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# ARTIFICIAL INTELLIGENCE

CODE - 417

10



Part A: Employability Skills is free with this book  
Adheres to NEP 2020 Guidelines

# SAMPLE PAPERS

# CBSE | DEPARTMENT OF SKILL EDUCATION

## ARTIFICIAL INTELLIGENCE (SUBJECT CODE - 417)

Blue-print for Sample Question Paper for Class X (Session 2022-2023)

Max. Time: 2 Hours

Max. Marks: 50

### PART A - EMPLOYABILITY SKILLS (10 MARKS):

UNIT NO.	NAME OF THE UNIT	OBJECTIVE TYPE QUESTIONS	SHORT ANSWER TYPE QUESTIONS	TOTAL QUESTIONS
		1 MARK EACH	2 MARKS EACH	
1	Self-Management Skills – II	2	2	4
2	ICT Skills – II	2	1	3
3	Entrepreneurial Skills – II	2	2	4
TOTAL QUESTIONS		6	5	11
NO. OF QUESTIONS TO BE ANSWERED		Any 4	Any 3	07
TOTAL MARKS		1 X 4 = 4	2 X 3 = 6	10 Marks

### PART B - SUBJECT SPECIFIC SKILLS (40 MARKS):

UNIT NO.	NAME OF THE UNIT	OBJECTIVE TYPE QUESTIONS	SHORT ANSWER TYPE QUESTIONS	DESCRIPTIVE/ LONG ANSWER TYPE QUESTIONS	TOTAL QUESTIONS
		1 MARK EACH	2 MARKS EACH	4 MARKS EACH	
1	Introduction to AI	6	2	2	10
2	AI Project Cycle	6	1	1	8
6	Natural Language Processing	6	2	1	9
7	Evaluation	6	1	1	8
TOTAL QUESTIONS		24	6	5	35
NUMBER OF QUESTIONS TO BE ANSWERED		20	Any 4	Any 3	27
TOTAL MARKS		1 X 20 = 20	2 X 4 = 8	4 X 3 = 12	40 MARKS

## ARTIFICIAL INTELLIGENCE (SUBJECT CODE - 417)

Sample Question Paper for Class X (Session 2022-2023)

Max. Time: 2 Hours

Max. Marks: 50

### General Instructions: (Please read the instructions carefully)

1. This Question Paper consists of 21 questions in two sections: Section A & Section B.
2. Section A has Objective type questions whereas Section B contains Subjective type questions.
3. **Out of the given (5 + 16 =) 21 questions, a candidate has to answer (5 + 10 =) 15 questions in the allotted (maximum) time of 2 hours.**
4. All questions of a particular section must be attempted in the correct order.
5. **SECTION A – OBJECTIVE TYPE QUESTIONS (24 MARKS):**
  - a. This section has 05 questions.
  - b. Marks allotted are mentioned against each question/part.
  - c. There is no negative marking.
  - d. Do as per the instructions given.
6. **SECTION B – SUBJECTIVE TYPE QUESTIONS (26 MARKS):**
  - a. This section has 16 questions.
  - b. A candidate has to do 10 questions.
  - c. Do as per the instructions given.
  - d. Marks allotted are mentioned against each question/part.

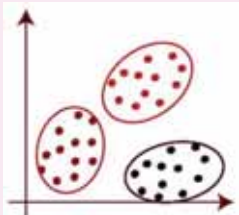
## SECTION A: OBJECTIVE TYPE QUESTIONS

<b>Q1. Answer any 4 out of the given 6 questions on Employability Skills (1 x 4 = 4 marks)</b>		
<b>1.</b>	Pranjali gets up at 5 am and goes to her badminton classes. Then she comes home and finishes her homework before going to school. She does this all by herself. No one tells her to do it. This is an example of a. Self-motivation b. External motivation c. Both self and external motivation d. Not any specific type of motivation	<b>1</b>
<b>2.</b>	Which of the following can cause stress? a. Yoga and meditation b. Driving during rush hour c. Organized academic life d. Enjoying holidays with family	<b>1</b>
<b>3.</b>	What is the term used when you quickly click the left mouse button twice? a. Hover b. Drag and drop c. Double clicking d. Moving	<b>1</b>
<b>4.</b>	Ravi learnt that if a laptop gets overheated, the internal parts get damaged. What happens if he leaves his device plugged in even after it is charged 100%? a. It can break b. It can stop functioning c. It can overheat d. Data can get corrupt	<b>1</b>
<b>5.</b>	Srishti is a young woman who makes earrings. She buys jute from a farmer and makes earrings from that. She sees that most women in her village do not work. So, she hires two women to help her. As her orders increase, she hires three more women to work for her. How was she helping her village grow? a. By selling earrings to women without a job b. By purchasing earrings from the local market c. By buying jute from the local farmer and by providing jobs to local women d. By attracting the women in her village with her creative earrings	<b>1</b>
<b>6.</b>	Mary has two people who work for her. Every day, she spends one hour with them to learn about what they've done that day. (a) Creates a new product (b) Divides income (c) Manages the business (d) Takes risks	<b>1</b>

**Q2. Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)**

<b>1.</b>	..... and ..... are AI based applications that help us in navigation.	<b>1</b>
<b>2.</b>	“This type of intelligence measure’s one’s awareness of the natural world around them and their sensitivities to any changes that occur. It allows us to identify the variation among two different species and understand how they are related”. Identify the type of intelligence described in the above sentence.	<b>1</b>
<b>3.</b>	Identify the incorrect statement(s) from the following: i. Deep learning is a subset of Machine Learning ii. Machine Learning is a subset of Deep Learning iii. Artificial Intelligence is a subset of Deep Learning iv. Deep Learning is the advanced form of AI and ML a. only (i) b. (ii) and (iii) c. (i) and (ii) d. Only (iii)	<b>1</b>
<b>4.</b>	Search engines not only predict what popular searches may apply to your query as you start typing, but it looks at the whole picture and recognizes what you’re trying to say rather than the exact search words. This is an example of a. Computer Vision b. Data Sciences c. Natural Language Processing d. Natural Language Understanding	<b>1</b>
<b>5.</b>	When a user installs an app in the smartphone, it asks for access to gallery, contacts, etc. After accepting this, it gives the user agreement which most users accept without realizing the implications. What is the concern here? a. Data Privacy b. Unemployment c. AI bias d. No concern	<b>1</b>
<b>6.</b>	We can’t make “good” decisions without information. (True/False)	<b>1</b>

**Q3. Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)**

1.	..... helps us to summarise all the key points into one single Template so that in future, whenever there is a need to look back at the basis of the problem, we can take a look at this and understand the key elements of it.	1
2.	Divya was learning neural networks. She understood that there were three layers in a neural network. Help her identify the layer that does processing in the neural network. a. Output layer b. Hidden layer c. Input layer d. Data layer	1
3.	Smita is working on a project that involves over a lakh of records. Which of the following should she use to make the best project? a. Traditional programming b. Manual processing c. IoT d. Neural networks	1
4.	For better efficiency of an AI project Training data should be ..... . i. Relevant ii. Scattered iii. Structured iv. Authentic Choose the correct option: a. Both (i) and (ii) b. Both (i) and (iv) c. Only (i) d. Only (iv)	1
5.	The _____ Sustainable Development Goals (SDGs) were launched at the United Nations Sustainable Development Summit in New York in the year 2015, forming the 2030 Agenda for Sustainable Development. a. 17 b. 15 c. 13 d. 19	1
6.	 <p>Identify the algorithm based on the given graph</p> <p>a. Dimensionality reduction b. Classification c. Clustering d. Regression</p>	1

**Q4. Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)**

1.	..... helps in assigning a predefined category to a document, organize it in such a way that helps customers to find information they want. For example, spam filtering in email, auto tagging on social media, categorization of news articles etc.	1
2.	Which of the following is the type of data used by NLP applications? a. Images b. Numerical data c. Graphical data d. Text and Speech	1
3.	Ayushi was learning about NLP. She wanted to know the term used for the whole textual data from all the documents altogether. Help her in identifying the term used for it.	1
4.	What is the full form of TF-IDF?	1
5.	A corpus contains 12 documents. How many document vectors will be there for that corpus? a. 12 b. 1 c. 24 d. 1/12	1
6.	<i>Identify the type of chatbot with the information given below:</i> These bots work on pre-programmed instructions inside the application/machine and are generally easy to develop. They are deployed in the customer care section of various companies. Their job is to answer some basic queries that they are coded for and connect them to human executives once they are unable to handle the conversation.	1

**Q5. Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)**

1.	The output given by the AI machine is known as ..... (Prediction/ Reality)	1
2.	..... is used to record the result of comparison between the prediction and reality. It is not an evaluation metric but a record which can help in evaluation.	1
3.	Raunak was learning the conditions that make up the confusion matrix. He came across a scenario in which the machine that was supposed to predict an animal was always predicting not an animal. What is this condition called? a. False Positive b. True Positive c. False Negative d. True Negative	1

4.	Which two evaluation methods are used to calculate F1 Score? a. Precision and Accuracy b. Precision and Recall c. Accuracy and Recall d. Precision, F1 score	1
5.	Which of the following statements is not true about overfitting models? a. This model learns the pattern and noise in the data to such extent that it harms the performance of the model on the new dataset b. Training result is very good and the test result is poor c. It interprets noise as patterns in the data d. The training accuracy and test accuracy both are low	1
6.	Priya was confused with the terms used in the evaluation stage. Suggest her the term used for the percentage of correct predictions out of all the observations. a. Accuracy b. Precision c. Recall d. F1 Score	1

## SECTION B: SUBJECTIVE TYPE QUESTIONS

**Answer any 3 out of the given 5 questions on Employability Skills (2 x 3 = 6 marks)**

**Answer each question in 20 – 30 words.**

Q6.	In SMART goals, what does 'A' stand for? Explain.	2
Q7.	Sameera is always punctual at school. She has a regular schedule that she follows every day. She plans for study and play time in advance. Enlist the four steps Sameera must have followed for effective time management.	2
Q8.	Enlist any two methods to protect our data on the computer.	2
Q9.	What do entrepreneurs do when they run their business? Mention any two points.	2
Q10.	Raj has a small convenience store in his locality. There are many other convenience stores in the area. Yet, Raj's store survives the competition and does well. Which stage of an entrepreneur's career process can you relate this to? Explain.	2

