

2021

DELHI PUBLIC SCHOOL, BHILAI CG
CLASS X – ARTIFICIAL INTELLIGENCE
(SAMPLE PAPER)

TIME : 2H

M.M.(40)

Section [A] Objective Type Questions

Q1: Answer any 4 out of the given 6 questions. (1x4=4 marks)

[1] Which of the following is an inner urge to do something, achieve their goals without any external pressure / lure for award or appreciation?

- a) Self-awareness b) Self-motivation
- c) Self-regulation d) Self-control

[2] Right, clicking on File or Folder opens

- a) Main Menu b) Shortcut Menu
- c) Back Menu d) Front Menu

[3] Which of the following is not a task of an entrepreneur?

- a) Sharing of wealth b) Preferably using foreign materials c) Fulfilling customer needs d) Helping society

[4] Which of the following is a function of an entrepreneur?

- a) Following the traditional method of business b) Innovation
- c) Keeping all the profit to himself/herself d) Avoid taking decisions

[5] GUI stands for:

- a) Graphical User Interaction b) Graphical User Interface
- c) Graphical Upper Interface d) None of these

[6] Stress management is vital because it leads to following benefits

- a) Improves mood b) Boosts Immune System
- c) Promotes longevity d) All of the above

Q2: Answer any 5 out of the given 6 questions (1x5=5 marks)

[1] Which of the following is defined as the measure of balance between precision and recall? a) Accuracy b) F1 Score

- c) Reliability d) Punctuality

[2] This is a fact that all human beings have all nine types of intelligences, but at different levels. Name any two such intelligences.

[3] Identify the incorrect statements from the following:

- i) AI models can be broadly categorized into four domains.
- ii) Data sciences is one of the domain of AI model.
- iii) Price comparison websites are examples of data science.
- iv) The information extracted through data science can be used to make decision about it. a) Only (iv) b) (iii) and (iv)

[6] Regression is one of the type of supervised learning model, where data is classified according to labels and data need not to be continuous. (True / False)

Q3: Answer any 5 out of the given 6 questions

(1x5=5 marks)

[1] Select the correct features of Smart Bot :

- a) Smart-bots are flexible and powerful
- b) Coding is required to take this up on board
- c) Smartbots work on bigger database and other resources directly
- d) All of the above

[2] Email filters, spam filters, and smart assistants are the examples of:

- a) Pocket Assistants b) CV
- c) NLP d) Evaluation

[3] For _____ the whole corpus is divided into sentences. Each sentence is taken as a different data so now the whole corpus gets reduced to sentences.

- a) Text Regulation b) Sentence Segmentation
- c) Tokenization d) Stemming

[4] _____ helps to find the best model that represents our data and how well the chosen model will work in future.

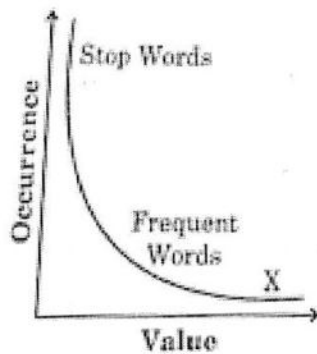
[5] While evaluating a model's performance, recall parameter considers

- i) False positive ii) True positive
- iii) False negative iv) True negative

Choose the correct option: 1

- a) only (i) b) (ii) and (iii)
- c) (iii) and (iv) d) (i) and (iv)

[6] With reference to NLP, consider the following plot of occurrence of words versus



their value :

In the given graph, X represents:

- a) Rare / valuable words b) Punctuation words
- c) Popular words d) Pronoun

4: Answer any 5 out of the given 6 questions

(1x5=5 marks)

[1] Under _____, One looks at various parameters which affect the problem we wish to solve, as this would make many lives better.

[2] Two conditions when prediction matches with the reality are true positive and ____

[5] Which of the following is a feature of document classification?

- a) Helps in classifying the type and genre of a document,
- b) Helps in creating a document,
- c) Helps to display important information of a corpus.
- d) Helps in including the necessary words in the text body.

[6] In this learning model, the data set which is fed to the machine is labelled. Name the model.

Q5: Answer any 5 out of the given 6 questions (1x5=5 marks)

[1] 4Ws Problem Canvas is a part of :

- a) Problem Scoping b) Data Acquisition
- c) Modelling d) Evaluation

[2] When the prediction matches the reality, the condition is termed as _____

[3] Smart Assistants such as Alexa, and Siri are examples of :

- a) Natural Language Processing b) Data Science
- c) Machine Learning d) Computer Vision

[4] _____ is a term used for any word or number or special character occurring in a sentence. (Token / Punctuator)

[5] It refers to the unsupervised learning algorithm which can cluster the unknown data according to the patterns or trends identified out of it.

- a) Regression b) Classification
- c) Clustering d) Dimensionality reduction

[6] Which of the following talks about how true the predictions are by any model? a) Accuracy b) Reliability

- c) Recall d) F1 Score

Section [B] Subjective Type Questions

Answer any 3 out of the given 5 questions

(2x3=6 marks)

Q6: Give any two key roles performed by an entrepreneur.

Q7: Mention any two benefits of working independently..

Q8: Face lock feature of a smartphone is an example of computer vision. Briefly discuss this

Q9: Gurmeet has just bought a new computer for his office. Suggest him any two points which he should keep in mind to prevent his computer from virus infection.

Q10: Explain any one example of AI bias.

Answer any 4 out of the given 6 questions in 20 – 30 words each (2x4=8 marks)

any model? a) Accuracy b) Reliability
c) Recall d) F1 Score

Q15: Define Confusion Matrix feature.

Q16: With reference to data processing, expand the term TFIDF. Also give any two applications of TFIDF.

Answer any 3 out of the given 5 questions in 50– 80 words each (4x3=12 marks)

Q17: What is the significance of the AI project cycle? Also, explain in detail about how Data Acquisition is different from data exploration.

Q18: Ms. Rao is a beginner in the field of Artificial Intelligence. She got confused among the core terms like Artificial Intelligence (AI), Machine Learning (ML), and Deep Learning (DL). Many times, these terms are used interchangeably but are they the same? Justify your answer. Help her in understanding these terms by drawing a well-labeled diagram to depict the interconnection between these three fields.

Q19: Will it be valid to say that not all the devices which are termed as smart are AI-enabled? Justify this statement. Explain any two examples from daily life which are commonly misunderstood as AI.

Q20: Recently the country was shaken up by a series of earthquakes which has done a huge damage to the people as well as the infrastructure. To address this issue, an AI model has been created which can predict if there is a chance of earthquake or not. The confusion matrix for the same is :

Confusion Matrix		Reality	
		Yes	No
Predicted	Yes	50	05
	No	25	20

- (i) How many total cases are True Negative in the above scenario?
(ii) Calculate precision, recall and F1 score.

Q21: Create a document vector table from the following documents by implementing all the four steps of Bag of words model. Also depict the outcome of each step.

Document 1: Sameera and Sanya are classmates.

Document 2: Sameera likes dancing but Sanya loves to study mathematics.

