Class 8

Answer Key

Artificial Intelligence (Ver. 1.1)

1. Excite

Ai Reboot (Page 14)

1. Generalised Learning: This model of AI is capable of drawing conclusions from the existing data and producing new results based on the new data. .

Ai Task (Page 17)

Do it yourself.

Ai Reboot (Page 19)

1. Natural Language Processing, usually shortened as NLP, is a domain of AI which works with the interactions between humans and computer systems using natural language.
2. Data, Natural Language Processing and Computer Vision.

Ai Task (Page 21)

Do it yourself.

Ai Quiz

1. b	2. b	3. c	4. a	5. d
6. a	7. b	8. a	9. b	10. a
11. b	12. c			

Exercise

A.

1. False	2. True	3. True	4. True	5. False
6. True	7. True	8. True	9. False	

B.

1. Data
2. Capabilities
3. Narrow
4. Data Mining
5. John McCarthy
6. Human-Machine Interaction
7. Machine Translation
8. Computer Vision
9. AI systems

C.

1. In simple terms, we can define AI as a machine that can simulate human thought process and can take actions based on those thoughts and even draw conclusions. It should also be able to correct itself, if it makes a mistake. This also means that AI based computer would be able to make a decision in a given situation like human beings and in some cases even better.
2. Following are the types of AI:
   a. Artificial Narrow Intelligence

b. Artificial General Intelligence

c. Artificial Super Intelligence

3. Artificial General Intelligence (AGI) has intelligence as par with human beings. Its performance is just like humans. It is called Strong AI or Deep AI. The machine can mimic human behaviour with the ability to learn and solve problems. Till now Strong AI is a theory, researchers and scientists have not achieved it.
4. AI machines are expected to perform the following tasks:
   a. Generalised Learning
   b. Reasoning
   c. Problem Solving
   d. Adaptability
   e. Perception
5. Data Science, Natural Language Processing and Computer Vision are the three domains of AI.
6. Data are the facts and figures which are processed to find meaningful results. Data plays a pivotal role in the field of AI. Data collection is the process of collecting and sourcing information from numerous sources .These data can be numeric (temperature, loan amount, etc.), categorical (gender, colour, etc.), or even free text (like doctor's notes, prescriptions, opinion surveys, etc.)
7. Following are the types of NLP:
   a. Optical Character Recognition
   b. Speech Recognition
   c. Machine Translation
   d. Natural Language Generation
   e. Sentiment Analysis
   f. Semantic Search
8. HMI can be defined as the interaction and communication between a human and a machine. It is a dynamic technical system which finds novel methods to let the communication take place between humans and computers.

Ai Lab (Page 30)

Do it yourself.

Ai Ready .....1 (Page 31)

Do it yourself.

2. Relate

Ai Reboot (Page 38)

AI helps the banks and financial sectors in various ways. AI predicts future scenarios by analysing past user experiences. This way it suggests the banks for future outcomes and trends. It also helps banks to identify frauds and detect anti-money laundering patterns.

Ai Task (Page 41)

Do it yourself.

Ai Reboot (Page 48)

1. Following are some of the benefits of Smart Cities:
   - They have data-driven and more effective decision-making standards.
   - Smart Cities have smart street lights. The lighting can be customised as per the activities on the street.
2. Smart hubs, smart cameras, smart lighting and smart speakers.

Ai Quiz

1. b	2. a	3. b	4. b
5. d	6. a	7. b	8. b

Exercise

A.

1. False	2. True	3. True	4. True	5. False
6. True	7. False	8. True	9. True	

B.

1. Facebook	2. Google Assistant	3. E-commerce	4. Google Maps	
5. Smart city	6. Smart	7. AI	8. Smartphone	9. Garbage

C.