**Answer any 4 out of the given 6 questions in 20 – 30 words each (2 x 4 = 8 marks)**

Q11.	How do you understand whether a machine/application is AI based or not? Explain with the help of an example.	2
Q12.	If you do an image search for vacations on a popular search engine, the first few searches mostly return the picture of beaches. What is the concern here? Explain.	2



<b>Q13.</b>	Suhana works for a company wherein she was assigned the task of developing a project using AI project cycle. She knew that the first stage was scoping the problem. Help her list the remaining stages that she must go through to develop the project.	<b>2</b>
<b>Q14.</b>	What will be the results of conversion of the term, 'happily' in the process of stemming and lemmatization? Which process takes longer time for execution?	<b>2</b>
<b>Q15.</b>	What do we get from the "bag of words" algorithm?	<b>2</b>
<b>Q16.</b>	People of a village are totally dependent on the farmers for their daily food items. Farmers grow new seeds by checking the weather conditions every year. An AI model is being deployed in the village which predicts the chances of heavy rain to alert farmers which helps them in doing the farming at the right time. Which evaluation parameter out of precision, recall and F1 Score is best to evaluate the performance of this AI model? Explain.	<b>2</b>

**Answer any 3 out of the given 5 questions in 50– 80 words each (4 x 3 = 12 marks)**

<b>Q17.</b>	Ashwat is amazed to learn about his sister Ananya who is multi-talented and has excelled in academics, music, dancing, sports and painting. He was quite curious when Ananya told him that he too possessed all these intelligences like every human being does, but only at different levels. He wondered which intelligence she was talking about. Can you help Ashwat in learning about different types of intelligences by naming and explaining any four types of intelligences?	<b>4</b>													
<b>Q18.</b>	Samarth attended a seminar on Artificial Intelligence and has now been asked to write a report on his learnings from the seminar. Being a non-technical person, he understood that the AI enabled machine uses data of different formats in many of the daily based applications but failed to sync it with the right terminologies and express the details. Help Samarth define Artificial Intelligence, list the three domains of AI and the data that is used in these domains.	<b>2</b>													
<b>Q19.</b>	Neural networks are said to be modelled the way how neurons in the human brain behave. A similar system is mimicked by the AI machine to perform certain tasks. Explain how neural networks work in an AI model and mention any three features of Neural Networks.	<b>2</b>													
<b>Q20.</b>	Samiksha, a student of class X was exploring the Natural Language Processing domain. She got stuck while performing the text normalisation. Help her to normalise the text on the segmented sentences given below:  Document 1: Akash and Ajay are best friends. Document 2: Akash likes to play football but Ajay prefers to play online games.	<b>2</b>													
<b>Q21.</b>	Automated trade industry has developed an AI model which predicts the selling and purchasing of automobiles. During testing, the AI model came up with the following predictions.  <table border="1"> <thead> <tr> <th colspan="2" rowspan="2">Confusion Matrix</th> <th colspan="2">Reality</th> </tr> <tr> <th>Yes</th> <th>No</th> </tr> </thead> <tbody> <tr> <th rowspan="2">Predicted</th> <th>Yes</th> <td>60</td> <td>25</td> </tr> <tr> <th>No</th> <td>05</td> <td>10</td> </tr> </tbody> </table> <p>a. How many total tests have been performed in the above scenario? b. Calculate precision, recall and F1 Score.</p>	Confusion Matrix		Reality		Yes	No	Predicted	Yes	60	25	No	05	10	<b>2</b>
Confusion Matrix				Reality											
		Yes	No												
Predicted	Yes	60	25												
	No	05	10												

# ARTIFICIAL INTELLIGENCE CLASS – 10

## SAMPLE PAPER – 1

### (SECTION – A)

#### OBJECTIVE TYPE QUESTIONS:

**Q1. Answer any 4 out of the given 6 questions on Employability Skills. (1 x 4 = 4 marks)**

- Preeti reached the office on the weekend, hoping to start on her document sorting work so that she can finish it by the evening before she goes home. Her manager tells her that her senior has left due to a family emergency, and she needs to fill in for him in an important meeting with their investors right away. Preeti handles this sudden disruption in her plans easily, and she successfully completes the meeting. What type of skill is this?
  - Time-management
  - Stress-management
  - Adaptability**
  - None of these
- What does it mean when you take feedback from others to constantly work on yourself and improve your proficiency?
  - Responsibility
  - Motivation
  - Self-confidence
  - Self-awareness**
- Which device is used to move, select and open items on your computer screen?
  - Joystick
  - Mouse**
  - Keyboard
  - None of these
- What are the major types of viruses?
  - Worms
  - Trojan Horse
  - Neither a) nor b)
  - Both a) and b)**
- Deepak is an extremely successful entrepreneur with many well-performing startups targeting different types of markets. Which of these qualities must he not have?
  - Patience
  - Creativity
  - Impulsiveness**
  - Confidence
- Statement: "Every business idea needs to be unique and special."  
What is this?
  - Myth**
  - Fact
  - Hypothesis
  - Rhetoric

**Q2. Answer any 5 out of the given 6 questions. (1 x 5 = 5 marks)**

- The capacity of a person to control, evaluate, and comprehend the abstraction and logic of numerical symbols is known as .....  
a. **Mathematical logical reasoning**                      b. Musical intelligence  
c. Intrapersonal intelligence                              d. Linguistic intelligence
- The ability to process information about our surroundings is a type of intelligence referred to as .....  
a. Existential intelligence                                      b. Naturalist intelligence  
c. Kinesthetic intelligence                                      d. **Intrapersonal intelligence**
- The first sufficiently advanced humanoid robot to be granted citizenship by Saudi Arabia is  
a. KURI    b. EVA  
c. AIBO    d. **SOPHIA**
- Computer vision acquires, screens, ....., identifies and extracts information.  
a. does price comparison                                      b. **analyses**  
c. collects    d. labels
- Google Translate is a free tool that provides fast translations between English and more than 100 additional languages for words, phrases, and web pages. Google Translate makes use of.  
a. 4w problem canvas    b. **Neural networks**  
c. KWLH chart    d. System maps
- Which of the following are common examples of voice assistants?  
a. Alexa    b. Cortana  
c. Siri    d. **All of the above**

**Q3. Answer any 5 out of the given 6 questions. (1 x 5 = 5 marks)**

- ..... are the people who face this problem and would be benefited with the solution  
a. Key persons    b. **Stakeholders**  
c. End user    d. None of the above
- The ..... block help in analysing the people getting affected directly or indirectly due to it.  
a. **Who**    b. What  
c. Where    d. Why

3. You must now test your model on some recently fetched data just when ..... is finished.
 

a. Data acquisition	b. <b>Modelling</b>
c. Data mining	d. None of the above
  
4. The first layer of a neural network is known as the ..... .
 

a. Output layer	b. <b>Input layer</b>
c. Hidden layer	d. All of the above
  
5. The higher dimensions dataset is transformed into the lower dimensions using a ..... method.
 

a. <b>Dimensionality reduction</b>	b. Clustering
c. Regression	d. Classification
  
6. The phrase "data acquisition" also goes by the following name:
 

a. <b>Data gathering</b>	b. Regression
c. Classification	d. Modelling

**Q4. Answer any 5 out of the given 6 questions. (1 x 5 = 5 marks)**

1. A mobile company has launched a new smartphone in the market and wants to know the review of the customers regarding the product. Which of the following applications of Natural Language Processing is used for the same?
 

a. Text Classification	b. Automatic Summarization
c. <b>Sentiment Analysis</b>	d. None of these
  
2. .... is the branch of Artificial Intelligence that focuses on teaching computers to comprehend and process human languages.
 

a. <b>Natural language processing</b>	b. Data science
c. Computer vision	d. None of the above
  
3. What are the applications of Natural Language Processing?
 

a. Automatic summarization	b. Sentiment analysis
c. Text classification	d. <b>All of the above</b>
  
4. The ability of ..... device is to communicate with people and make their lives easier.
 

a. Google assistant	b. Cortana
c. Siri	d. <b>All of the above</b>
  
5. Which of these is not an application of NLP?
 

a. Sentiment Analysis	b. Summarization
c. <b>Image Recognition</b>	d. Virtual Assistants

6. .... information overload is a real problem when we need to access a specific important piece of information from a huge knowledge base.
- a. **Automatic summarization**
  - b. Sentiment analysis
  - c. Text classification
  - d. All of the above

**Q5. Answer any 5 out of the given 6 questions (1 x 5 =5 marks)**

1. An AI model predicted a downpour in Gujarat, but it was not even drizzling there. Which of the following describes this situation perfectly?
- a. True Positive
  - b. **False Positive**
  - c. True Negative
  - d. False Negative
2. .... is defined as the percentage of true positive cases versus all the cases where the prediction is true
- a. Overfitting
  - b. Accuracy
  - c. **precision**
  - d. Data acquisition
3. The proportion of successfully detected positive instances can be described as .....
- a. **Recall**
  - b. Accuracy
  - c. Precision
  - d. Data acquisition
4. Which metric is calculated as  $TP/(TP+FN)$ ?
- a. **Recall**
  - b. Accuracy
  - c. Precision
  - d. F1 score
5. Prediction and reality can be easily mapped together with the help of:
- a. Prediction
  - b. Reality
  - c. Accuracy
  - d. **Confusion Matrix**
6. Which of the following metrics best evaluates a model's performance?
- a. Recall
  - b. Accuracy
  - c. Precision
  - d. **F1 score**

**(SECTION – B)**

**SUBJECTIVE TYPE QUESTIONS:**

**Answer any 3 out of the given 5 questions on Employability Skills. (2 x 3 =6 marks)**

**1. What are stressors?**

**Ans.** Stressors include a wide range of perceived demands or threats that cause someone to react physically, mentally, emotionally, or socially. Stressors can range from feeling unprepared for a task or test to losing something crucial to getting too little sleep.