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ARTIFICIAL INTELLIGENCE (SUBJECT CODE- 417)

SAMPLE QUESTION PAPER CLASS X (SESSION 2024-2025)

Max. Time: 2 Hours

Max. Marks: 50

PART A - EMPLOY ABILITY SKILLS (10 MARKS):

UNIT NO.	NAME OF THE UNIT	OBJECTIVE TYPE QUESTIONS	SHORT ANSWER TYPE QUESTIONS	TOTAL QUESTIONS
		1 MARK EACH	2 MARK EACH	
1	Communication Skills-II	1	1	2
2	Self-Management Skills-II	2	1	3
3	ICT Skills-II	1	1	2
4	Entrepreneurial Skills-II	1	1	2
5	Green Skills-II	1	1	2
TOTAL QUESTIONS		6	5	11
NO. OF QUESTIONS TO BE ANSWERED		Any 4	Any 3	07
TOTAL MARKS		1x4=4	2x3=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 MARK EACH	4 MARK EACH	
1	Introduction to AI	5	1	1	7
2	AI Project Cycle	3	1	2	6
3	Advance Python	-	-	-	-
4	Data Sciences	3	1	-	4
5	Computer Vision	3	1	-	4
6	Natural Language Processing	5	1	1	7
7	Evaluation	5	1	1	7
TOTAL QUESTIONS		24	6	5	35
NO. OF QUESTIONS TO BE ANSWERED		20	Any 4	Any 3	27
TOTAL MARKS		1x20=20	2x4=8	4x3=12	40 MARKS

CBSE|DEPARTMENT OF SKILLED EDUCATION

ARTIFICIAL INTELLIGENCE (SUBJECT CODE- 417)

SAMPLE QUESTION PAPER-1 (PRACTICE PAPER-1) CLASS X (SESSION 2024-2025)

Max. Time: 2 Hours

Max. Marks: 50

General Instructions:

1. Please read the instructions carefully.
2. This Question Paper consists of **21 questions** in two sections : Section A & Section B.
3. Section A has Objective type questions whereas Section B contains Subjective type questions.
4. **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.**
5. All questions of a particular section must be attempted in the correct order.
6. **SECTION A- OBJECTIVE TYPE QUESTIONS(24 MARKS):**
 - i. This section has 05 questions.
 - ii. Marks allotted are mentioned against each question/part.
 - iii. There is no negative marking.
 - iv. Do as per the instructions given.
7. **SECTION B-SUBJECTIVE TYPE QUESTIONS(26 MARKS):**
 - i. This section has 16 questions.
 - ii. A candidate has to do 10 questions.
 - iii. Do as per the instructions given.
 - iv. Marks allotted are mentioned against each question/part.

SECTION A:OBJECTIVE TYPE QUESTIONS

Q.1	Answer any 4 out of the given 6 questions on Employability Skills(1 x4=4 marks)	
i.	Stress Management is vital because it leads to the following benefits. (a) Improves mood (b) Boosts Immune System (c) Promotes longevity (d) All of the above	1
ii.	Right clicking on the file or folder opens (a) Main menu (b) Shortcut menu (c) Back menu (d) Front menu	1
iii.	Which of the following is an inner urge to do something, achieve their goals without any external pressure/lure for award or appreciation? (a) Self-awareness (b) Self-motivation (c) Self-regulation (d) Self-control	1
iv.	Which of the following is not a task of an entrepreneur? (a) Sharing of wealth (b) Preferably using foreign materials (c) Fulfilling customer needs (d) Helping society	1
v.	You cannot park your car anywhere this building for security reasons. (a) from (b) around (c) like (d) for	1
vi.	Ecosystem consists of (a) plants (b) animals (c) humans (d) all of these	1

Q.2	Answer any 5 out of the given 6 questions (1x5= 5 marks)	
i.	<p>A person's ability to quantify things, analyze problems logically and solve them is known as.....</p> <p>(a) Interpersonal intelligence (b) Intrapersonal intelligence (c) Logical-Mathematical intelligence (d) Interpersonal intelligence</p>	1
ii.	<p>The basis of decision making depends upon</p> <p>(a) Availability of information (b) Past experience (c) Positive attitude (d) Self-awareness</p>	1
iii.	<p>During Data Acquisition, feeding previous data into the machine is called</p> <p>(a) Training Data (b) Predicting Data (c) Testing Data (d) Evaluation data</p>	1
iv.	<p>..... are modelled on human brain, it is essentially a machine learning algorithm useful for solving problems when dataset is large.</p> <p>(a) Computer vision (b) Data Science (c) Natural language processing (d) Neural network</p>	1
v.	<p>_____ is a simple file format that stores data separated by commas.</p> <p>(a) jpg (b) doc (c) csv (d) png</p>	1
vi.	<p>A corpus contains 4 documents in which the word 'diet' was appearing once in document 1. Identify the term in which we can categorise the word 'diet'.</p> <p>(a) Stopword (b) Rareword (c) Frequentword (d) Removableword</p>	1

Q.3	Answer any 5 out of the given 6 questions (1x5= 5 marks)	
i.	Unscramble the letters and find the correct answer DATA+.....= AI MACHINE (a) SMEGSEA (b) IMLHOMRGAT (c) RROER (d) TSMCMCOE	1
ii.	In which of the following, the machine is trained with huge amounts of data which helps in training itself around the data? (a) Deep Learning (b) Machine Learning (c) AI (d) NLP	1
iii.	What does CSV stand for? (a) Comma Separated Values (b) Common selected values (c) Common Significant Values (d) Comma Selection Values	1
iv.	Which of the following is commonly used in applications such as image retrieval and automated vehicle parking systems? (a) Instance segmentation (b) Object detection (c) Classification (d) Localization	1
v. is to be removed to avoid noise in a sentence. (a) Stemming (b) Lemmatization (c) Stopwords (d) All of the above	1
vi.	Which of the following is not an example of evaluation method? (a) Precision (b) Accuracy (c) Prediction (d) Recall	1
Q.4	Answer any 5 out of the given 6 questions (1x5= 5 marks)	
i.	Email filters, spam filters, smart assistants are the examples of: (a) Pocket assistants (b) CV (c) NLP (d) Evaluation	1

ii.	Which of the following is true for Accuracy? (a) It is defined as the percentage of correct predictions out of all the observations. (b) It is defined as the percentage of true positive cases versus all the cases where the prediction is true. (c) It can be defined as the fraction of positive cases that are correctly defined. (d) None of the above	1
iii.	Which among the following feature Facebook uses to suggest you people to tag, When you upload a picture? (a) Data Science (b) NLP (c) Image Recognition (d) Supervised Modelling	1
iv.	Which among the following images around us are made up of 3 primary colors Red, Green and Blue? (a) Moving (b) Static (c) Monochrome (d) Colored	1
v.	Which of the following refers to the meaning of the word in a sentence which helps in interpreting the proper message of the complete of the complete structure of words? (a) Syntax (b) Smantics (c) Analogy (d) Language	1
vi.	F1 Score is 1 when: (a) Recall and precision is 100% (b) Recall is 100% (c) Precision (d) Recall and precision is 0	1

Q.5	Answer any 5 out of the given 6 questions(1x5= 5 marks)	
i.	Price comparison websites are related to which domain of AI? (a) Artificial Intelligence Computer Vision (b) Machine Learning (c) Deep Learning (d) Data Science	1
ii.	Which of the following is true when the value of precision is low? (a) True positive is high (b) False positive is low (c) False positive is high (d) None of the above	1

iii.	In which of the following images, the shades range starts with 0 and ends with 255? (a) Gray scale images (b) RGB images (c) Black and white images (d) High resolution images	1
iv.	For the whole corpus is divided into sentences. Each sentence is taken as a different data so now the whole corpus to sentences. (a) Text Regulation (b) Sentence Segmentation (c) Tokenisation (d) Stemming	1
v.	Select the correct feature of Smart Bot: (a) Smart bot are flexible and powerful (b) Coding is required to take this on board (c) Smart-bot work on bigger database and other resources directly (d) All of the above	1
vi.	Prediction and Reality can be easily mapped together with the help of : (a) prediction (b) reality (c) accuracy (d) confusion matrix	1

SECTION B:SUBJECTIVE TYPE QUESTIONS

Answer any 3 out of the given 5 questions on Employability Skills (2x3=6 marks) Answer each question in 20 – 30 words.