1. The three examples of AI that are used in everyday life are:
   a. Facebook b. Amazon c. Google Maps
2. For Security and Surveillance, AI program functions by using Computer Vision. The video surveillance cameras have AI programs that analyse images and audio in order to recognize humans, various objects, vehicles and actions. The Artificial Intelligence program sends an alert if it detects some unusual activities breaking the set rules.
3. AI assistants, such as chatbots, use artificial intelligence to generate personalised financial advice and natural language processing to provide instant, self-help customer service.
4. Education sector can highly benefit with the use of AI. Now, primarily its being used as a tool to develop skills and test systems. Today essay-grading systems are in place to grade the children's thoughts in its primary stage. It can also be used in providing individualized learning, which is a challenging task at teacher's level.
5. Information and Communication Technology (ICT) is used to improve the operations efficiently, share the data with the residents easily, provide quality government services and citizen's well-being effectively.
6. The concept of smart living is based on making life easier for the people using various electronic appliances. These appliances are capable of understanding the user's behaviour patterns and work accordingly.
7. Smart cameras, smart thermostats and smart speakers.
8. Smart Homes provide insights to efficient energy usage. They also enhance people's level of safety. The benefits are:
   a. **Power Saver:** Smart Homes are great at saving power.
   b. **Increased energy efficiency:** The Smart Home technology makes it possible to make the home energy-efficient.

c. **Protect home and its belongings:** The home is protected from intruders with AI systems.

d. **Interactive home:** The AI enabled appliances are controlled through voice or smart phones.

9. Following are some of the benefits of Smart Cities:
   a. They have data-driven and more effective decision-making standards.
   b. Smart Cities have smart street lights. The lighting can be customised as per the activities on the street.
   c. Parking sensors provide real time information about the free parking spaces to make it hassle-free.
   d. Garbage sensors equipped trucks are used for automatic waste collections.
   e. They have adequate water supply.
   f. They have better transportation facilities.
10. Smart Cities offer many benefits to its residents but there are many challenges in establishing it. Some of them are:
   - Financial challenges due to lack of proper funds.
   - Growing population.
   - Digital security issues.
   - Lack of high-speed internet facility and connectivity issues.

Ai Lab (Page 59)

Do it yourself.

Ai Ready .....2 (Page 60)

Do it yourself.

Test Sheet–1

(Based on Units 1 & 2)

A. 1. a 2. a 3. a 4. a 5. d
6. b 7. b 8. b

B. 1. Capabilities 2. Human-Machine Interaction 3. Narrow
4. E-commerce 5. Google Maps 6. Garbage 7. Smart 8. Violence

C. 1. True 2. False 3. True 4. False 5. True
6. True 7. True 8. True

D. 1. In simple terms, we can define AI as a machine that can simulate human thought process and can take actions based on those thoughts and even draw conclusions. It should also be able to correct itself, if it makes a mistake. This also means that AI based computer would be able to make a decision in a given situation like human beings and in some cases even better.

2. AI in e-commerce helps in interactive and personalized buying experience. With the AI-enabled systems, companies can see their customer's preferences and can boost their sales by reliable and customized shopping experiences. AI helps in the real time database analysis to predict the number of customers willing to buy a new product and also helps in running a cashierless store.
3. Data are the facts and figures which are processed to find meaningful results. Data plays a pivotal role in the field of AI. Data collection is the process of collecting and sourcing information from numerous sources. These data can be numeric (temperature, loan amount, etc.), categorical (gender, colour, etc.), or even free text (like doctor's notes, prescriptions, opinion surveys, etc.)
4. Following are the types of NLP:
   a. Optical Character Recognition
   b. Speech Recognition
   c. Machine Translation
   d. Natural Language Generation
   e. Sentiment Analysis
   f. Semantic Search
5. For Security and Surveillance, AI program functions by using Computer Vision. The video surveillance cameras have AI programs that analyse images and audio in order to recognize humans, various objects, vehicles and actions. The Artificial Intelligence program sends an alert if it detects some unusual activities breaking the set rules.
6. Smart Cities offer many benefits to its residents but there are many challenges in establishing it. Some of them are:
   - Financial challenges due to lack of proper funds.
   - Growing population.
   - Digital security issues.
   - Lack of high-speed internet facility and connectivity issues.
7. Information and Communication Technology (ICT) is used to improve the operations efficiently, share the data with the residents easily, provide quality government services and citizen's well-being effectively.
8. Smart cameras, smart thermostats and smart speakers.

3. Purpose

Ai Reboot (Page 69)

The growing population along with the economic cost to achieve these goals pose great difficulties.