**2. What are the skills related to Emotional Intelligence?**

**Ans.** The skills which are related to Emotional Intelligence are:

- a. **Emotional awareness:** the ability to identify and name one's own emotions.
- b. **Harnessing emotions:** the ability to harness and apply emotions to tasks like thinking and problem-solving.
- c. **Managing emotions:** the ability to regulate one's own emotions when necessary and help others to do the same.

**3. What will an anti-virus do to protect your device?**

**Ans.** An anti-virus can protect my device from overheating. It can also increase the performance of my device. Moreover, it can prevent data from getting corrupted and it can also create a backup of the data.

**4. What do entrepreneurs do for the society?**

**Ans.** Entrepreneurs play a crucial role in the functioning of the society. They make profits through activities that benefit society. Some entrepreneurs work towards saving the environment, some give money to build schools and hospitals. Many buy raw materials from local people or hire them to create refined products. Hence, they create jobs and fulfill the needs of society. They also fulfill various types of customer needs.

**5. What are the functions of an entrepreneur?**

**Ans.** The functions of an entrepreneur are as follows:

- |                                    |                      |
|------------------------------------|----------------------|
| a. Decision-making                 | b. Business managing |
| c. Income division                 | d. Taking risks      |
| e. Creating new ideas and products |                      |

**Answer any 4 out of the given 6 questions in 20-30 words each. (2 x 4 =8 marks)**

**1. How is deep learning related to Machine Learning?**

**Ans.** Machine Learning aims to make it possible for machines to learn by themselves using the supplied data and produce precise predictions. Deep Learning is the subset of Machine Learning. Deep learning involves teaching a machine about enormous volumes of data, which it then uses to train itself on the data. Such machines possess sufficient intelligence to create their own algorithm. The most sophisticated type of artificial intelligence is Deep Learning.

**2. List any four types of intelligence and briefly explain any two.**

**Ans.** The four types of intelligence are: Musical intelligence, Interpersonal intelligence, Linguistic Intelligence, and Existential intelligence. The explanation of Linguistic intelligence and Existential intelligence:

- a. **Linguistic intelligence:** Language processing skill both in terms of understanding or implementation in writing or verbally

b. **Existential Intelligence:** Intelligence relating to religious and spiritual awareness

**3. List 4 methods to collect data.**

- Ans.** a. Survey  
b. Open-sourced websites hosted by the government  
c. Interviews  
d. Sensors

**4.**

a. **Name the process of dividing a whole corpus into sentences.**

**Ans.** Text Segmentation is the process of dividing the whole corpus into sentences.

b. **Mention any two commonly used applications of NLP.**

**Ans.** Two commonly used applications of NLP are: Voice assistants and chatbots.

**5. What will the word "Studies" look like if we perform the following:**

1. Lemmatization

**Ans.** After lemmatization, the word's output will be 'studied'.

2. Stemming

**Ans.** After stemming, the word will produce the term 'studi'.

**6. An AI model made predictions for 60 samples. Out of these, 20 were True Positive, 15 were False Positive and 10 were False Negative. Calculate the precision of the AI model.**

**Ans.** Precision =  $TP / ((TP + FP)) * 100\%$   
 $= 20 / (20 + 15) * 100\%$   
 $= 57.14\%$

**Answer any 3 out of the given 5 questions in 50-80 words each (4 x 3 =12 marks)**

**1. Differentiate between Machine learning and Deep learning.**

**Ans. Machine Learning:** It is a subset of AI that enables systems to learn automatically from experience or past information. It focuses on the development of computer programs that can access data and use it to learn by themselves. For example, auto-complete suggestions feature in search engines.

**Deep learning:** Deep Neural Learning is a subset of machine learning. This system is trained with a vast amount of data. It has the ability to learn from unstructured or unlabelled data. Machines can recognize patterns and create algorithms for themselves. For example, self-driving cars.

2. **Samarth attended a seminar on Artificial Intelligence and has now been asked to write a report on his learnings from the seminar. Being a non-technical person, he understood that the AI-enabled machine uses data of different formats in many of the daily-based applications but failed to sync it with the right terminologies and express the details. Help Samarth define Artificial Intelligence, list the three domains of AI, and the data that is used in these domains.**

**Ans.** Artificial Intelligence (AI) refers to any technique that enables computers to mimic human intelligence., make decisions, predict the future, as well as learn and improve on its own. With respect to the type of data fed in the AI model, AI models can be broadly categorized into three domains:

- a. Data science
- b. Computer vision
- c. Natural Language Processing

Data Science takes input in the form of numeric and alphanumeric data. Computer Vision takes input in the form of images and videos. Natural Language Processing takes input in the form of text and speech.

3. **Neural networks are said to be modeled the way how neurons in the human brain behave. A similar system is mimicked by the AI machine to perform certain tasks. Explain how neural networks work in an AI model and mention any three features of Neural Networks.**

**Ans.** Neural networks are loosely modelled after the behaviour of neurons in the brain.

The features of a neural network are:

- a. They are able to extract data features automatically without needing the input of the programmer.
- b. A neural network is essentially a system of organizing machine learning algorithms to perform certain tasks.
- c. It is a fast and efficient way to solve problems for which the dataset is very large, such as in images.

4. **Explain with examples how virtual assistants have made our lives easy. Also, mention the AI domain in which these virtual assistants belong.**

**Ans.** Virtual assistants such as Google Now and Siri, use Natural Language Processing, a domain of Artificial Intelligence that is concerned with interactions between computers and humans. They, by using natural language in written or verbal form, pretty much manage our days, find restaurants, search the web, schedule meetings, propose umbrellas, and more. Based on information from our friend's social media profile, they can make online present selections. They can even reply to our emails.

A virtual assistant can be utilized by businesses to organize meetings, alert co-workers of late arrivals, scan emails, and automatically respond to text and voice messages.



5. Consider the following confusion matrix. Calculate Accuracy, Recall, Precision and F1 score.

CONFUSION MATRIX		REALITY	
		TRUE	FALSE
PREDICTION	TRUE	647	460
	FLASE	193	700

Ans.

$$\begin{aligned} \text{Accuracy} &= \frac{(TP+TN)}{(TP+TN+FP+FN)} * 100\% \\ &= \frac{(647+700)}{2000} * 100\% = 67.35\% \end{aligned}$$

$$\begin{aligned} \text{Precision} &= \frac{TP}{(TP+FP)} * 100\% \\ &= \frac{647}{(647+460)} = 58.44\% \end{aligned}$$

$$\begin{aligned} \text{Recall} &= \frac{TP}{(TP+FN)} \\ &= \frac{647}{(647+193)} = 0.77 \end{aligned}$$

$$\begin{aligned} \text{F1 Score} &= 2 * \frac{(\text{Precision} * \text{Recall})}{(\text{Precision} + \text{Recall})} \\ &= 2 * \frac{(0.58 * 0.77)}{(0.58 + 0.77)} \\ &= 0.66 \end{aligned}$$

# ARTIFICIAL INTELLIGENCE CLASS – 10

## SAMPLE PAPER – 2

### (SECTION – A)

#### OBJECTIVE TYPE QUESTIONS:

#### Q1. Answer any 4 out of the given 6 questions on Employability Skills. (1 x 4 = 4 marks)

- Which of these is not a good stress management technique?
  - Do exercise and yoga
  - Ignore responsibilities**
  - Manage your time
  - Have a healthy diet
- Aditya can identify his emotions. What type of skills does he have?
  - Stress management
  - Emotional awareness**
  - Harnessing of emotions
  - Self-correctness
- What is the name of the long horizontal bar present at the bottom of the computer screen?
  - Task Bar**
  - Menu Bar
  - Tool Bar
  - Navigation Bar
- You can move a file or a folder in any of the following ways:
  - Shortcut menu
  - Drag and drop method
  - Using keyboard
  - All of these**
- Which of these is not a Managerial Function?
  - Organising
  - Financing**
  - Staffing
  - Directing
- Vidya has her own house decor business, in which she oversees the factors of production, delegation of tasks, smooth functioning across different business departments, timely delivery of inputs and outputs, etc. Which entrepreneurial role is she playing?
  - Agent's role
  - Innovator's role
  - Coordinating role**
  - Capital formation role

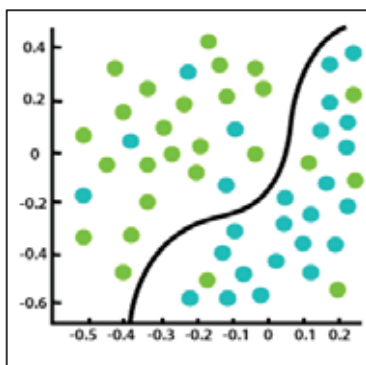
#### Q2. Answer any 5 out of the given 6 questions. (1 x 5 = 5 marks)

- Seema is a counsellor in a school. She provides academic, personal, and career advice to students and helps them develop social/emotional skills. She has the natural ability to communicate with others by understanding people's feelings which helps her identify the problems of the students as well as their potential solutions. Which of the following intelligence does Seema possess?
  - Intrapersonal intelligence
  - Spatial Visual Intelligence
  - Interpersonal Intelligence**
  - Linguistic Intelligence

2. When a machine engages in cognitive functions like reasoning, perception, learning, and decision-making, it is referred to as ..... .
  - a. **AI-enabled machine**
  - b. Electronic machine
  - c. Electrical machine
  - d. Smart machine
  
3. Raj works as a psychologist in the field. He runs a clinic where he assists those who are struggling with mental health concerns. He naturally reads people's behaviour, temperament, and mood, which aids him in providing an accurate diagnosis and prompt treatment. Which of the following traits of intelligence does Raj have?
  - a. Musical Intelligence
  - b. Spatial Visual Intelligence
  - c. **Interpersonal Intelligence**
  - d. Mathematical Logical Intelligence
  
4. Sites like Netflix, Amazon, Spotify, YouTube, and others present us with recommendations based on our preferences. This is made possible because of ..... .
  - a. **Artificial Intelligence**
  - b. Machine Intelligence
  - c. Platform Intelligence
  - d. Application Intelligence
  