Q.6	You have recently attended a Cyber Safety Workshop in your school. You are excited to share the information with your mother. How would you describe the event?	2
Q.7	Sometimes stress can be useful. Explain.	2
Q.8	What is Mobile operating system? Give any two examples.	2
Q.9	Write short note on women entrepreneurship.	2
Q.10	List some ways in which we can use resources sensibly.	2

Answer any 4 out of the given 6 questions in 20 –30 words each(2x4 =8 marks)

Q.11	Explain any one example of AI bias.	2
Q.12	What are sustainable development goals?	2
Q.13	What are the important points to remember when data is collected.	2

Q.14	Explain the term resolution with an example.	2
Q.15	Difference between script bot and smart bot.	2
Q.16	Explain in short important terminologies of Confusion Matrix.	2

Answer any 3 out of the given 5 questions in 50–80 words each (4x3=12 marks)

Q.17	Ms. Sooji is a beginner in the field of Artificial Intelligence. She got confused among the core terms like Artificial Intelligence (AI), Machine Learning and Deep Learning(DL). Many times, these terms are used interchangeably but they are the same? Justify your answer. Help her in understanding these terms by drawing a well-labelled diagram to depict the interconnection between these fields.	4													
Q.18	Explain him the following: (a) 4W Problem Canvas (b) Problem Statement Template	4													
Q.19	Explain the difference between supervised learning model and unsupervised learning model.	4													
Q.20	Consider the text of following documents: Document1:Sahil likes to play cricket. Document2 : Sajal likes cricket too. Document 3 : Sajal also like to play basketball. Apply all the four steps of Bag or words to NLP on the above given documents and generate the output.	4													
Q.21	Recently the country was shaken up by a series of earthquakes which ahs done a huge damage to the people as well as the infrastructure. To address this issue, an AI model has been created which can predict if there is achance of earthquake or not. The confusion matrix for the same is: <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>50</td> <td>05</td> </tr> <tr> <th>No</th> <td>25</td> <td>20</td> </tr> </tbody> </table> <p>(i) How many total cases are True Negative in the above scenario (ii) Calculate precision, recall and F1Score.</p>	Confusion Matrix		Reality		Yes	No	Predicted	Yes	50	05	No	25	20	4
Confusion Matrix				Reality											
		Yes	No												
Predicted	Yes	50	05												
	No	25	20												

DELHI PUBLIC SCHOOL, BHILAI

SAMPLE PAPER -2024-25

SUBJECT – ARTIFICIAL INTELLIGENCE (Code :417)

Max. Time: 2 Hours

Max. Marks: 50

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 - i. This section has 05 questions.
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7. SECTION B – SUBJECTIVE TYPE QUESTIONS (26 MARKS):
 - i. This section has 16 questions.
 - ii. A candidate has to do 10 questions.
 - iii. Do as per the instructions given.
 - iv. Marks allotted are mentioned against each question/part.

SECTION A: OBJECTIVE TYPE

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

- i. 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
- ii. 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

iii. Assertion(A): A doctor works for a renowned hospital.

Reason(R): The statement given above is an example of wage employment.

- (a) Both A and R are correct and R is the correct explanation of A
- (b) Both A and R are correct but R is NOT the correct explanation of A
- (c) A is correct but R is not correct
- (d) A is not correct but R is correct

iv. 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

v. Taniya travelled to Sweden from India to pursue her higher education. But she doesn't

know how to speak Swedish (language of Sweden). Because of this, she was unable to find a part time job. This is an example of

- (a) Interpersonal barrier
- (b) Physical barrier
- (c) Organisational barrier
- (d) Linguistic barrier

vi. Efforts are made to increase the solar power generation so that our electricity needs are met and at the same time we do not pollute the environment or use up natural resources".

Which SDG can you relate this statement to?

- (a) Life on land
- (b) Clean water and sanitation
- (c) Affordable and clean energy
- (d) Reduced inequalities

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

i. Assertion (A)– One can be a good singer while the other can be a great athlete.

Reason(R) – Humans possess different types of intelligences but at different levels.

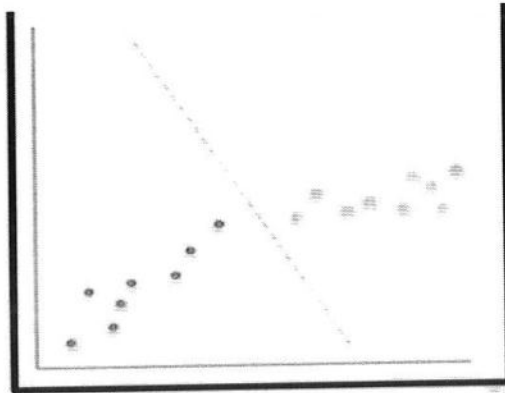
- (a) Both A and R are correct and R is the correct explanation of A
- (b) Both A and R are correct but R is not the correct explanation of A
- (c) A is correct but R is not correct
- (d) A is not correct but R is correct.

ii. 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)

iii. Observe the given graph and fill in the blank:



The graphical representation above shows _____ model of AI.

- a) Classification
- b) Regression
- c) Clustering
- d) Prediction

iv. The Indian Government banned a few apps stating – “servers in the hostile nation are

receiving and using the acquired data improperly”.

Which terminology suits best for this action?

- (a) AI Ethics
- (b) Data Privacy
- (c) AI Bias
- (d) AI Access

v. Platforms like Netflix, Amazon, Spotify, YouTube etc. show us recommendations on the

basis of what we like. State True/False.

vi. A corpus contains 4 documents in which the word 'diet' was appearing once in document1. Identify the term in which we can categorise the word 'diet'.

- (a) Stop word
- (b) Rare word
- (c) Frequent word
- (d) Removable word

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

i. Which of the following is an application of data science?

- (a) Object Detection
- (b) Target Advertisements
- (c) Face lock in smartphones
- (d) Email filters

ii. _____ 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.

iii. Rajni 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.

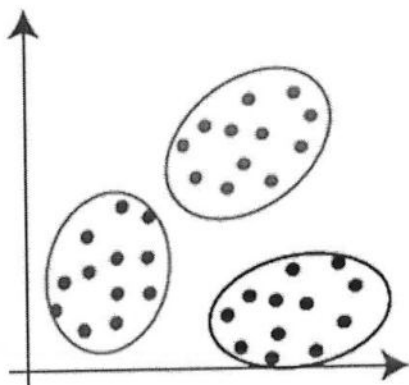
- (a) Output layer
- (b) Hidden layer
- (c) Input layer
- (d) Data layer

iv. 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

v.



Identify the algorithm based on the given graph

- (a) Dimensionality reduction
- (b) Classification
- (c) Clustering
- (d) Regression

vi. is the process of finding instances of real-world objects in images or videos.