Ai Task (Page 69)

Do it yourself.

Ai Quiz

1. b
2. a
3. b
4. c
5. a
6. b

Exercise

A. 1. True 2. True 3. False 4. True

B. 1. Sustainable Development Goals 2. 70 3. 17.2
4. Marine Pollution

C. 1. AI goals include learning, reasoning and creating awareness. AI is being used by many industries which also includes finance and healthcare.
2. AI can help in improving the farming land, agriculture, quality of products, etc. AI can also help with aid distribution in poor and war-torn areas, or where natural disasters have caused heavy destruction.
3. AI can help in achieving this goal by increasing the ability of healthcare professionals to analyse huge data sets, providing better feedback and finding accurately the cause of diseases to discover the cure. Wearable healthcare technology also uses AI to serve the patients and healthcare workers.
4. This SDG 16 aims to guarantee justice and freedom for all people by 2030. The target is to significantly reduce all forms of violence with communities and governments to end conflict and insecurity.

Ai Lab (Page 71)

Do it yourself.

Ai Ready .....3 (Page 74)

Do it yourself.

4. Possibilities

Ai Reboot (Page 81)

A robotics engineer requires to be good at:

- Creative ideas
- Programming mind-set
- Science, mathematics or applied mathematics, electronics, psychology and cognition.

Ai Reboot (Page 82)

Niki.ai, Discover.ai and Expertrons

Ai Task (Page 83)

Do it yourself.

Ai Quiz

1. d 2. a 3. d 4. b
5. a 6. b 7. c

Exercise

A. 1. True 2. False 3. False 4. True

B. 1. Soft, Technical
2. Robotics Engineer
3. 270
4. Machine Learning

C. 1. Some of the skills required to get a job in the field of AI are:

- Data literacy skills
- Critical thinking skills
- Programming language
- Artificial neural networks
- Collaboration skills
- Leadership skills
- Machine learning algorithm
- Signal processing techniques

2. Following are the soft skills:

- Data literacy skills
- Critical thinking skills
- Collaboration skills
- Leadership skills

3. Organizations expect their employees to work in a collaborative manner. Departments like Design and Marketing need to collaborate with each other to reach to user experience and develop machines accordingly.
4. A Computer Vision Engineer is expected to have mastery over:
   - Image generation and segmentation
   - Classification of images
   - Object detection and tracking moving object over time
   - Optical character recognition
   - Face detection and recognition
5. Discover.ai, Niki.ai, Expertrons and Niramai Health Analytix are few of the AI Start-ups in India.

Ai Lab (Page 86)

Do it yourself.

Ai Ready .....4 (Page 87)

Do it yourself.

5. AI Ethics

AI Reboot (Page 90)

The increasing usage of AI driven machines will generate huge amounts of wages to their owners leaving behind inequality among the others. When we talk about the impact of this on nations, AI in the hands of few high-income countries will create a huge gap between them and developing countries.

AI Reboot (Page 94)

1. Artificial Intelligence Ethics can be defined as a set of values, principles and techniques which can be applied in the development and deployment of Artificial Intelligence technologies to guide the moral conduct of a machine towards right and wrong.

   The AI code of ethics also called the AI value platform is a policy statement that defines the role of Artificial Intelligence.

2. AI systems have a training phase in which they learn from a huge data pool to understand images and patterns and act accordingly. Once this training phase is over, it goes to the testing phase to understand its performance. This training phase may also not prepare the system for all the possibilities it may undergo in the real world. It is possible that they may be wrongly used by malicious people for their own gain.

AI Reboot (Page 98)

Advantages:

a. **Diligent:** AI machines can work 24×7 as compared to humans who can only work only 4-6 hours at a stretch and may need a break to refresh.

b. **Reduction of human error:** Humans tend to make mistakes. AI based systems get better and better as we use them and tend to make less mistakes or no mistakes.

Disadvantages:

a. **Expensive:** AI machines are very complex in nature, have huge manufacturing costs.

b. **Health Issues:** With Smart House, having the ability to control everything over a cell phone, ability to complete tasks with the click of a button, makes humans more lazy.