5. The capacity to recognize objects in the visual world and their relationships to one another is known as ..... .
  - a. Mathematical logical reasoning
  - b. Musical intelligence
  - c. **Spatial visual intelligence**
  - d. Linguistic intelligence
  
6. Medha shared some images from her school's farewell on her Facebook page. Facebook automatically tagged her friends when she shared images. What branch of AI needs to be used for this?
  - a. Data science
  - b. Natural language Processing
  - c. **Computer vision**
  - d. None of these

**Q3. Answer any 5 out of the given 6 questions. (1 x 5 = 5 marks)**

1. Identify the algorithm based on the given graph:



- a. Clustering
- b. **Classification**
- c. Regression
- d. Dimensionality Reduction

2. Choose the five stages of the AI project cycle in correct order.
  - a. Evaluation -> Problem Scoping -> Data Exploration -> Data Acquisition -> Modelling
  - b. Problem Scoping -> Data Exploration -> Data Acquisition -> Evaluation -> Modelling
  - c. Data Acquisition -> Problem Scoping -> Data Exploration -> Modelling -> Evaluation
  - d. **Problem Scoping ->Data Acquisition -> Data Exploration -> Modelling -> Evaluation**
  
3. To assess each student's academic achievement, a teacher divided the class into four intelligence-level groups: Below Average, Average, Above Average, and Brilliant. This is an example of:
  - a. **Clustering**
  - b. Classification
  - c. Regression
  - d. Decision Tree
  
4. The data that is supplied into the ..... models is utilised to uncover connections, patterns, and trends. It aids the user in comprehending the significance of the data and the key characteristics that the computer has picked out in it.
  - a. **Unsupervised learning**
  - b. supervised learning
  - c. Reinforcement learning
  - d. All of the above
  
5. The task of an employee is to collect data and give it to the neural network.
  - a. Output layer
  - b. **Input layer**
  - c. Neural layer
  - d. All of the above
  
6. Which of the following canvases serves as the foundation for problem-solving in the "why" block canvas?
  - a. Who are the people that would be benefited by the solution
  - b. What is to be solved
  - c. Where will the solution be deployed
  - d. **All of the above**

**Q4. Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)**

1. In lemmatization, a root word is called:
  - a. **lemma**
  - b. lem
  - c. lemmat
  - d. Itz
  
2. The word with higher frequency of occurrence has negligible value and are termed as:
  - a. Rare words
  - b. **Stopwords**
  - c. Bag of words
  - d. Frequent words
  
3. What is the main challenge/s of NLP?
  - a. **Handling Ambiguity of Sentences**
  - b. Handling Tokenization
  - c. Handling POS-Tagging
  - d. All of the mentioned

4. "Reducing the words to their base or root form."  
What is this phase in NLP called?
- |                       |                          |
|-----------------------|--------------------------|
| a. Removing stopwords | b. <b>Stemming</b>       |
| c. Tokenisation       | d. Sentence segmentation |
5. Isha is doing her Ph.D. and has to go through lot of research paper to frame her thesis. She requires a tool which can summarize the details of all of those research papers. Which application of NLP can help her achieve this task?
- |               |                                   |
|---------------|-----------------------------------|
| a. Stopwords  | b. <b>Automatic Summarization</b> |
| c. Script bot | d. Sentiment Analysis             |
6. The process of constructing meaningful phrases and sentences in the form of natural language from some internal representation is referred to as .....
- |                    |                                       |
|--------------------|---------------------------------------|
| a. Data science    | b. Natural language Understanding     |
| c. Computer vision | d. <b>Natural Language Generation</b> |

**Q5. Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)**

1. False Negative is also called ..... error.
- |                   |             |
|-------------------|-------------|
| a. Type I         | b. Type III |
| c. <b>Type II</b> | d. Type IV  |
2. F1 score is a ..... mean of Precision and Recall.
- |                    |               |
|--------------------|---------------|
| a. Accuracy        | b. Prediction |
| c. <b>Harmonic</b> | d. Deployed   |
3. Prediction and Reality can be easily mapped together with the help of:
- |               |                            |
|---------------|----------------------------|
| a. Prediction | b. Reality                 |
| c. Accuracy   | d. <b>Confusion matrix</b> |
4. Comparison between prediction and reality is done using .....
- |                   |                            |
|-------------------|----------------------------|
| a. Regression     | b. Clustering              |
| c. Classification | d. <b>Confusion matrix</b> |
5. Which matrix is calculated as  $TP/(TP+FN)$ ?
- |              |                  |
|--------------|------------------|
| a. Precision | b. Accuracy      |
| c. F1 score  | d. <b>Recall</b> |
6. In a confusion matrix based on 200 sample  $TP = 110$  and  $TN = 30$ , what is the accuracy of the model?
- |        |               |
|--------|---------------|
| a. 69% | b. <b>70%</b> |
| c. 71% | d. 0.7%       |

## (SECTION – B)

### SUBJECTIVE TYPE QUESTIONS:

Answer any 3 out of the given 5 questions. (2 X 3 = 6 marks)

**1. Why is stress management so important?**

**Ans.** Stress management is important because it has the following benefits:

- a. Improves mood
- b. Boosts immune system
- c. Promotes longevity
- d. Leads to bursts of physical strength, which is vital for reaching goals
- e. Complete mental and physical engagement for task accomplishment
- f. Increases efficiency and effectiveness
- g. Prevents psychological disorders and behavioural problems

**2. What is self – regulation?**

**Ans.** Self – regulation inculcates discipline that helps in consistent efforts to move towards the goal. It guides independent individuals as it helps them consider long term consequences rather than just transient feelings. It leads to a responsible and a value driven behaviour. It teaches self - control and well directed efforts to reach goal.

**3. What is a real time operating system?**

**Ans.** A real time operating system is used to control machinery, scientific instruments, like robots, in complex animations and computer controlled automated machines. It manages the resources of the computer so that any particular operation is executed in the same amount of time every time it is executed. Two real-time operating systems are Windows CE and Lynx OS.

**4. What are the three entrepreneurial functions?**

**Ans.** The three entrepreneurial functions are:

- a. Organisation Building and Management
- b. Risk taking
- c. Innovation

**5. How do entrepreneurs promote innovation?**

**Ans.** By introducing novel concepts, ideas, designs, products, services, etc., entrepreneurs promote innovation. They might introduce something novel and ground-breaking in any sector of the economy. A new business cannot survive and thrive in today's world without innovating in some way.

Answer any 4 out of the given 6 questions in 20-30 words each (2 x 4 = 8 marks)

1. **How do you understand whether a machine/application is AI-based or not? Explain with the help of an example.**

**Ans.** Any machine that has been trained with data and can make decisions/predictions on its own can be termed as AI. For example, an automation machine not trained with any data is not an AI while a chatbot that understands and processes human language is an AI.

2. **Data collection is one of the most serious by-products of AI systems. It comes under the category of privacy concerns. Discuss.**

**Ans.** The process of data collection and storage, and training machines with it, raises serious privacy concerns for the user as that data can be used in any manner and the potential risks are incredibly high.

3. **Write any two applications of Neural Network.**

**Ans.** A Neural Network has great potential to solve problems for which the dataset is very large, like images recognition, patterns, etc. Many e-commerce companies use Neural Network in personalized product recommendations for the customers and it also aids in the development of chatbots.

4. **Write the difference between script-bot and smart-bot?**

**Ans. Script-bots:** Chatbots that use scripts or rules are simple to create. They follow a set of instructions or pre-written scripts. These chatbots have a finite amount of requests they can answer to, and they can only do so in a restricted number of ways, including utilizing predefined commands.

**Smart-bot:** While an AI chatbot or smart bot makes use of NLP, it has a broad range of features and can complete the task for the customer without any help from a human. These chatbots are adaptable and learn from every human encounter, so they grow their knowledge base and enrich themselves with vast amounts of data.

5. **Give any two applications of TFIDF.**

**Ans.**

- a. Document Classification: It helps in classifying the type and genre of a document.
- b. Topic Modelling: It helps in predicting the topic for a corpus.

6. **“Recall is an important evaluation method where False Negative outperforms False Positive”. Comment.**

**Ans.** Recall is more important where overlooked cases (false negative) could become more costly than false alarms (false positive).

Answer any 3 out of the given 5 questions in 50-80 words each (4 x 3 = 12 marks)

1. Explain any 3 domains of AI.

**Ans. Data Science:** It deals with gathering, analysing, exploring, and visualising a lot of data, including numerical and alphabetic data, so that pertinent information can be seen.

**Computer Vision:** Computer vision is a field of study that teaches machines to see and understand the human world. With the use of Artificial Intelligence, machines can recognise and analyse items in pictures and videos in a way that is human-like. Computer vision is necessary for applications like the Face Lock mobile app and self-driving vehicles.

**Natural Language Processing:** In this area of Artificial Intelligence, computers utilise algorithms to comprehend and respond to human speech or writing in languages like Hindi or English. Both spoken word and written text can be used as the input and output data for NLP systems. Smart assistants like Siri and Alexa are some of the few examples.

2. What do you mean by Computer Vision?

**Ans.**

- a. Computer Vision is one of the three domains of AI. It gets the visual data and analyses them to make a decision. This process includes acquiring images, screening, analysing, identifying and extracting information. In computer vision, input to the machines are photo-graphs, videos taken from thermal, or infrared sensors, indicators and other sources.
- b. In this process, the visual data can be translated into descriptions and turned into computer readable language to make a decision.
- c. The examples of computer visions are as follows:
  - i. **Face recognition systems:** Apps such as Google Photos, Snapchat, Facebook, Interpol
  - ii. **Content-Based Image Retrieval (CBIR):** Search engines such as Google, Bing, CT scans and MRI scans in hospitals, Earth science, etc.
  - iii. **Smart Interactions:** Gaming

3. Explain Reinforcement learning with an example.

**Ans.** Reinforcement learning is a machine learning algorithm that interacts with its environment and produces actions. For each right action, the machine gets positive feedback, and for each wrong action, the machine gets negative feedback or a penalty. The machine learns from experience as there is no labelled data. Example: Deep blue machine was trained to play chess; IBM Wat-son was trained to play the game jeopardy.