- (a) Instance segmentation
- (b) Object detection
- (c) Classification
- (d) Image segmentation

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

i. 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

ii. Read the examples given below-

- i. Using Chat GPT to write an email
- ii. Face unlock technology of mobile phones using camera
- iii. Turning off lights with IoT device
- iv. Hand sanitizer dispenser having sensor

Choose the options that are not AI

- (a) i and ii
- (b) iii and i
- (c) iii and iv
- (d) i, iii and iv

iii. Statement1 : The output given by the AI model is known as reality.

Statement2 : The real scenario is known as Prediction.

- (a) Both Statement1 and Statement2 are correct
- (b) Both Statement1 and Statement2 are incorrect
- (c) Statement1 is correct but Statement2 is incorrect
- (d) Statement2 is correct but Statement1 is incorrect

iv. F1 Score is the measure of the balance between

- (a) Accuracy and Precision
- (b) Precision and Recall
- (c) Recall and Accuracy
- (d) Recall and Reality

v. _____ 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.

vi. F1 Score is the measure of the balance between

- (a) Accuracy and Precision
- (b) Precision and Recall
- (c) Recall and Accuracy
- (d) Recall and Reality

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

- i. Rajat has made a model which predicts the performance of Indian Cricket players in upcoming matches. He collected the data of players' performance with respect to stadium, bowlers, opponent team and health. His model works with good accuracy and precision value. Which of the statement given below is incorrect?
- (a) Data gathered with respect to stadium, bowlers, opponent team and health is known as Testing Data.
 - (b) Data given to an AI model to check accuracy and precision is Testing Data.
 - (c) Training data and testing data are acquired in the Data Acquisition stage.
 - (d) Training data is always larger as compared to testing data.
- ii. Which algorithms result in two things, a vocabulary of words and frequency of the words in the corpus?
- (a) Sentence segmentation
 - (b) Tokenisation
 - (c) Bag of words
 - (d) Text normalisation
- iii. Ranjana, a student of AI developed a chatbot that clarifies the doubts of Economics students. He trained the software with lots of data sets catering to all difficulty levels. If any student would type or ask questions related to Economics, the software would give an instant reply. Identify the domain of AI in the given scenario.
- (a) Computer Vision
 - (b) Data Science
 - (c) Natural Language Processing
 - (d) None of these
- iv. Which one of the following scenario result in a high false positive cost?
- (a) viral outbreak
 - (b) forest fire
 - (c) flood
 - (d) spam filter
- v. _____ means a picture element which is the smallest unit of information that makes up a picture.
- (a) Vision
 - (b) Pics
 - (c) Pixel
 - (d) Piskel
- vi. A _____ is divided into multiple layers and each layer is further divided into several blocks called nodes.
- (a) Neural Networks
 - (b) Convolutional Neural Network (CNN)

(c) Machine learning algorithm

(d) Hidden Layers

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. What is SDG? Mention any two challenges which are faced for SDG.

Q7. Enlist any four precautionary measures to protect your data in the computer.

Q8. Mention two external barriers in Effective Communication?

Q9. What is Feedback? How does it help in business to grow?

Q10. Mention any two human activities that lead to environmental degradation.

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

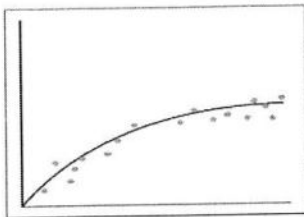
Q11. What are the possible reasons for an AI model not being efficient? Explain.

Q12. Draw the confusion matrix for the following data

- the number of true positive = 100
- the number of true negative = 47
- the number of false positive = 62
- the number of false negative = 290

Q13. Sailaja and Nisha want to make a model which will organize the unlabelled input data into groups based on features. Which learning model should they use and why?

Q14. Identify the following figure which demonstrate one type of Supervised Learning Model of AI. Identify the model and explain it with suitable example.



Q15. Differentiate between Smart-bot and Script-bot.

Q16. Suman 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.

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

Q17. 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.

Q18. Create a 4W Project Canvas for the following.

As more and more new technologies get into play, risks will get more concentrated into a common network. Cybersecurity becomes extremely complicated in such scenarios and goes beyond the control of firewalls. It will not be able to detect unusual activity and patterns including the movement of data.

Think how AI algorithms can scrape through vast amounts of logs to identify susceptible user behaviour. Use an AI project cycle to clearly identify the scope, how you will collect data, model and evaluation parameters.

Q19. Explain how AI can play a role in sentiment analysis of human beings? Explain with suitable examples.

Q20. Through a step-by-step process, calculate TFIDF for the given corpus and mention

the word(s) having highest value.

Document 1: We are going to Mumbai

Document 2: Mumbai is a famous place.

Document 3: We are going to a famous place.

Document 4: I am famous in Mumbai.

Q21. An Automated Food Production industry developed an AI model which predicts the selling and purchasing of food items. During testing, the AI model came up with the following predictions.

Confusion Matrix

Confusion Matrix		Reality	
		Yes	No
Predicted	Yes	60	25
	No	05	10

(i) How many total predictions have been found True in the above scenario?

(ii) Calculate precision, recall and F1 Score.

DELHI PUBLIC SCHOOL, BHIALI
SAMPLE PAPER TEST FOR BOARD EXAM 2023 (ANSWERS)

SUBJECT: ARTIFICIAL INTELLIGENCE (417)
CLASS : X

MAX. MARKS : 50
DURATION : 2 HRS

General Instruction:

1. Please read the instructions carefully.
2. This Question Paper consists of 21 questions in two sections: Section A & Section B.
3. Section A has Objective type questions whereas Section B contains Subjective type questions.
4. 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.
5. All questions of a particular section must be attempted in the correct order.
6. **SECTION A - OBJECTIVE TYPE QUESTIONS (24 MARKS):**
 - i. This section has 05 questions.
 - ii. Marks allotted are mentioned against each question/part.
 - iii. There is no negative marking.
 - iv. Do as per the instructions given.
7. **SECTION B – SUBJECTIVE TYPE QUESTIONS (26 MARKS):**
 - i. This section has 16 questions.
 - ii. A candidate has to do 10 questions.
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 - iv. Marks allotted are mentioned against each question/part.

SECTION – A (OBJECTIVE TYPE QUESTIONS)

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

(i) _____ is not the quality of self-confident people.

- a. Dependent
- b. Hard Working
- c. Positive Attitude
- d. Commitment

Ans: a.

Dependent

(ii) From the following statements, which one is not the positive impact of Entrepreneurship on society:

- a. Stimulates Innovation and Efficiency
- b. Creates Jobs and Employment Opportunities
- c. Solves the problems of the society
- d. Discourages welfare of the society

Ans: d. Discourages welfare of the society

(iii) _____ operating system enables multiple users to work on the same computer at different times or simultaneously.

- a. multiprogramming.
- b. multiprocessors.
- c. multi-user.
- d. multi-tasking.

Ans: c. multi-user

(iv) _____ is a series of postures and breathing exercises practiced to achieve control of body and mind.

- a. Meditation
 - b. Nature Walk
 - c. Yoga
 - d. Physical
- Exercise Ans: c.
Yoga

(v) To remove the files of temporary folder, we type _____ in Run dialog box after pressing "Windows button + R" on the keyboard.

- a. #temp#
- b. %temp%
- c. e \$temp%
- d. &temp&

Ans: b. %temp%

(vi) From the following statements, which one is not correct about the Qualities of an entrepreneur

- a. Successful entrepreneurs adapt the habit of hard work from a very early stage.
- b. Entrepreneur should not think optimistically about the future of the business.
- c. Confident entrepreneur must not deviate from his/her decisions too early in case success is delayed.
- d. Entrepreneurs like to function at their own will and rules.

