turnedinto Intelligent search which is a new network of systems that produces direct answers. Ituses voice and image searches and has incorporated deep learning to fasten the searches with more accuracy.

**b. Voice assistant:** AI is being used in voice assistants to recognize words spoken by the user. NLP has capabilities like "Speech-to-Text" convert the natural language of the userinto text for further processing. As the digital assistant answers more and more queries, it"learns" using ML algorithms. The more tasks it performs, its ML algorithms help it "learn" from the tasks and the preferences of the user. As a result, the digital assistant improves its performance over time.

**c. E-commerce website:** With the use of big data, AI in E-Commerce is impacting customer choices by recording the data of previous purchases, searched products, and

online browsing habits. Product recommendations provide multiple benefits for E-commerce retailers including: Higher number of returning customers.

**Q. 12. How has AI changed the gaming world?**

**A.** AI has changed the gaming world in terms of feel and emotions. Some video games reactto player skill level. Depending on how well you do, adaptive AI ratchets the game's difficulty level up and down to give you a greater challenge when you need it or to prevent you from rage-quitting in frustration. AI can also adapt to your playing style by making the game more exciting.

**Q. 13. Why training with information/Data is important in Artificial Intelligentdevices?**

**A.** Similar to human beings, AI devices need experience to give better results and improve in every next iteration. For giving better results, the machine should be trained with some real data. The more the amount of accurate data, the better predictions will bemade by the machine. Hence, data is very important in AI devices.

i.e.

The AI devices need to be trained with information / Big data to produce the best possible accurate results. All of AI's learning happens only through this data. So, it makes sense to have as big a dataset as is required to include variety, subtlety, and nuance that makes the model viable for practical use. Before training, the model is just a theorist.

## Q.14.Explain the advantages and disadvantages of AI.

Advantages of Artificial Intelligence

***1. Reduction in Human Error - Example:***

Robotic surgery systems are an example of AI reducing human error. These systems can perform complex procedures with precision and accuracy, reducing the risk of human error and improving patient safety in healthcare.

***2. Decision-Making- Example:***

In the healthcare industry, AI assists doctors in diagnosing diseases. For example, AI algorithms can analyze medical images, such as X-rays or MRIs, to detect early signs of conditions like cancer. This not only helps in providing timely treatment but also reduces the likelihood of human error in diagnosis. By augmenting doctors' decision-making processes, AI improves patient outcomes and more efficient healthcare delivery.

***3. Zero Risks - Example:***

One example of zero risks is a fully automated production line in a manufacturing facility. Robots perform all tasks, eliminating the risk of human error and injury in hazardous environments.

***4. 24x7 Availability - Example:***

An example is online customer support chatbots, which can provide instant assistance to customers anytime, anywhere. Using AI and natural language processing, chatbots can answer common questions, resolve issues, and escalate complex problems to human agents, ensuring seamless customer service around the clock.

***5. Digital Assistance - Example:***

We all know that businesses have a customer service crew that must address patrons' doubts and concerns. Businesses can create a chatbot or voice bot using AI to answer all of their client's questions.

***6. New Inventions - Example:***

Another example of innovative inventions is self-driving cars, which utilize a combination of cameras, sensors, and AI algorithms to navigate roads and traffic autonomously. These vehicles have the potential to enhance road safety, reduce traffic congestion, and increase accessibility for individuals with disabilities or limited mobility. Companies like Tesla, Google, and Uber are at the forefront of developing self-driving cars, poised to revolutionize the transportation industry.

***7. Unbiased Decisions - Example:***

An example is AI-powered recruitment systems that screen job applicants based on skills and qualifications rather than demographics. This helps eliminate bias in the hiring process, leading to an inclusive and more diverse workforce.

***8. Perform Repetitive Jobs - Example:***

An example of this is using robots in manufacturing assembly lines. These robots can handle repetitive tasks such as welding, painting, and packaging with high accuracy and speed, reducing costs and improving efficiency.

***9. Daily Applications - Example:***

When planning a trip about twenty years ago, you must have asked someone who had already been there for instructions. All you need to do now is ask Google where Bangalore is. The best route between you and Bangalore will be displayed on a Google map, along with Bangalore's location.

***10. AI in Risky Situations - Example:***

For instance, the explosion at the Chernobyl nuclear power facility in Ukraine. As any person who came close to the core would have perished in a matter of minutes, at the time, there were no AI-powered robots that could assist us in reducing the effects of radiation by controlling the fire in its early phases.