4. "Automatic summarization is used in NLP applications". Is the given statement, correct? Justify your answer with an example.

**Ans.** Yes, Automatic Summarization is useful for gathering data from social media and other online sources, as well as for summarising the meaning of documents and other written materials. When utilised to present an overview of a news story or blog post while eliminating redundancy from different sources and maximising the diversity of content acquired, automatic summarising is particularly pertinent.

5. In a school, a lot of times it so happens that there is no transport facility available to com-mute. This unavailability of school transport is a very common and prominent problem. Hence, an AI model is designed to predict if there is going to be school transport available or not.

The confusion matrix for the same is:

CONFUSION MATRIX		REALITY	
		1	0
PREDICTION	0	22	12
	1	47	18

Calculate accuracy, precision, recall and F1 score for the above problem.

**Ans.**

TP	FP
22	12
47	18

$$\begin{aligned}
 \text{Accuracy} &= \frac{(TP+TN)}{(TP+TN+FP+FN)} * 100\% \\
 &= \frac{(22+18)}{(22+118+12+47)} * 100 \\
 &= \frac{(140)}{(199)} * 100 = 70.35\%
 \end{aligned}$$

$$\begin{aligned}
 \text{Precision} &= \frac{TP}{(TP+FP)} * 100\% \\
 &= \frac{(22)}{(22+12)} * 100\%
 \end{aligned}$$

$$\text{Recall} = \frac{TP}{(TP+FN)} = 0.64$$

$$\begin{aligned}
 \text{F1 Score} &= 2 * \frac{\text{Precision} * \text{Recall}}{\text{Precision} + \text{Recall}} \\
 &= 2 * \frac{64.70 * 0.64}{64.70 + 0.64} \\
 &= 1.26
 \end{aligned}$$

# ARTIFICIAL INTELLIGENCE CLASS – 10

## SAMPLE PAPER – 3

### (SECTION – A)

#### OBJECTIVE TYPE QUESTIONS:

**Q1. Answer any 4 out of the given 6 questions on Employability Skills. (1 x 4 = 4 marks)**

- Which of these elements is required to have the ability to work independently?
  - Self-awareness
  - Self-motivation
  - Self-regulation
  - All of these**
- Shyam has completed his post-graduation but is unable to find a job which is making him feel stressed. What type of stress is he experiencing?
  - Emotional Stress
  - Financial Stress**
  - Physical Stress
  - Mental Stress
- Heena has been using her computer for one year, and it has started to slow down. It keeps rebooting itself, and ads keep popping on her screen. Her web homepage keeps changing itself and the system freezes when she opens or closes important work. Her brother has recommended that she can install an anti-virus software to tackle these issues. Help her to find out which of these is not an anti-virus.
  - McAfee
  - Quick Heal
  - Stuxnet**
  - Norton
- What are the small files which are stored on a user's computer when you visit a website?
  - Cookies**
  - Firewall
  - Temporary Files
  - Components
- Mohan wants to create sustainable solutions for problems such as accessibility to quality education, health and sanitation, unemployment, child labour, etc. What type of entrepreneurship is he interested in?
  - Small-scale entrepreneurship
  - Social entrepreneurship**
  - Women entrepreneurship
  - Agricultural entrepreneurship
- Which of these is not a managerial function?
  - Organising
  - Financing**
  - Directing
  - Staffing

**Q2. Answer any 5 out of the given 6 questions. (1 x 5 = 5 marks)**

- ..... is a sub-field of AI that enables computers to understand and process human language.  
a. Machine language  
b. Fuzzy logic  
c. **NLP**  
d. Expert system
- The prejudiced assumptions made during the AI algorithm development process or prejudices in the AI training data is called .....  
a. **AI bias**  
b. AI prejudice  
c. AI preconception  
d. AI impairment
- ..... is a domain of AI in which the system collects numerous data, maintains data sets and derives meaning / sense out of them.  
a. **Data science**  
b. Computer vision  
c. NLP  
d. Expert systems
- Which of the following statements is true about Neural Networks?  
a. **Neural Networks tend to perform better larger amount of data**  
b. Neural Networks tend to perform worse with larger amount of data  
c. Neural Networks tend to perform better with smaller amount of data  
d. Neural Networks need no data
- Choose the correct option.  
a. Unsupervised learning -> Labelled dataset, Regression  
b. **Supervised learning -> Labelled data set, Regression**  
c. Unsupervised learning -> Unlabelled dataset, Classification  
d. Supervised learning -> Unlabelled dataset, Regression
- Self-driving car is an example of .....  
a. Data Science  
b. **Computer Vision**  
c. NLP  
d. Augmented Reality

**Q3. Answer any 5 out of the given 6 questions. (1 x 5 = 5 marks)**

- Which of these is not a stage of Project Life Cycle?  
a. Problem Scoping  
b. **Data Exploration**  
c. Data mining  
d. Evaluation/deployment
- K Nearest neighbour is a ..... Learning Algorithm.  
a. Unsupervised  
b. **Supervised**  
c. Reinforcement  
d. None of these
- One of the most common causes of failure or delay in AI projects is:  
a. Wrong Goal Setting  
b. Late Testing  
c. **Erroneous Problem Scoping**  
d. Wrong Prototype

4. Processing occurs in the ..... layer of a neural layer.
  - a. Input layer
  - b. **Hidden layer**
  - c. Output layer
  - d. None of these
  
5. .... is used only to access the performance of a model.
  - a. Training Data
  - b. **Test data**
  - c. Bad data
  - d. None of these
  
6. Unscramble the letters and find the parameter that is NOT used in Evaluation stage.
  - a. **CMVETEEHAIN**
  - b. ONSIPRICE
  - c. RYAUACCC
  - d. ECLARL

**Q4. Answer any 5 out of the given 6 questions. (1 x 5 = 5 marks)**

1. Which of these chatbots is easy to make, and also has limited functionality?
  - a. **Script-bot**
  - b. Smart-bot
  - c. Simple chatbot
  - d. None of the above
  
2. The frequency of a word in one document is called .....
  - a. Document frequency
  - b. **Term frequency**
  - c. Bag of words
  - d. None of the above
  
3. "Once trained, the model cannot learn from its mistakes." This statement is true for which types of models?
  - a. **Rule based**
  - b. Learning based
  - c. Machine learning
  - d. Deep learning
  
4. .... work on bigger databases and learn with more data.
  - a. Chatbot
  - b. Script-bot
  - c. **Smart-bot**
  - d. All of these
  
5. Commonly used words that an NLP model is programmed to ignore are called .....
  - a. **Stop words**
  - b. Metadata
  - c. True positive
  - d. True Negative
  
6. .... is a process of removing affixes from a word in NLP to get meaningful root words.
  - a. Tokenisation
  - b. Stemming
  - c. **Lemmatization**
  - d. Bag of words

**Q5. Answer any 5 out of the given 6 questions. (1 x 5 = 5 marks)**

1. Accuracy is the proportion of ..... in a confusion matrix.
  - a. F score
  - b. **Correctness**
  - c. Prevalence
  - d. None of the above

2. In a confusion matrix, TP = 90 and FN = 70. What is the recall?  
a. 0.8  
b. **0.56**  
c. 1.22  
d. 0.2
3. A model is said to have good performance if the ..... for the model is high.  
a. Accuracy  
b. **F1 Score**  
c. Precision  
d. Recall
4. Which of the following metric best analyses the performance of a model?  
a. Accuracy  
b. Recall  
c. Precision  
d. **F1 Score**
5. .... is defined as the percentage of correct predictions out of all the observations.  
a. Predictions  
b. **Accuracy**  
c. Reality  
d. F1 Score
6. Confusion matrix is generally used to evaluate ..... models/algorithms.  
a. False Positive  
b. Overfitting  
c. **Classification**  
d. Precision

### (SECTION – B)

#### SUBJECTIVE TYPE QUESTIONS:

Answer any 3 out of the given 5 questions. (2 x 3 = 6 marks)

1. **Neeti's teacher told her that stress is not good for health. However, whenever Neeti knows she has a test coming up, she takes more stress as she ends up studying and revising harder for a week which helps her achieve good results. Getting good results also makes her happier and more confident. What does it tell us about stress?**

**Ans.** Occasional stress is an unavoidable part of one's life. Stress refers to a "physical, mental, or emotional strain or tension". Small amount of stress has a positive effect and they help us stretch ourselves to a new level. Stress can be a positive stress, if taken in right sense and may help in achieving effective outcomes.

2. **Nirav has to make a presentation on the importance of being an independent worker. Can you give him a few relevant pointers to do so?**

**Ans.** Here are some of the pointers which can be used for making a presentation on the importance of being an independent worker:

- a. Ensures greater learning
- b. Individuals feel more empowered and responsible
- c. It provides flexibility to choose and define working hours and working mechanisms

- d. Failure and success of the task assigned are accounted for by individuals
- e. Individuals become assets to organizations, groups and nations at large
- f. It ensures creativity and satisfaction amongst individuals.

**3. What are a few functions of an operating system?**

**Ans.** The functions of an operating system are as follows:

- a. It manages all the devices of a computer and keeps track of the status of the device, whether it is busy or not.
- b. It also checks whether the device is functioning properly or not.
- c. It also controls software resources of the computer.
- d. It manages the structure of the files and directories on a computer system.

**4. Ananya wants to be employed so that she can start earning. Can you explain her the ways in which a person can get employed?**

**Ans.** There are two ways for a person to be employed. They are:

- a. **Self-employment:** When a person earns through their own ventures where they employ others.
- b. **Wage employment:** When someone earns by working for others.

**5. Why are entrepreneurship skills good for students who are being prepared to enter into a large work force?**

**Ans.** Entrepreneurship teaches young students to:

- a. develop the ability to handle failure and ambiguity
- b. enhance critical thinking and problem-solving ability
- c. be prepared for future by giving early exposure to the real world
- d. to be Inspired to think about one's career differently

**Answer any 4 out of the given 6 questions in 20-30 words each. (2 x 4 = 8 marks)**

**1. What are price comparison websites?**

**Ans.** These websites are driven by large amount of data. Using these sites, it is easy to compare the prices of products from multiple suppliers in one place. PriceGrabber, PriceRunner, Junglee, Shopzilla, DealTime, etc. are some examples of price comparison websites. Today, price comparison websites can be found in almost every field such as technology, hotels, automobiles, durable goods, clothing, etc.