Ans: b. Entrepreneur should not think optimistically about the future of the business

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

(i) _____ is defined as the ability to perceive the visual world and the relationship of one object with other.

- a. Mathematical Logical Reasoning
- b. Musical Intelligence
- c. Spatial Visual Intelligence
- d. Linguistic Intelligence

Ans. c. Spatial Visual Intelligence

(ii) _____ comprises the crucial part of intelligence.

- a. Understanding
- b. Decision Making
- c. Self Awareness
- d. Recognition

Ans. b. Decision Making

(iii) Platforms like Netflix, Amazon, Spotify, YouTube etc. show us recommendations on the basis of what we like. This become possible because of __

- a. Artificial Intelligence
- b. Machine Intelligence
- c. Platform Intelligence
- d. Application Intelligence

Ans. a. Artificial Intelligence

(iv) Which of the following is an AI enabled?

- a. A machine that gets trained first on the training data and then optimizes itself according to its own experiences
- b. A machine which can automate our surroundings with the help of sensors.
- c. A machine which is not trained with any data.

d. None of the above

Ans. a. A machine that gets trained first on the training data and then optimizes itself according to its own experiences

(v) "AI is not a well-defined technology and no universally agreed definition exists."

This definition of AI is given by _____

a. NITI Aayog

b. World Economic Forum

c. European Artificial Intelligence

d. Encyclopedia Britannica

Ans. b. World Economic Forum

(vi) _____ is part of Artificial Intelligence.

a. Machine Learning

b. Deep Learning

c. Both of the above

d. None of the above

Ans. c. Both of the above

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

(i) "What" block helps to gather evidence from _____ to prove that the problem you have selected actually exists.

a. Media

b. Announcements

c. Newspaper & Articles

d. All of the above

Ans: d. All of the above

(ii) Sometimes, you use the internet and try to acquire data for your project from some random websites. Such data might not be authentic as its accuracy cannot be proved. Due to this, it becomes necessary to find a _____.

a. Reliable source

b. Random source

c. Unauthorize source

d. All of the above

Ans: a. Reliable source

(iii) One of the most reliable and authentic sources of information where we can download the authentic data for our project are _____.

a. Private websites

b. Government websites

c. Personal websites

d. None of the above

Ans: b. Government websites

(iv) An _____ model works on an unlabeled dataset.

a. Unsupervised learning

b. Supervised learning

c. Reinforcement Learning

d. All of the above

Ans: a. Unsupervised learning

(v) We humans are able to visualize up to 3-Dimensions only but according to a lot of theories and algorithms, there are various entities which exist beyond 3-Dimensions.

- a. Clustering
- b. Dimensionality Reduction
- c. Both a) and b)
- d. None of the above

Ans: b. Dimensionality Reduction

(vi) Efficiency of the model is calculated on the basis of which parameters.

- a. F1 Score >> Recall >> Precision >> Accuracy
- b. Accuracy >> Precision >> Recall >> F1 Score
- c. Precision >> Accuracy >> F1 Score >> Recall
- d. Recall >> Precision >> Accuracy >> F1 Score

Ans: b. Accuracy >> Precision >> Recall >> F1 Score

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

(i) _____ makes sure that lemma is a word with meaning and hence it takes a longer time to execute than stemming.

- a. Stopwords
- b. Stemming
- c. Lemmatization
- d. Token

normalization Ans: c.

Lemmatization

(ii) One of the applications of Natural Language Processing is relevant when used to provide an overview of a news item or blog post, while avoiding redundancy from multiple sources and maximizing the diversity of content obtained. Identify the application from the following

- a. Sentiment Analysis
- b. Virtual Assistants
- c. Text classification
- d. Automatic Summarization

Ans: d. Automatic Summarization

(iii) _____ is all about how machines try to understand and interpret human language and operate accordingly.

- a. Natural Language Processing
- b. Data Science
- c. Computer Vision
- d. None of the above

Ans: a. Natural Language Processing

(iv) Cognitive Behavioural Therapy includes _____

- a. understanding the behaviour of a person in their normal life.
- b. understanding the emotions of a person in their normal life.
- c. understanding the mindset of a person in their normal life
- d. All of the above

Ans: d. All of the above

(v) The following line refers to _____

$2/3$ (Python 2.7) \neq $2/3$ (Python 3)

- a. Different syntax, same semantics
- b. Same syntax, Different semantics

- c. Different syntax, Different semantics
 - d. None of the above
- Ans: b. Same syntax, Different semantics

(vi) _____ is a Natural Language Processing model. In this we get the occurrences of each word and construct the vocabulary for the corpus.

- a. Bag of Words
- b. Bag of Alphabets
- c. Bag of Characters
- d. Bag of Numbers

Ans: a. Bag of Words

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

(i) _____ can be defined as the measure of balance between precision and recall.

Ans: F1 Score

(ii) The result of comparison between the prediction and reality can be recorded in what we call the _____.

- a. Overfitting
- b. Problem Scoping
- c. Confusion Matrix
- d. Data acquisition

Ans: c. Confusion Matrix

(iii) _____ is the process of understanding the reliability of any AI model, based on outputs by feeding test dataset into the model and comparing with actual answers.

- a. Evaluation
- b. Problem Scoping
- c. Data acquisition
- d. Data Exploration

Ans: a. Evaluation

(iv) _____ is defined as the percentage of correct predictions out of all the observations.

- a. Overfitting
- b. Accuracy
- c. Confusion Matrix
- d. Data acquisition

Ans: b. Accuracy

(v) _____ is defined as the percentage of true positive cases versus all the cases where the prediction is true.

Ans: Precision

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.

6. What are the advantages of the ability to Work Independently? Ans: The advantages of the ability to Work Independently:
- i. Ensures greater learning.
 - ii. Individuals feel more empowered and responsible.
 - iii. It provides flexibility to choose and define working hours and working mechanisms.

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

7. Name the Stress causal agents.

Ans: The Stress causal agents are:

1.MENTAL, 2.PHYSICAL, 3.SOCIAL, 4.FINANCIAL.

8. What do you mean by Disk Defragmentation?

Ans: A disk defragmentation removes all unnecessary information that slows down the computer. It should be done at regular intervals which helps the disc space to be used at an optimal level.

9. Explain any two Myths about Entrepreneurship. Ans: Myths about Entrepreneurship are:

1. The misconception is that every business idea needs to be unique or special.

Each entrepreneur saw customer demand and brought a new idea into their business. A person can take an idea that is already there in the market and do something different with it.

2. The misconception we have is that a person needs a lot of money to start a business.

Every business does not need a lot of capital to start. Depending on how much money you have or can borrow, you can start a business with that much money. Once you make more money, you can put that into your business to make it bigger.

3. A misconception we have is that only a person having a big business is an entrepreneur. No business is big or small. If a person is running a business to fulfill a customer's need, they are an entrepreneur. Most businesses start small. It becomes big with hard work and creativity.

4. A misconception we have is that entrepreneurs are born, not made.

Only some people have the talent for doing business. An entrepreneur is a person who does whatever it takes to make the business successful.

Being an entrepreneur starts with a way of thinking. You must believe that anything is possible and it shall be achieved. It starts with thinking of an idea that you want to work on, making it different.