**11. Medical Applications**

***Example:***

AI has revolutionized cancer diagnosis and treatment. For instance, AI algorithms can analyze medical images such as mammograms or CT scans to detect early signs of cancer that may be missed by human eyes. In one notable case, researchers at Google Health

developed an AI model that outperformed radiologists in identifying breast cancer in mammograms. The AI system was able to reduce false positives and false negatives, leading to more accurate diagnoses. Additionally, AI can help create personalized treatment plans by analyzing a patient's genetic information, medical history, and current health status. This tailored approach ensures that patients receive the most effective therapies, improving their chances of recovery and overall quality of life.

**12. Automate Repetition –**

Example: In banking, AI-powered robots handle routine tasks such as data entry, transaction processing, and customer inquiries. For instance, chatbots can answer frequently asked questions, while AI algorithms can process loan applications and verify documents. This automation streamlines operations, reduces costs, and improves service delivery, enabling banks to serve more customers efficiently.

***13. Increased Efficiency and Productivity –***

***Example:***

In manufacturing, AI-driven robots and predictive maintenance systems are transforming production lines. Robots equipped with AI can work alongside humans, performing tasks such as assembly, welding, and painting with precision and speed. Predictive maintenance uses AI to monitor equipment health and predict failures before they occur, preventing downtime and ensuring continuous production. These advancements result in higher production rates and better quality control.

**14. Avoid Fraud**

***Example:***

In the financial industry, AI is used to combat credit card fraud. AI systems analyze millions of transactions to identify patterns associated with fraud, such as sudden large purchases or transactions in different geographic locations. When an anomaly is detected, the system alerts the bank and the cardholder, enabling swift action to prevent unauthorized transactions. This not only protects customers but also saves financial institutions from significant losses.

### 15. Fulltime Availability

***Example:***

E-commerce companies often use AI-powered chatbots to provide customer support at all hours. These chatbots can handle inquiries, process orders, and resolve issues even when human staff are unavailable. For example, a customer shopping online at midnight can instantly get assistance with product information, order tracking, and payment issues through an AI chatbot, enhancing the overall shopping experience and ensuring customer satisfaction.

### 16. Identifies Better Human Workflows

***Example:***

AI tools can analyze project timelines, resource allocation, and task dependencies in project management to identify bottlenecks and suggest more efficient workflows. For instance, an AI system might recommend reassigning tasks based on team members' skills and availability, leading to faster project completion and better resource utilization. This ensures that projects are completed on time and within budget, enhancing overall project efficiency.

### 17. Personalized Recommendations for Customers

***Example:***

Streaming services like Netflix use AI algorithms to recommend shows and movies to users. The system analyzes viewing history, ratings, and user interactions to suggest content that aligns with individual preferences. For example, the AI recommends similar titles if a user watches crime dramas frequently. This personalization keeps users engaged and increases their likelihood of subscribing to the service.

### 18. Security and Surveillance

***Example:***

In smart cities, AI-powered surveillance cameras monitor public spaces. These cameras can detect suspicious behavior, such as loitering in restricted areas or unattended bags, and alert security personnel. Facial recognition technology can also identify known criminals or missing persons, assisting law enforcement in maintaining public safety. This proactive approach to security helps prevent crimes and ensures a safer environment for residents.

**19. AI Helps Improve Customer Service**

***Example:***

Telecom companies use AI chatbots to assist customers with troubleshooting technical issues. For example, a customer experiencing internet connectivity problems can interact with a chatbot that guides them through diagnostic steps and suggests solutions. If the issue remains unresolved, the chatbot can escalate the case to a human agent with all the relevant information, ensuring a smooth transition and quick resolution. This results in efficient customer service and higher customer satisfaction.

**20. Bias and Fairness**

***Example:***

AI tools screen resumes and conduct initial candidate assessments in the hiring process. These tools can be programmed to ignore irrelevant factors such as gender, race, or age, focusing solely on qualifications and experience. For instance, an AI system can rank candidates based on their skills and achievements rather than demographic characteristics, promoting a fairer hiring process and increasing diversity within the organization.

# Disadvantages of Artificial Intelligence

**1. Creativity -** Artificial Intelligence (AI) often lacks the intrinsic creativity of humans, like emotional depth, abstract thinking, and imaginative processes. While AI can mimic creativity by generating art, music, or writing based on existing patterns, it doesn't possess genuine originality or the ability to think outside the box.