**2. Differentiate between Machine Learning and Deep Learning.**

**Ans. Machine Learning:**

- a. Requires large amount of training data.
- b. Focus is on solving a problem.
- c. It does not need high processing powers.
- d. The output result is easy to understand.
- e. Programmer has to manually enter the features.

**Deep Learning:**

- a. Requires very large amount of training data.
- b. Focus is on identifying patterns from the training data.
- c. It needs high processing powers.
- d. The output result is often not easy to understand.
- e. Machine identifies the features itself based on the training data.

**3. Name the machine learning algorithms.**

**a. Handles continuous data**

**Ans.** Regression

**b. Is used to find trends or patterns from the data**

**Ans.** Clustering

**c. Works on discrete data set**

**Ans.** Classification

**d. This algorithm can be used to solve both Classification and Regression problems**

**Ans.** KNN

**4. Explain Sentence Segmentation and Tokenisation with example.**

**Ans. Sentence Segmentation:** In this step, a group of sentences is divided into its component sentence. Each sentence is taken as different data. For example,



**Tokenisation:** After sentence segmentation, each sentence is then further divided into tokens. A token is any word or number or special character occurring in a sentence. For example, I don't eat non-veg on Tuesday -> I, don't, eat, non, -, veg, on, Tuesday.

**5. Is a smart-bot based on NLP? List any 2 characteristics of a smart-bot.**

**Ans.** Yes, smart-bot is based on NLP.

- a. Smart bots work on bigger databases and other resources directly.
- b. Smart bots learn with more data.

**6. What should be the value of F1 Score if the model needs to have 100% accuracy?**

**Ans.** The model will have an F1 Score of 1 if it has to be 100% accuracy.

Answer any 3 out of the given 5 questions in 50-80 words each. (4 x 3 = 12 marks)

1. Explain any 4 popular real-life applications of AI.

**Ans.** 4 popular real-life applications of AI are:

- a. **Virtual Assistant:** Alexa, Siri, OK Google. They set reminders, make calls, launch games, open websites, and tell you about the weather, date and time, greeting, news, etc.
- b. **Self-driving Cars:** These autonomous vehicles combine AI software, sensors, real-time cameras to ensure safe decisions on the road.
- c. **Spam Filters:** These use AI to detect unwanted, and virus-infested email (called spam) and stop it from getting into email inboxes.
- d. **Facial Recognition:** Social media apps like Facebook and Snapchat use AI for tagging people and face filters.

2. Why do we need AI ethics? Explain with an example.

**Ans.** Artificial intelligence is ultimately an advanced calculation and analysis tool. When developed with malicious intent or trained with conflicting data, it is prone to errors and biases. Artificial intelligence has great potential to be used as a weapon in a way that threatens public safety, security and quality of life, which is why the ethics of artificial intelligence is so important. Example, deep fakes are video and audio content generated by AI for deception. Such machine-generated videos have great potential to harm society by promoting the spread of misinformation and cyber-attacks.

3. How many types of Unsupervised Learning models are there in AI?

**Ans.** There are two types of Unsupervised learning models in AI.

- a. **Clustering:** It refers to the unsupervised learning technique that can cluster the unknown data according to patterns or trends found in it. The developer may already be aware of the patterns noticed, or it may even generate some original patterns as a result.
- b. **Dimensionality Reduction:** If you have a large number of features, it could be beneficial to minimize them using an unsupervised step before moving on to supervised steps. Numerous unsupervised learning techniques include a transformation technique that can be used to lessen the dimensionality.

4. Write any three applications of TF-IDF.

**Ans.** Here are some of the applications of TF-IDF:

- a. **Document Classification:** It classifies the documents into various categories and helps in the process of organizing and maintaining the documents.
- b. **Information Retrieval/Keyword Extraction:** This is the most popular application of TF-IDF, used by many web search engines. Here, the user



searches for a text or a keyword and those words which have the highest TF-IDF values retrieve the most relevant documents for the user.

- c. **Stopwords Removal:** It helps in removing the stopwords from the corpus so that the important words/keywords can be easily extracted.

5. Consider the following confusion matrix for a model predicting breast cancer for women and answer the questions (a - d):

CONFUSION MATRIX		PREDICTION	
		NO	YES
REALITY	NO	49	5
	YES	6	105

- a. What is the total number of samples?

**Ans.** Total no. of samples = 49 + 5 + 6 + 105 = 165

- b. How many in total were predicted 'yes' and 'no'?

**Ans.** Total no. of Predictions for 'YES' = 110

Total no. of Predictions for 'NO' = 50

- c. In reality, how many are suffering from breast cancer and how many are not?

**Ans.** In reality, no. of patients suffering from breast cancer = 111

In reality, no. of patients not suffering from breast cancer = 54

- d. Calculate the Recall of the model.

**Ans.** Recall =  $\frac{TP}{(TP+FP)}$   
=  $\frac{105}{(105+6)} = 0.94$

# ARTIFICIAL INTELLIGENCE CLASS – 10

## SAMPLE PAPER – 4

### (SECTION – A)

#### OBJECTIVE TYPE QUESTIONS:

#### Q1. Answer any 4 out of the given 6 questions on Employability Skills. (1 x 4 = 4 marks)

- Riti moved to Delhi from North-East India with her parents. Sometimes she feels conscious of the way her peers look at her, and she starts over-thinking. She wonders if others don't like her because of the way she looks. What kind of stress is Riti going through?
  - Physical
  - Social**
  - Mental
  - Financial
- To have the knowledge of which of these is known as self-awareness?
  - Our feelings
  - Our capabilities
  - Our character
  - All of these**
- Heena has been using her computer for one year, and it has started to slow down. It keeps rebooting, and ads keep popping on the screen. Her web homepage keeps changing itself and the system freezes when she opens or closes important work. Her brother has recommended she install an anti-virus software. Help her to find out which of these is not an anti-virus.
  - McAfee
  - Quick Heal
  - Stuxnet**
  - Norton
- Which one of these is a Mobile Operating System?
  - Windows
  - Symbian**
  - Linux
  - DOS
- Which of these qualities does not belong to a Perseverant entrepreneur?
  - Accepting failures
  - Learning from mistakes
  - Not giving up
  - Not experimenting**
- Production and Operation are a part of which function performed by entrepreneurs?
  - Promotional
  - Entrepreneurial
  - Managerial
  - Commercial**

**Q2. Answer any 5 out of the given 6 questions. (1 x 5 = 5 marks)**

1. Krishiv is a student in grade five. He likes to move constantly even when he is sitting on his seat. He plays with pencils, taps his fingers, and stands up in his place whenever he gets a chance. He enjoys playing basketball, and likes to play in the classroom. Which of the following intelligences does he demonstrate?
  - a. Linguistic
  - b. Logical mathematical
  - c. Musical
  - d. **Kinaesthetic**
2. Infrared sensors detect infrared energy that emits from one's body heat. When hands are placed in the proximity of the sensor, the infrared energy quickly fluctuates. This fluctuation triggers the pump to activate and dispense the designated amount of sanitiser. This is an example of:
  - a. **Automated machine**
  - b. AI machine
  - c. Semi-automatic machine
  - d. Deep learning machine
3. Which of the following is a type of human intelligence?
  - a. Musical intelligence
  - b. Existential intelligence
  - c. Naturalist intelligence
  - d. **All of these**
4. These autonomous vehicles combine AI software, sensors, and real-time cameras to ensure safe decisions on the road. Identify them.
  - a. Computer vision
  - b. Recommender system
  - c. **Self-driving cars**
  - d. Expert system
5. In 2014, Amazon developed an AI model to recruit software engineers. It was found that the model discriminated against women. This is an example of:
  - a. Computer vision
  - b. **AI bias**
  - c. Data
  - d. Patterns
6. Airline route planning is an application of .....
  - a. Computer vision
  - b. AI bias
  - c. **Data science**
  - d. Patterns

**Q3. Answer any 5 out of the given 6 questions. (1 x 5 = 5 marks)**

1. In neural network, which layer handles user-interface?
  - a. Input layer
  - b. Hidden layer
  - c. Node
  - d. **Output layer**
2. .... is a type of supervised learning model, where Data is classified according to labels and it need not to be continuous.
  - a. Regression
  - b. **Classification**
  - c. Clustering
  - d. Dimensionality reduction

3. .... refers to the unsupervised learning algorithm which can cluster the unknown data according to the patterns or trends identified out of it.
  - a. Classification
  - b. Regression
  - c. **Clustering**
  - d. Dimensionality reduction
4. Which of the following approaches is not used in AI system?
  - a. Rule based approach
  - b. Learning based approach
  - c. Adaptive intelligence approach
  - d. **Situational intelligence approach**
5. Which of the following machine learning algorithm allows machines to automatically determine the ideal behaviour within a specific context and maximise its performance?
  - a. Supervised learning
  - b. Unsupervised learning
  - c. **Machine learning**
  - d. Reinforcement learning
6. Which of the following stages is used by the programmers to write about the nature and boundaries of a problem?
  - a. Data Acquisition
  - b. **Problem Scoping**
  - c. Data Exploration
  - d. Data Validation

**Q4. Answer any 5 out of the given 6 questions. (1 x 5 = 5 marks)**

1. .... refers to the process of creating meaningful phrases and sentences in the form of natural language from some internal representation.
  - a. Data Science
  - b. Natural Language Understanding
  - c. Computer Vision
  - d. **Natural Language Generation**
2. .... is used for generating a concise and meaningful summary of the text by extracting the most important information from multiple text resources.
  - a. **Automatic Summarization**
  - b. Sentiment analysis
  - c. Text Classification
  - d. None of these
3. Which of the following chatbot is formerly known as Mitsuku Bot?
  - a. **Kuki**
  - b. Jabberwacky
  - c. Haptik
  - d. Cleverbot
4. .... refers to creating an overview of a news item or blog post while avoiding redundancy.
  - a. NLP
  - b. **Text summarization**
  - c. Smartbots
  - d. Bag of words
5. .... helps to analyse and interpret emotions in text data using text analysis techniques.
  - a. NLP
  - b. Summarization
  - c. **Sentiment analysis**
  - d. Text classification