(Any two out of four Myths can be explained)

10. Write any four roles of Entrepreneurs.

Ans: Any four roles of Entrepreneurs are:

i. Coordinating role

ii. Agent's role

iii. Innovator's Role

iv. Risk assumption role

v. Imitating role

vi. Capital formation role:

vii. Employment Generation role

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

11. How does a machine become Artificially Intelligent?

Ans: A machine becomes intelligent by training with data and algorithm. AI machines keep updating their knowledge to optimize their output.

12. Explain how AI works in the following areas (any two):

a. Google Search Engine b. Voice Assistants c. E-commerce websites

Ans:

a. Google Search Engine:

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

b. Voice assistant:

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

c. E-commerce website:

With the use of big data, AI in E-Commerce is impacting customer choices by recording the data of previous purchases, searched products, and online browsing habits. Product recommendations provide multiple benefits for E-commerce retailers including: Higher number of returning customers.

13. Explain any two SDGs in detail.

Ans: 1. No Poverty: This is Goal 1 and strives to End poverty in all its forms everywhere globally by 2030. The goal has a total of seven targets to be achieved.

2. Quality Education: This is Goal 4 which aspires to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. It has 10 targets to achieve.

* (Any two goals can be defined)

14. Differentiate between a script-bot and a smart-bot. (Any 2 differences) Ans:

Script-bot	Smart-bot
<ul style="list-style-type: none">• A scripted chatbot doesn't carry even a glimpse of A.I• Script bots are easy to make• Script bot functioning is very limited as they are less powerful.• Script bots work around a script which is programmed in them• No or little language processing skills• Limited functionality	<ul style="list-style-type: none">• Smart bots are built on NLP and ML.• Smart –bots are comparatively difficult to make.• Smart-bots are flexible and powerful.• Smart bots work on bigger databases and other resources directly• NLP and Machine learning skills are required.• Wide functionality

15. What is TFIDF? Write its formula.

Ans: Term frequency–inverse document frequency, is a numerical statistic that is intended to reflect how important a word is to a document in a collection or corpus.

The number of times a word appears in a document divided by the total number of words in the document. Every document has its own term frequency.

$$tf_{i,j} = \frac{n_{i,j}}{\sum_k n_{i,j}}$$

16. What is Accuracy? Mention its formula.

Ans: Accuracy is defined as the percentage of correct predictions out of all the observations.

A prediction is said to be correct if it matches reality. Here we have two conditions in which the Prediction matches with the Reality, i.e., True Positive and True Negative.

Therefore, Formula for Accuracy is

$$\text{Accuracy} = \frac{\text{Correct prediction}}{\text{Total cases}} \times 100\%$$

$$\text{Accuracy} = \frac{(TP + TN)}{(TP + TN + FP + FN)} \times 100\%$$

Where TP = True Positives, TN = True Negatives, FP = False Positives, and FN = False Negatives.

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

17. What is Intelligence? Explain in brief any three types of intelligence that are mainly perceived by human beings?

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

As per major researches, there are mainly 9 types of Intelligence;

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

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

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

(iv) **Kinesthetic Intelligence:** Ability that is related to how a person uses his limbs in a skilled manner.

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

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

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

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

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

18. As Artificially Intelligent machines become more and more powerful, their ability to accomplish tedious tasks is becoming better. Hence, it is now that AI machines have started replacing humans in factories. While people see it in a negative way and say AI has the power to bring mass unemployment and one day, machines would enslave humans, on the other hand, other people say that machines are meant to ease our lives. If machines overtake monotonous and tedious tasks, humans should upgrade their skills to remain their masters always.

What according to you is a better approach towards this ethical concern? Justify your answer. Ans: • AI taking over laborious jobs won't create unemployment. It is just a groundless fear. The standard view of technical change is that some jobs are displaced by the substitution of machines for labour, but that the fear of total displacement is misplaced because new jobs are created, largely due to the technology-fuelled increase in productivity. Humans have always shifted away from work suitable for machines and to other jobs.

• The basic fact is that technology eliminates jobs, not work. If this level of AI revolution will happen, lots of job opportunities will be created. For example: 20-30 years ago, being an accountant was a lucrative job, AI took over this job but this created a lot of opportunities, it raised the demand of a software engineer, data scientist, etc.

• It will open doors to skillful jobs rather than doing laborious tasks.

• Thus, we will be able to cope with the level of major unemployment, if AI took over laborious jobs.

19. Draw the 4Ws problem canvas and explain each one of them briefly.

Ans: The 4Ws problem canvas is the basic template while scoping a problem and using this canvas, the picture becomes clearer while we are working to solve it.

a) **Who:** The “Who” block helps you in analyzing the people getting affected directly or indirectly due to it? Under this, you find out who the ‘stakeholders’ to this problem are and what you know about them. Stakeholders are the people who face this problem and would be benefitted with the solution.

b) **What:** Under the “What” block, you need to look into what you have on hand. At this stage, you need to determine the nature of the problem. What is the problem and how do you know that it is a problem?

c) **Where:** In this block, you need to focus on the context/situation/location of the problem. It will help you look into the situation in which the problem arises, the context of it, and the locations where it is prominent.

d) **Why:** in the “Why” canvas, think about the benefits which the stakeholders would get from the solution and how would it benefit them as well as the society.

20. What are the steps of text Normalization? Explain them in brief.

Ans: Text Normalization in Text Normalization, we undergo several steps to normalize the text to a lower level.

Sentence Segmentation - Under sentence segmentation, the whole corpus is divided into sentences. Each sentence is taken as a different data so now the whole corpus gets reduced to sentences.

Tokenisation- After segmenting the sentences, each sentence is then further divided into tokens. Tokens is a term used for any word or number or special character occurring in a sentence.

Under tokenisation, every word, number and special character is considered separately and each of them is now a separate token.

Removing Stop words, Special Characters and Numbers - In this step, the tokens which are not necessary are removed from the token list.

Converting text to a common case -After the stop words removal, we convert the whole text into a similar case, preferably lower case. This ensures that the case-sensitivity of the machine does not consider same words as different just because of different cases.

Stemming In this step, the remaining words are reduced to their root words. In other words, stemming is the process in which the affixes of words are removed and the words are converted to their base form.

Lemmatization -in lemmatization, the word we get after affix removal (also known as lemma) is a meaningful one.

With this we have normalized our text to tokens which are the simplest form of words present in the corpus. Now it is time to convert the tokens into numbers. For this, we would use the Bag of Words algorithm

21. Calculate Accuracy, Precision, Recall and F1 Score for the following Confusion Matrix on Heart Attack Risk. Also suggest which metric would not be a good evaluation parameter here and why?