**2. Unemployment**

Robot, displacing occupations and increasing unemployment (in a few cases). there is always a chance of unemployment due to chatbots and robots replacing humans.

**3. Emotional Intelligence**

AI systems lack emotional intelligence, which is the ability to understand, interpret, and respond to human emotions in a empathetic manner.

**4. High Costs**

Creating a machine that can simulate human intelligence requires plenty of time and resources and can cost much money. AI also needs to operate on the latest hardware and software to stay updated and meet the latest requirements, thus making it quite costly.

**5. Security Risks**

AI systems can pose significant security risks, especially in critical infrastructures like finance, healthcare, and national security. These systems can be vulnerable to hacking, data breaches, and malicious attacks.

**6. Encouraging Human Laziness**

AI systems take over more responsibilities, individuals might become less inclined to develop their skills and knowledge, relying excessively on technology.

**7. Privacy Concerns**

AI-driven surveillance systems and data mining practices can erode personal privacy, leading to potential misuse of data by corporations, governments, or cybercriminals.

8. Job Displacement

In manufacturing, retail, customer service, and even certain professional sectors like legal research or medical diagnostics are increasingly being automated, leading to significant job displacement. While AI can create new job opportunities, the transition period can be challenging, with many workers requiring retraining and upskilling. The economic and social impact of widespread job displacement can increase unemployment rates and social inequality if not managed effectively.

**9. Bias**

AI systems risk perpetuating systemic inequalities and making unfair or unethical decisions without these measures.

**10. Technological Dependence**

As society becomes increasingly reliant on AI, there is a growing risk of technological dependence. This dependence can reduce human skills and capabilities as individuals and organizations rely more on automated systems for decision-making and problem-solving.

### 11. Algorithms Developments Concerns

The proprietary nature of many AI algorithms can limit transparency and public scrutiny, making it challenging to assess their fairness, accuracy, and overall impact on society.

### 12. Environmental Issues

Data centers, which house the infrastructure for AI systems, require constant cooling and maintenance, further adding to their environmental footprint. As AI technology grows, finding sustainable and energy-efficient solutions becomes crucial to mitigating its environmental impact.

### 13. Ethical Concerns

AI raises numerous ethical concerns, particularly concerning its decision-making processes and potential for misuse. Issues such as the lack of accountability, transparency, and the potential for AI to be used in harmful ways (e.g., autonomous weapons or mass surveillance) pose significant ethical challenges.

### 14. Lack of Common Sense

Unlike humans, AI lacks the innate ability to grasp everyday knowledge and social norms, which can result in logically correct decisions but are practically or ethically flawed.

### 15. No Ethics

Ethics and morality are important human features that can be difficult to incorporate into an AI. The rapid progress of AI has raised several concerns that one day, AI will grow uncontrollably and eventually wipe out humanity. **This moment is referred to as the AI singularity.**

### 16. Interpretability and Transparency

Many AI models, particularly deep learning algorithms, operate as "black boxes," meaning their decision-making processes are not easily interpretable or transparent. This lack of interpretability can be problematic in critical applications, such as healthcare or criminal justice, where understanding the rationale behind AI decisions is essential. Transparency makes it easier to trust AI systems fully and hold them accountable for their actions.

**17. No Improvement**

Humans cannot develop artificial intelligence because it is a technology based on pre-loaded facts and experience. AI is proficient at repeatedly carrying out the same task, but we must manually alter the codes if we want any adjustments or improvements. AI cannot be accessed and utilized like human intelligence but can store infinite data

Q.15 Explain different applications of AI.

ANS -Application of AI in different field are-:

# 1. Healthcare

AI is making significant strides in healthcare by improving patient outcomes and streamlining administrative processes.

- **Medical Imaging**: AI algorithms can analyze medical images, such as X-rays, MRIs, and CT scans, to detect abnormalities like tumors, fractures, and infections accurately.
- **Predictive Analytics:** AI can analyze patient data and health records to predict disease outbreaks, patient readmissions, and the progression of chronic diseases.
- **Personalized Medicine:** Machine learning models help tailor treatments to individual patients based on their genetic makeup and health history, improving the effectiveness of therapies.
- **Virtual Health Assistants:** AI-powered chatbots and virtual assistants provide patients with 24/7 support, answering questions, scheduling appointments, and offering medical advice.

# 2. Finance

AI is transforming the finance industry by enhancing security, improving customer service, and optimizing financial operations.