6. The process of dividing a long sentence into words is known .....
- a. Virtual assistance
  - b. Stopwords
  - c. **Tokenization**
  - d. Semantics

**Q5. Answer any 5 out of the given 6 questions. (1 x 5 = 5 marks)**

1. A bank has deployed an AI based system to predict customers who are eligible for loan. What evaluation method or parameter should be used for this purpose?
- a. **Precision**
  - b. Recall
  - c. Accuracy
  - d. Prediction
2. DreamBig is an AI startup company which wants to develop a model that can forecast floods, so that a lot of lives can be saved from the disaster. What evaluation method or parameter can be used for this purpose?
- a. Precision
  - b. **Recall**
  - c. Accuracy
  - d. Prediction
3. Which of the following metrics best evaluates a model's performance?
- a. Recall
  - b. Accuracy
  - c. Precision
  - d. **F1 score**
4. What will be the outcome, if the prediction is "Yes" and it matches with the Reality? and what will be the outcome, if the prediction is "Yes" and it does not match with the reality?
- a. True Negative, False Negative
  - b. True Negative, False Positive
  - c. **True Positive, False Positive**
  - d. True Positive, True Negative
5. .... is defined as the percentage of correct predictions out of all the observations.
- a. Predictions
  - b. **Accuracy**
  - c. Reality
  - d. F1 Score
6. The value of F1 score must be between ..... to .....
- a. 1 to 10
  - b. 0 to 10
  - c. **0 to 1**
  - d. 1 to 100

## (SECTION – B)

### SUBJECTIVE TYPE QUESTIONS:

Answer any 3 out of the given 5 questions. (2 x 3 = 6 marks)

1. Himani is feeling stressed lately due to her exams. What are the physical symptoms she might be experiencing at this time?

**Ans.** Physical signs which may suggest stress are: breathlessness, dry mouth, butterflies in stomach, indigestion, nausea, acidity, fatigue, sweaty palms, cold hands and feet, irritation hyperactivity, etc.

2. What is self-motivation?

**Ans.** Self-motivation means to have an inner urge to do something, and achieve goals without any external pressure/lure of an award or appreciation. It is a life skill and must be necessarily developed so that a person can become an independent worker.

3. How can you copy a file or a folder using the keyboard?

**Ans.** You can copy a file or a folder using the keyboard like this:

- Select the file or the folder.
- Press Ctrl + C to copy the file or the folder.
- Open the destination folder.
- Press Ctrl + V to paste the copied file.

4. Kritika deals with the recruitment, employment, selection, training, development and compensation of the employees in her organization. Which role is she playing? Which entrepreneurial function does this role fall under?

**Ans.** Kritika is playing the role of a Human Resource manager in her organization. This role falls under "Commercial Function".

5. What do you understand by "Imitating role" of an entrepreneur?

**Ans.** In many developing countries, an entrepreneur either imitates or adopts the innovations of developed nations. These innovations are adopted according to the local needs and conditions, and work towards overcoming the entrepreneurial challenges. This is known as the Imitating Role of an entrepreneur.

Answer any 4 out of the given 6 questions in 20-30 words each. (2 x 4 = 8 marks)

1. How does a machine become Artificially intelligent?

**Ans.** By using data and algorithm for training, the machines become intelligent. Artificial intelligence machines constantly update their knowledge to optimize their performance.

**2. What is AI bias?**

**Ans.** Artificial intelligence bias includes biases that are passed into the Artificial intelligence systems created by humans. These biases can be passed into the AI systems when they are trained on data based on gender, race, nationality, etc.

**3. List any four features of a neural network.**

**Ans.**

- a. Neural networks are modelled on the basis of human brain.
- b. They are able to automatically extract features without input from programmer.
- c. Every neural network node is essentially a machine learning algorithm.
- d. It is useful for solving problems for which the dataset is very large.

**4. Expand and explain TF-IDF.**

**Ans.** TF-IDF stands for term frequency inverse document frequency. This algorithm uses two methods- TF and IDF to determine the relevance of a word to a document in a collection of documents. This is done by multiplying the number of times a word appears in the document (TF), and the inverse document frequency of the word across a set of documents. For a word to have a high TFIDF value, the word needs to have a high term frequency but less document frequency.

**5. What are the limitations of Chatbots?**

**Ans.**

- a. Chatbots cannot make out grammatical errors in the text
- b. Chatbots have no emotions
- c. They can't ask qualifying questions if clarification is required
- d. Complex Chatbots are expensive

**6. Define evaluation. Why is it important?**

**Ans.** Evaluation is a final stage of AI project cycle where the AI model is checked for its efficiency and accuracy as per the requirement of the project.

**Answer any 3 out of the given 5 questions in 50-80 words each. (4 x 3 = 12 marks)**

**1. Explain any 4 popular real-life applications of AI.**

**Ans. Virtual assistant:** Alexa, Siri, OK Google. They give reminders, make calls, launch games, open websites, tell you about the weather, date and time, say greetings, tell news, etc.

**Self-driving Cars:** These autonomous vehicles combine AI software sensors and real time cameras to ensure safe decisions being made on the road.

**Spam filters:** These use AI to detect unwanted, and virus infested e-mail and stop it from getting into e-mail inboxes.

**Facial Recognition:** Social media apps like Facebook and snapchat use AI for tagging people and face filters.

2. How do Social-networking websites make use of Artificial Intelligence?

**Ans.** Artificial Intelligence plays an important role in social networking applications such as Instagram, Facebook and Snapchat. On Facebook, you can make new friends, upload photos and do much more. When you upload photos, the application automatically highlights faces and suggests friends for you to tag.

3. Differentiate between rule based and learning based approach in machine learning.

**Ans. Rule based approach:** The machine follows the rules of instructions mentioned by the developer and performs its task accordingly.

**Learning based approach:** The AI model gets trained on the data fed to it and then is able to design a model which is adaptive to the change in data.

4. "The result of stemming is not always successful." Explain.

**Ans.** Stemming is the process of reducing words to their root form. For example, 'connection', 'connected' and 'connecting' are various forms of a common word, 'connect'. The result of stemming is not always successful. A stem word may or may not have a meaning or be included in the dictionary. It just removes the affixes. Hence, it is faster.

5. For an AI model recall is 0.22 and precision is 0.33. Calculate the F1 Score of the model. Also state the range of F1 Score.

**Ans.**

$$\begin{aligned} \text{F1 Score} &= 2 * \frac{(\text{Precision} * \text{Recall})}{(\text{Precision} + \text{Recall})} \\ &= 2 * \frac{(0.33 * 0.22)}{(0.33 + 0.22)} \\ &= 0.26 \end{aligned}$$

The range of F1 score is 0 to 1.



### (SECTION – A)

#### OBJECTIVE TYPE QUESTIONS:

**Q1. Answer any 4 out of the given 6 questions on Employability Skills. (1 x 4 = 4 marks)**

- Priya, a 37-year-old woman is the Marketing Director of a high-tech firm. She wants to leave the job to become a life coach to heal others. But due to her profile, she has strong reputation in the society which always holds her back from pursuing her passion, and this causes dissatisfaction to her. What type of stress is this?

  - Physical Stress
  - Social Stress**
  - Mental Stress
  - None of these
- Suprabhat is a 14-year-old student who wants to become a cricketer. To pursue his passion, he gets up at 5 a.m. and goes to the cricket academy for his classes. Besides, academically he is also doing well. He always completes his work on time and passes the assessments with flying colours. He does all this by himself without any external guidelines. This is an example of:

  - Self-motivation**
  - Extrinsic -motivation
  - Both (a) and (b)
  - None of these
- Samarth is going to have a practical exam in school. In the computer lab, the teacher gives him instructions to create a document using a word processor on his PC within the time limit of 20 minutes. But all of a sudden, his mouse stops working and he is not able to move the cursor in the document. His teacher asks him to use the keyboard for the same. Which of the following keys should he use?

  - Navigation keys**
  - Punctuation keys
  - Control keys
  - Shift keys
- The teacher opens one folder on the computer and asks the students to explain the different types of files present in the folder. The students will be able to differentiate files using their .....

  - Windows key
  - Firewall
  - Extension**
  - Antivirus
- Satish owns a company called anchor's fans. He decides to sell fans in Sri Lanka but faces a huge loss. He apologises to the people who work for him and assures them to come up with a better business plan and strategy. What quality of an entrepreneur is depicted through this?