AI Task (Page 99)

Do it yourself (Under the guidance of your teacher).

AI Quiz

1. c	2. d	3. b	4. a	5. a
6. c	7. d	8. d		

Exercise

A.

1. False	2. True	3. False	4. True	5. True
6. False	7. True	8. True	9. True	

B. 1. 22 2. Joseph Weizenbaum
3. Institute of Electrical and Electronic Engineers 4. Ownership 5. Accuracy
6. Correctional Offender Management Profiling for Alternative Sanctions 7. Robots

C. 1. The fact remains that the jobs once done by humans are now done by machines much more efficiently and cost effectively. It is clear that the development of AI would replace some jobs completely from the market. This has always been the case with the invention of a new technology, for example, typewriters were replaced by the invention of computers, taxis replaced manual rickshaws.

2. The need of AI Ethics is to define ownership. It also involves the moral behaviour of humans as they design, create, use and treat artificially intelligent systems. We need national and international regulatory frameworks to ensure that AI benefits humanity as a whole. We need to develop human centered AI for the greater interest of people.

3. Following are the ethical issues related to AI:
   a. It is blamed that AI continues to widen the Gender Gap. Research proves that only 22% of AI professionals are females. Siri, Alexa, Cortana, the virtual personal assistants are voiced as a female by default which further establishes that AI may continue to reinforce gender biases in our society.
   b. The increasing usage of AI driven machines will generate huge amounts of wages to their owners leaving behind inequality among the others. When we talk about the impact of this on nations, AI in the hands of few high-income countries will create a huge gap between them and developing countries.

4. Artificial Intelligence Ethics can be defined as a set of values, principles and techniques which can be applied in the development and deployment of Artificial Intelligence technologies to guide the moral conduct of a machine towards right and wrong.

   The AI code of ethics also called the AI value platform is a policy statement that defines the role of Artificial Intelligence.

5. There are mainly three types of AI bias:
   a. **Perceptive biases:** There may be operative feelings towards a particular group based upon the group, one belongs to. Approximately 180 human biases are defined by psychologists. These can affect the decisions we make.
   b. **Incomplete data biases:** When the data is not complete, it lacks accuracy. For example, when research is done initially using a particular group, it may not represent the whole population.
   c. **People:** The developers of AI can also be a reason for the bias. The designers focussing on achieving a specific goal with the available data, may not think of the other broader aspects which may land onto these biased results.

6. Following are some ways to prevent AI Bias:
   - Awareness of biases can lead to its prevention.
   - Selecting the training data that is large enough and represents the group appropriately.

7. In 2019, Facebook started allowing its advertisers to post housing and employment ads which were excluding people from different race, religion, gender, etc. Later, this tech giant was sued by the US Department of Housing and Urban Development for purposefully targeting their advertisement. Later, the company announced that it will stop allowing this.

Ai Lab (Page 102)

Do it yourself.

Ai Ready .....4 (Page 103)

Do it yourself.

Test Sheet–2

(Based on Units 3 to 5)

A. 1. a 2. b 3. d 4. b 5. d
6. d 7. c 8. c

B. 1. Robotics Engineer
2. Correctional Offender Management Profiling for Alternative Sanctions
3. 22 4. Marine Pollution 5. 270 6. Ownership
7. Machine Learning 8. 17.2

C. 1. True 2. True 3. True 4. True 5. True
6. True 7. False 8. True

D. 1. A Computer Vision Engineer is expected to have mastery over:
- Image generation and segmentation
- Classification of images
- Object detection and tracking moving object over time
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2. Following are the ethical issues related to AI:
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5. AI can help in improving the farming land, agriculture, quality of products, etc. AI can also help with aid distribution in poor and war-torn areas, or where natural disasters have caused heavy destruction.
6. Discover.ai, Niki.ai, Expertrons and Niramai Health Analytix are few AI Start-ups in India.
7. Education is one of the most basic public services. It enables people to develop all of their attributes and skills to achieve their potential as human beings and members of the society. Quality Education provides the foundation for equity in society and helps to reach gender equality.
8. Following are the soft skills:
   - Data literacy skills
   - Critical thinking skills
   - Collaboration skills
   - Leadership skills