The Confusion Matrix	Reality: 1	Reality: 0
Prediction: 1	50	20
Prediction: 0	10	20

The Confusion Matrix	Reality: 1	Reality: 0	
Prediction: 1	50	20	70

Prediction: 0	10	20	30
	60	40	100

Ans: Calculation:

Accuracy:

Accuracy is defined as the percentage of correct predictions out of all the observations

$$\text{Accuracy} = \frac{\text{Correct prediction}}{\text{Total cases}} * 100\%$$

$$\text{Accuracy} = \frac{(TP + TN)}{(TP + TN + FP + FN)} * 100\%$$

Where True Positive (TP), True Negative (TN), False Positive (FP) and False Negative (FN).

$$\text{Accuracy} = (50+20) / (50+20+20+10)$$

$$= (70/100)$$

$$= 0.7$$

Precision:

Precision is defined as the percentage of true positive cases versus all the cases where the prediction is true.

$$\text{Precision} = \frac{\text{True Positive}}{\text{All Predicted Positives}} * 100\%$$

$$\text{Precision} = \frac{TP}{TP + FP} * 100\%$$

$$= (50 / (50 + 20))$$

$$= (50/70)$$

$$= \mathbf{0.714}$$

Recall: It is defined as the fraction of positive cases that are correctly identified.

$$\text{Recall} = \frac{\text{True Positive}}{\text{True Positive} + \text{False Negative}}$$

$$\text{Recall} = \frac{TP}{TP + FN}$$

$$= 50 / (50 + 10)$$

$$= 50 / 60$$

$$= \mathbf{0.833}$$

F1 Score:

F1 score is defined as the measure of balance between precision and recall.

$$\text{F1 Score} = 2 * \frac{\text{Precision} * \text{Recall}}{\text{Precision} + \text{Recall}}$$

$$= 2 * (0.714 * 0.833) / (0.714 + 0.833)$$

$$= 2 * (0.595 / 1.547)$$

$$= 2 * (0.38462)$$

$$= 0.769$$

Therefore,

Accuracy= 0.7, Precision=0.714,

Recall=0.833 F1 Score = 0.769

Here within the test there is a tradeoff. But Recall is not a good Evaluation metric. Recall

metric needs to improve more.

Because,

False Positive (impacts Precision): A person is predicted as high risk but does not have heart attack.

False Negative (impacts Recall): A person is predicted as low risk but has heart attack.

Therefore, False Negatives miss actual heart patients, hence recall metric need more improvement.

False Negatives are more dangerous than False Positives.



DELHI PUBLIC SCHOOL, BHILAI
SAMPLE PAPER TEST FOR BOARD EXAM 2024 (ANSWERS)

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CLASS : X

MAX. MARKS : 50
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 - ii. A candidate has to do 10 questions.
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 - iv. Marks allotted are mentioned against each question/part.

SECTION – A (OBJECTIVE TYPE QUESTIONS)

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

(i) Rahul gets feedback on his project work from his class teacher. Which of these options demonstrates positive attitude in this situation?

- (a) Rahul ignores the feedback.
- (b) Rahul takes the feedback but does not use it.
- (c) Rahul tells others that the teacher is wrong.
- (d) Rahul learns from the feedback and makes his project work better.

Answer: (d) Rahul learns from the feedback and makes his project work better.

(ii) If you are aware of your own values, likes, dislikes, strengths, and shortcomings as an individual. It denotes the fact that you are _____.

- (a) Self-Confident
- (b) Self-Control
- (c) Self Motivated
- (d) Self-Aware

Ans: (d) Self-Aware

(iii) 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

Ans: (c) It can overheat

(iv) What is the shortcut key to rename a file or folder in windows?

- (a) Ctrl + R
 - (b) F2
 - (c) Alt + R
 - (d) Ctrl + F2
- Answer: (b) F2

(v) Susheela decides to sell her company tyres in Sri Lanka. It does not sell and she has a loss. She apologises to the people who work for her. She says she will plan better next time. She _____.

- (a) takes responsibility for your mistakes
 - (b) thinks before making a decision
 - (c) does not give up
 - (d) is creative
- Ans: (a) takes responsibility for your mistakes

(vi) Ravi's customer comes to his store and starts shouting at him. He does not get angry. He listens to what his customer is saying. He is _____.

- (a) Hardworking
 - (b) Confident
 - (c) Patient
 - (d) Trying new ideas
- Answer : (c) Patient

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

(i) _____ is the sub-field of AI that is focused on enabling computers to understand and process human languages.

- a) Deep Learning
- b) Machine Learning
- c) NLP
- d) Data Sciences

Ans: c) NLP

(ii) In _____, the machine is trained with huge amounts of data which helps it in training itself around the data.

- a) Supervised Learning
- b) Deep Learning
- c) Classification
- d) Unsupervised Learning

Ans: b) Deep Learning

(iii) The _____ canvas helps you in identifying the key elements related to the problem.

- a) Problem scoping
- b) 4Ws Problem
- c) Project cycle
- d) Algorithm

Ans: b) 4Ws Problem

(iv) _____ is a domain of AI that depicts the capability of a machine to get and analyse visual information and afterwards predict some decisions about it.

- a) NLP
- b) Data Sciences
- c) Augmented Reality
- d) Computer Vision

Ans: d) Computer Vision

(v) _____ is defined as the percentage of correct predictions out of all the observations.

- a) Predictions
- b) Accuracy
- c) Reality
- d) F1 Score

Ans: b) Accuracy

(vi) A _____ is divided into multiple layers and each layer is further divided into several blocks called nodes.

- a) Neural Networks
- b) Convolutional Neural Network (CNN)
- c) Machine learning algorithm
- d) Hidden Layers

Ans: a) Neural Network

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

(i) Recall-Evaluation method is

- a) defined as the fraction of positive cases that are correctly identified.
- b) defined as the percentage of true positive cases versus all the cases where the prediction is true.
- c) defined as the percentage of correct predictions out of all the observations.
- d) comparison between the prediction and reality

Ans: a) defined as the fraction of positive cases that are correctly identified.

(ii) Give 2 examples of Supervised Learning models.

- a) Classification and Regression
- b) Clustering and Dimensionality Reduction
- c) Rule Based and Learning Based
- d) Classification and Clustering

Ans: a) Classification and Regression

(iii) Name any 2 methods of collecting data.

- a) Surveys and Interviews
- b) Rumors and Myths
- c) AI models and applications
- d) Imagination and thoughts

Ans: a) Surveys and Interviews

(Any two of the following)

Surveys, Observing the therapist's sessions, Databases available on the internet, Interviews, etc.

(iv) What is the role of modelling in an NLP based AI model?

- a) Modelling in NLP helps in processing of AI model
- b) Modelling is required to make an AI model
- c) In NLP, modelling requires data pre-processing only after which the data is fed to the machine.
- d) Modelling is used in simplification of data acquisition

Ans: c) In NLP, modelling requires data pre-processing only after which the data is fed to the machine.

(v) What will be the outcome, if the Prediction is "Yes" and it matches with the Reality? What will be the outcome, if the Prediction is "Yes" and it does not match the Reality?

- a) True Positive, True Negative
- b) True Negative, False Negative
- c) True Negative, False Positive

d) True Positive, False Positive
Ans: d) True Positive, False Positive

(vi) Expand CBT _____
a) Computer Behaved Training
b) Cognitive Behavioural Therapy
c) Consolidated Batch of trainers
d) Combined Basic Training
Ans: b) Cognitive Behavioural Therapy

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

(i) Give one example of an application which uses augmented reality.
Ans: Self Driving Cars

(ii) 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.
Ans: c) Helps in understanding the reliability of any AI model

(iii) Which of the following is not part of the AI Project Cycle?
a) Data Exploration
b) Modelling
c) Testing
d) Problem Scoping
Ans: (c) Testing

(iv) Define Machine Learning.
a) Machine learning is the study of computer algorithms that improve automatically through experience.
b) Refers to any technique that enables computers to mimic human intelligence.
c) Machine learning refers to computer systems (both machines and software) enables machines to perform tasks for which it is programmed.
d) Machine Learning refers to projects that allow the machine to work on a particular logic.
Ans: a) Machine learning is the study of computer algorithms that improve automatically through experience.