  - Responsible**
  - Creative
  - Patient
  - Hard Work

6. Rishabh carries out research, investigates and evaluates an idea to launch an app that will help young students in finding books by kilo near their location, and provide them the service of finding second-hand books from those people who own them and wish to sell them away. He considers various factors and estimates the total demand based on market practises. Which promotional function is this?
- |                                |                                  |
|--------------------------------|----------------------------------|
| a. Assembling the Requirements | b. <b>Detailed Investigation</b> |
| b. Planning                    | d. Idea Discovery                |

**Q2. Answer any 5 out of the given 6 questions. (1 x 5 = 5 marks)**

1. Which of the following is not a domain of Artificial Intelligence?
- |                  |                                |
|------------------|--------------------------------|
| a. Data          | b. Computer vision             |
| c. <b>Drones</b> | d. Natural language processing |
2. Which of the following is not an example of NLP?
- |                        |             |
|------------------------|-------------|
| a. Siri                | b. Alexa    |
| c. <b>Facelock app</b> | d. Chatbots |
3. Anshika was searching for new shoes online. Now, she is fed up with mails in her e-mail inbox, pop-ups, advertisements related to shoes on her social media accounts, and SMS on her phone. This is an issue related to:
- |                  |                            |
|------------------|----------------------------|
| a. Data privacy  | b. <b>Data acquisition</b> |
| c. Poor training | d. Lack of access          |
4. Sakshi has recently bought a robot to do cleaning and mopping. The robot senses the dirty floor, calculates the average time which will take to mop, senses the obstacle and changes its direction. It also goes for auto charging. Her house maid was feeling insecure as if she would not be required in the near future. This is problem related to:
- |                                    |                 |
|------------------------------------|-----------------|
| a. AI bias                         | b. AI ethics    |
| c. <b>AI creating unemployment</b> | d. Data privacy |
5. Medha shared some images from her school's farewell on her Facebook page. Facebook automatically tagged her friends when she shared the images. What branch of AI needs to be used for this?
- |                           |                                |
|---------------------------|--------------------------------|
| a. Data science           | b. Natural language Processing |
| c. <b>Computer vision</b> | d. None of these               |
6. AI bias is due to bias of the .....
- |                               |                  |
|-------------------------------|------------------|
| a. <b>Programmer</b>          | b. Machine       |
| c. Company building the model | d. None of these |

**Q3. Answer any 5 out of the given 6 questions. (1 x 5 = 5 marks)**

1. A business problem wherein we categorize whether an observation is “safe”, “At Risk”, and “Unsafe” is an example of:  
a. **Classification**  
b. Clustering  
c. Regression  
d. Dimensionality reduction
2. .... is used only to access the performance of a model.  
a. Training Data  
b. **Test data**  
c. Bad data  
d. None of these
3. .... is a step in the AI project cycle where we train and test the machine learning models to select the best one for the given problem.  
a. Problem scoping  
b. **Modelling**  
c. Data acquisition  
d. Evaluation
4. In neural network, the layers are made of .....  
a. Perceptron  
b. **Neurons**  
c. Both a. And b.  
d. **Nodes**
5. .... are the people who face a problem and would benefit from the solution.  
a. Key persons  
b. **Stakeholders**  
c. End user  
d. None of the above
6. A neural network is the complex structure in AI systems which is made up of artificial .....  
a. Brain  
b. **Neurons**  
c. Nucleus  
d. Axon

**Q4. Answer any 5 out of the given 6 questions. (1 x 5 = 5 marks)**

1. Kamla has launched an e-commerce portal where she sells cosmetic products. She wants to know what her customers think about the products and services so as to analyze the reviews for the same. Which application of NLP will help her achieve this task?  
a. **Sentiment analysis**  
b. Automatic summarization  
c. Script bot  
d. Stop words
2. By dividing up large problems into smaller ones, ..... aims to help you manage them in a more constructive manner.  
a. CDP  
b. **CBT**  
c. CSP  
d. CLP

3. .... is used for generating a concise and meaningful summary of the text by extracting the most important information from multiple text resources.
  - a. **Automatic summarization**
  - b. Sentiment analysis
  - c. Text classification
  - d. All of the above
4. .... makes it possible to assign predefined categories to a document and organise it to help you find the information you need or simplify some activities.
  - a. Automatic summarization
  - b. Sentiment analysis
  - c. **Text classification**
  - d. All of the above
5. Commonly used words that an NLP model is programmed to ignore are called:
  - a. **Stop words**
  - b. Metadata
  - c. True positive
  - d. True Negative
6. CBT stands for:
  - a. Cognitive Behavioural Treatment
  - b. **Cognitive Behavioural Therapy**
  - c. Cognitive Behavioural Theory
  - d. None of these

**Q5. Answer any 5 out of the given 6 questions. (1 x 5 = 5 marks)**

1. A model is said to have good performance if the ..... for the model is high.
  - a. Accuracy
  - b. **F1 Score**
  - c. Precision
  - d. Recall
2. Comparison between prediction and reality is done using .....
  - a. Regression
  - b. Clustering
  - c. Classification
  - d. **Confusion Matrix**
3. Which of the following statements is true for the term evaluation?
  - a. Helps in classifying the type and genre of a document
  - b. It helps in predicting the topic for a corpus
  - c. **Helps in understanding the reliability of any AI model**
  - d. Process to extract the important information out of a corpus
4. What does prediction signify in an AI model?
  - a. Input to the model
  - b. **Output of the model based on the real scenario**
  - c. Prediction is the same as reality
  - d. None of these
5. In a confusion matrix based on 200 sample TP = 110 and TN = 30, what is the accuracy of the model?
  - a. 69%
  - b. **70%**
  - c. 71%
  - d. 0.7%

6. Accuracy is the Proportion of ..... in a confusion matrix
- |               |                       |
|---------------|-----------------------|
| a. F-score    | b. <b>Correctness</b> |
| c. Prevalence | d. None of the above  |

## (SECTION – B)

### SUBJECTIVE TYPE QUESTIONS:

Answer any 3 out of the given 5 questions on Employability Skills (2 x 3 = 6 marks).

Answer each question in 20-30 words.

1. Rajat is planning to open his own venture and seeking the advice of his mentor for the same. His mentor suggests Rajat to use the SMART method to set goals. Can you explain the significance of the SMART method?

**Ans.** A SMART goal is used as a guide to help you in goal setting. SMART is an acronym that stands for Specific, Measurable, Achievable, Realistic, and Timely. Therefore, a SMART goal incorporates all of these criteria to help focus your efforts and increase the chances of achieving your goal.

2. What is self-regulation and how does it help an individual?

**Ans.** Self-regulation is a person's ability to identify, understand and manage their actions, as well as reactions to feelings and things happening around you. It includes being able to:

- Regulate reactions to strong emotions like frustration, excitement, anger and embarrassment.
- Calm down after something exciting or upsetting happens.

3. Parminder bought his laptop eight months ago. He is doing his studies along with a part-time job and due to this, he has extensive use of a laptop. He uses it for his work and study. But, the speed of the laptop degrades with the passage of time. Can you specify the reason for the same?

**Ans.** The main reasons that the speed of a laptop, as well as any other device, tends to slow down over time are:

- Large amounts of data stored on the hard Disk Drive.
- Unnecessary software and obsolete data, lack of sufficient RAM, constantly updating software, and viruses.

4. Explain any one myth of Entrepreneurship.

**Ans.** It is a myth, or a false conception that every business idea needs to be unique or special. A person's idea does not have to be unique. He or she can take an idea that is already there in the market and do something different with it.

**5. Who is a self-employed person?**

**Ans.** A self-employed, or an entrepreneur, is a person who is running a business to satisfy a need by trying new ideas. If a chef opens his own restaurant, he is a self-employed person.

**Answer any 4 out of the given 6 questions in 20-30 words each. (2 x 4 = 8 marks)**

**1. Training the students to be well-versed in using technology makes them really smart. Comment.**

**Ans.** Using the technology will make the students smart users, but at the same time it can hinder their mental skills and learning capabilities.

**2. Data collection is one of the most serious by-products of AI systems. It comes under the category of privacy concerns. Discuss.**

**Ans.** The process of data collection and storage, and training machines with it, raises serious privacy concerns for the user as that data can be used in any manner and the potential risks are incredibly high.

**3. What is the purpose of Data Exploration?**

**Ans.** Data Exploration involves analysing the large dataset in an unstructured way to understand initial patterns and characteristics. Data visualization tools like charts are also used to understand the patterns.

**4. Give any two applications of TF-IDF.**

**Ans.** Two applications of TF-IDF are:

- a. **Document classification:** Help in classifying the type and genre of a document.
- b. **Topic modelling:** It helps in predicting the topic for a corpus.

**5. What do you mean by CBT?**

**Ans.** Cognitive Behavioural Therapy (CBT) is considered to be the best method to address this problem. This therapy is used to treat anxiety, depression and other mental health problems by understanding and changing the disturbing thinking pattern of an individual.

**6. Define Accuracy. How can one calculate it?**

**Ans.** Accuracy refers to the percentage of correct prediction out of all the observations. A prediction can be said to be correct only if it matches reality. Accuracy is calculated as the number of all the correct predictions divided by the total number of datasets. The formula for calculating accuracy is:

$$\text{Accuracy} = \frac{\text{correct predictions}}{\text{total cases}} * 100$$

**Answer any 3 out of the given 5 questions in 50-80 words each (4 x 3 =12 marks)**

**1. How do social networking websites make use of Artificial Intelligence?**

**Ans.** Artificial Intelligence plays an important role in social networking applications such as Instagram, Facebook and Snapchat. On Facebook, you can make new friends, upload photos and do much more. When you upload photos, the application automatically highlights faces and suggests friends for you to tag.

**2. Write a short note on possible bias in data collections.**

**Ans.** AI systems can make decisions on the basis of data which is being fed by the programmer at the developmental stage. If the data fed into it is biased, the AI system is bound to act in a biased way.

**3. Do ethics in AI hamper data acquisition stage? Justify your answer.**

**Ans.** Data acquisition is the most important factor or stage as the entire project development is based on the acquired data. There are several ethical issues which must always be considered when planning any type of data collection. We need to understand that the data which is collected is ethical only if the provider agrees to provide. For example, in case of smartphone users, data is collected by clicking on allow when it asks for permission and by agreeing to all the terms and conditions. But at the same time if one does not want to share his/her data with anyone then this ethical issue hampers the acquisition process and lowers the accuracy or amount of data required for development. Hence, regardless of the type of data collection, it is absolutely necessary to gain the approval of the community from which the data will be collected otherwise.

**4. Differentiate between Stemming and Lemmatization.**

**Ans.** Removal of affixes from the words is known as Stemming. Every search engine uses stemming to index the words. There are multiple algorithms for stemming – Porter stemming algorithm, Lancaster stemming algorithm, Regular Expression stemming algorithm and Snowball stemming algorithm. Whereas Lemmatization means to find the correct root word with meaning for the given word. The main difference between stemming and lemmatization is that the stemming focuses on the word by removing affix and lemmatization focuses on the meaning of the word while reducing it to its base form.

**5. Explain from the given graph, how the value and occurrence of a word are related in a corpus?**

**Ans.** As shown in the graph, occurrence and value of a word are inversely proportional. The words which occur most (like stop words) have negligible value. As the occurrence of words drops, the value of such words rises. These words are termed as rare or valuable words.