- **Fraud Detection**: AI algorithms analyze transaction patterns to identify and prevent real-time fraudulent activities.
- **Algorithmic Trading**: AI-driven trading systems use historical data and market trends to execute high-frequency trades, optimizing investment strategies.
- **Customer Service**: AI chatbots and virtual assistants handle customer inquiries, process transactions, and provide financial advice, improving efficiency and customer satisfaction.
- **Credit Scoring:** Machine learning models assess creditworthiness by analyzing various data points, offering more accurate and fair credit scores.

# 3. Retail

AI is reshaping the retail industry by enhancing customer experiences, optimizing inventory management, and driving sales.

- **Personalized Recommendations:** AI algorithms analyze customer behavior and preferences to provide personalized product recommendations, increasing

sales and customer loyalty.

- **Inventory Management:** AI systems predict demand and optimize inventory levels, reducing waste and ensuring products are available when needed.
- **Chatbots and Virtual Assistants:** AI-powered chatbots assist customers with product inquiries, order tracking, and returns, providing efficient and personalized customer service.
- **Visual Search:** AI enables customers to search for products using images, making finding items that match their preferences easier.

# 4. Transportation

AI is revolutionizing transportation by improving safety, efficiency, and convenience.

- **Autonomous Vehicles:** AI-powered self-driving cars and trucks use sensors and machine learning to navigate and make driving decisions, reducing accidents and improving traffic flow.
- **Predictive Maintenance:** AI analyzes data from vehicles and infrastructure to predict maintenance needs, preventing breakdowns and reducing downtime.
- **Route Optimization:** AI algorithms optimize routes for logistics companies, reducing fuel consumption and delivery times.
- **Traffic Management:** AI systems monitor and manage traffic flow in real-time, reducing congestion and improving overall transportation efficiency.

# 5. Manufacturing

AI transforms manufacturing by enhancing production processes, quality control, and supply chain management.

- **Predictive Maintenance**: AI predicts equipment failures before they occur, allowing for proactive maintenance and reducing downtime.
- **Quality Control**: Machine learning models analyze production data to detect defects and ensure product quality.
- **Robotics**: AI-powered robots precisely perform repetitive and dangerous tasks, increasing productivity and worker safety.
- **Supply Chain Optimization**: AI optimizes supply chain operations by predicting demand, managing inventory, and improving logistics.

# 6. Education

AI enhances education by personalizing learning experiences and improving administrative efficiency.

- **Personalized Learning:** AI-driven platforms adapt to individual student needs, providing personalized learning paths and resources.
- **Automated Grading**: AI systems grade assignments and exams, providing timely feedback and freeing teachers' time for more personalized instruction.
- **Virtual Tutors**: AI-powered virtual tutors offer students additional support and

tutoring, helping them understand complex concepts.

- **Administrative Tasks**: AI automates administrative tasks such as scheduling, enrollment, and resource allocation, improving efficiency in educational institutions.

## 7. Entertainment

AI is reshaping the entertainment industry by creating new content, enhancing user experiences, and optimizing production processes.

- **Content Recommendation**: AI algorithms analyze user preferences and behavior to provide personalized content recommendations on streaming platforms.
- **Game Development**: AI generates realistic characters and environments, enhancing the gaming experience.
- **Video Editing**: AI automates video editing processes, such as cutting, filtering, and adding effects, speeding up production times.
- **Music Composition**: AI composes music by analyzing existing compositions and creating new pieces in various styles and genres.

***Four (04) Mark Question***

**Q. 1. What is Intelligence? Explain in brief any three types of intelligence that aremainly perceived by human beings?**

**A.** Intelligence is the 'ability to perceive or infer information, and to retain it as knowledge to be applied towards adaptive behaviour within an environment or context.'

**As per major research, there are mainly 9 types of Intelligence:**

(i) Mathematical Logical Intelligence: A person's ability to regulate, measure, andunderstand numerical symbols, abstraction, and logic.

(ii) Linguistic Intelligence: Language processing skills both in terms of understanding orimplementation in writing or speech.

(iii) Spatial Visual Intelligence: It is defined as the ability to perceive the visual worldand the relationship of one object to another.

(iv) Kinaesthetic Intelligence: Ability that is related to how a person uses his limbs in askilled manner.

(v) Musical Intelligence: As the name suggests, this intelligence is about a person'sability to recognize and create sounds, rhythms, and sound patterns.

(vi) Intrapersonal Intelligence: Describes the level of self-awareness someone hasstarting from realizing weakness, and strength, to recognizing his own feelings.

(vii) Existential Intelligence: An additional category of intelligence relating to religiousand spiritual awareness.

(viii) Naturalist Intelligence: An additional category of intelligence relating to the abilityto process information on the environment around us.

(ix) Interpersonal Intelligence: Interpersonal intelligence is the ability to communicatewith others by understanding other people's feelings and the influence of the person.

**Q. 2. How can AI be integrated with non-AI technologies? Explain with the help ofan example.**

**A.** Today's world is changing with the adoption of IOT (Internet of Things). IOT is helping in prominently capturing a tremendous amount of data from multiple sources. The convergence of AI (Artificial Intelligence) and IOT can redefine the way industries,businesses, and economies function. AI-enabled IoT creates intelligent machines that

simulate smart behaviour and supports decision-making with little or no human interference. While IOT provides data, artificial intelligence acquires the power to unlockresponses, offering both creativity and context to drive smart actions. Here are some examples:

Ex. 1: Self-driving Cars: Tesla's self-driving cars are the best example of IoT and AI working together. With the power of AI, self-driving cars predict the behaviour of pedestrians and cards in various circumstances. For example, they can determine roadconditions, optimal speed, weather and getting smarter with each trip.

Ex. 2: Robots in Manufacturing: Manufacturing is one of the industries that already embraced new technologies like IoT, artificial intelligence, facial recognition, deep learning, Robots and many more. Robots employed in factories are turning smarter with the support of implanted sensors, which facilitates data transmission. Moreover, as the robots are provisioned with intelligence algorithms, they can learn from newer data. Thisapproach not only saves time and cost but also makes the manufacturing process better over time.

Ex.3: Weather forecasting System: In a weather forecasting system, where IOT temperature sensor and humidity sensors collect data from the physical world, AI tries tofigure out patterns from previous data collected and tries to interpret and give accurate predictions of upcoming day weather.

Ex.4: Smart Drones: Initially drones were only able to capture photographs, these were not AI drones. As the scientist used to analyse the data captured through drones. Now drones are incorporated with AI, which helps them to make decisions on the basis of thepictures they capture.

**Q. 3. Read the given scenario and answer the questions that follow:**

A farmer keeps rabbits in three large hutches that stand in a row in his backyard. Each of the hutches is painted different colours – red, yellow, and green. Until recently, the number of rabbits in the green hutch was twice as large as the numberof rabbits in the yellow hutch. Then, one day, the farmer took five rabbits out of theleft-side hutch and gave them away to the local school's pet corner. He also took half of the rabbits that remained in the left-side hutch and moved them to the red hutch.
a. What was the color of the left-side hutch? Justify your answer with explanation.

**A.** The answer is yellow.

Explanation: As we already know at the outset the number of rabbits in the green hutch was twice as large as the number of rabbits in the yellow hutch. This means that the number of rabbits in the green hutch was an even number. After the farmer removed fiverabbits from the left side hutch, then the number of rabbits that remained there also became an even number. This is proven by the fact that it was divisible by 2. Therefore, before those five were removed, the left side hutch contained an uneven number of rabbits hence the left side hutch cannot be the green one, but based on the given information, it cannot be the red one. Hence it is yellow.

Q. 4. A thief has just found a pair of ancient treasure caves. One of the caves is filledwith unbelievable treasure and the other has a fire-breathing monster that will eat anyone who opens that cave. One cave has a black door decorated with diamonds and the other cave has a brown door decorated with sapphires. Each of the doors has an engraved description on top. The descriptions say:
**a.** Black Door: Monster is here.
**b.** Brown Door: Only One Door speaks the truth.
Which door should the thief open?

**A.** The treasure is in the Black door.

Explanation: Let us look at the description on the Brown door. It can be correct or wrong.

Scenario 1: The description on the Brown door is true. Then the description on the Black door has to be false. That means that the inscription on the Black door is false and the cave with black door contains the treasure!
Scenario 2: The description on the Brown door is false. Then either both the descriptions are false or both are true. Both cannot be true as that is impossible and not consistent. That means that both descriptions are false.

**Q. 5. How intelligent robots are helping us in accomplishing dangerous jobs?**
**A.** Robots let humans avoid some hurtful work:
(i) Lifting up heavy material at the construction site.
(ii) Stirring and mixing metals or liquids at a high temperature.
(iii) Collecting and packaging of radioactive waste.
(iv) Working in contaminated and dusty environments.