(v) Differentiate between Prediction and Reality.
a) Prediction is the input given to the machine to receive the expected result of the reality.
b) Prediction is the output given to match the reality.
c) The prediction is the output which is given by the machine and the reality is the real scenario in which the prediction has been made.
d) Prediction and reality both can be used interchangeably.
Ans: c) The prediction is the output which is given by the machine and the reality is the real scenario in which the prediction has been made.

(vi) The term Sentence Segmentation is
a) the whole corpus is divided into sentences
b) to undergo several steps to normalise the text to a lower level
c) in which each sentence is then further divided into tokens
d) the process in which the affixes of words are removed
Ans: a) the whole corpus is divided into sentences.

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

(i) In _____, input to machines can be photographs, videos and pictures from thermal or infrared sensors, indicators and different sources.

- (a) Computer Vision
- (b) Data Acquisition
- (c) Data Collection
- (d) Machine learning

Ans: (a) Computer Vision

(ii) Prediction and Reality can be easily mapped together with the help of :

- (a) Prediction
- (b) Reality
- (c) Accuracy
- (d) Confusion Matrix

Ans: (d) Confusion Matrix

(iii) _____ refers to the AI modelling where the machine learns by itself.

- (a) Learning Based
- (b) Rule Based
- (c) Machine Learning
- (d) Data Sciences

Ans: (a) Learning Based

(iv) In _____, the machine is trained with huge amounts of data which helps it in training itself around the data.

- (a) Machine Learning
- (b) Artificial Intelligence
- (c) NLP
- (d) Deep Learning

Ans: (d) Deep Learning

(v) _____ is an example of Applications of Natural Language Processing.

- (a) Evaluation
- (b) Automatic Summarization
- (c) Deep Learning
- (d) Problem Scoping

Ans: (b) Automatic Summarization

(vi) _____ is the last stage of the AI project Life cycle.

- (a) Problem Scoping
- (b) Evaluation
- (c) Modelling
- (d) Data Acquisition

Ans: (b) Evaluation

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.

6. Differentiate between Interests and Abilities.

Ans.

Interests	Abilities
Things that you like to do in your free time that make you happy.	An acquired or natural capacity

Things you are curious to do even if no one asked you to do it.

Enable you to perform a particular task with proficiency

7. 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.

Ans: The four steps of effective time management which Sameera must have followed are:

- (i) Organise
- (ii) Prioritise
- (iii) Control
- (iv) Track

8. Write few tips to protect your data from online theft and viruses.

Ans. Few tips to protect our data from online theft and viruses are:

- a. Use passwords to login to your computer:
- b. Install Anti-virus and Firewall:
- c. Use Data Encryption
- d. Give details of your credit card or bank account only on secure sites

9. Ramya and Ramu both own plant shops. Ramu sits at his shop every day. When customers come, he sells to them. Ramya walks around and gets customers to her shop. She also sells seeds and flowers with her plants. Who is Entrepreneur out of Ramya and Ramu and why?

Ans: Ramya is entrepreneur as she is working to grow her business. She has also added a different idea to her business.

10. How does entrepreneurs and entrepreneurship contributes to society?

Ans: Entrepreneurs and entrepreneurship contributes to society are

- (i) Entrepreneurship Creates Jobs,
- (ii) Entrepreneurship helps raise the standard of living,
- (iii) Successful entrepreneurs as Role models generate more entrepreneurship
- (iv) Community / Society Development

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

11. Why training with information/Data is important in Artificial Intelligent devices?

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

OR

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

12. 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.

Ans: In the given scenario, we are concerned about the bias. When we talk about a machine, we know that it is artificial and cannot think on its own. It can have intelligence, but we cannot expect a machine to have any biases of its own. Any bias can transfer from the developer to the machine while the algorithm is being developed.

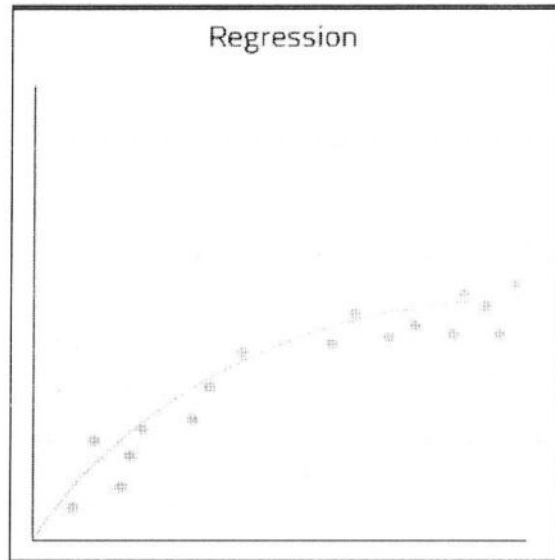
13. Draw the graphical representation of Regression AI model. Explain in brief.

Ans: Regression: These models work on continuous data to predict the output based on patterns. For example, if you wish to predict your next salary, then you would put in the data of your

previous salary, any increments, etc., and would train the model. Here, the data which has been fed to the machine is continuous.

OR

Regression is the process of finding a model for distinguishing the data into continuous real values instead of using discrete values. It can also identify the distribution movement depending on the historical data.



14. Give an example of the following:

- Multiple meanings of a word
- Perfect syntax, no meaning

Ans: Example of Multiple meanings of a word –

His face turns red after consuming the medicine

Meaning - Is he having an allergic reaction? Or is he not able to bear the taste of that medicine?

Example of Perfect syntax, no meaning-

Chickens feed extravagantly while the moon drinks tea.

This statement is correct grammatically but it does not make any sense. In Human language, a perfect balance of syntax and semantics is important for better understanding.

15. What do we get from the “bag of words” algorithm?

Ans: Bag of words gives us two things:

1. A vocabulary of words for the corpus
2. The frequency of these words (number of times it has occurred in the whole corpus)

16. 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.

Ans: Let us take each of the factor into consideration at once,

If precision is considered, FN cases will not be taken into account, so it will be of great loss as if the machine will predict there will be no heavy rain, but if the rain occurred, it will be a big monetary loss due to damage to crops.

If only recall is considered, then FP cases will not be taken into account. This situation will also cause a big amount of loss, as all people of the village are dependent on farmers for food, and if the model predicts there will be heavy rain and the farmers may not grow crops, it will affect the basic needs of the people.

Hence F1 Score is the best suited parameter to test this AI model, which is the balance between Precision and Recall.

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

What was the colour of the left-side hutch? Justify your answer with explanation.

Ans: The answer is yellow.

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

18. Aditya 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 i.e., make decisions, predict the future, learn and improve on its own.

With respect to the type of data fed in the AI model, AI models can be broadly categorised into three domains:

1. Data sciences
2. Computer vision
3. 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.

19. Categorize the following under Data Sciences, Machine Learning, Computer Vision and NLP. The latest technological advancements have made our lives convenient. **Google Home, Alexa** and **Siri** have been a huge help to non-tech savvy people. Features like **Facial** recognition and **Facelock** have added additional security to our gadgets. These advancements have also contributed in making our needs more approachable and convenient. Now you can even check the prices with **Price comparison websites** and order groceries online with **chatbots**. Did you know that you can even find how you are going to look when you grow old? **Faceapps** and **Snapchat filters** have made this possible!

Ans:

- Alexa, Siri-NLP, Facial Recognition - Computer Vision
- Facelock - Computer Vision
- Price comparison websites - Data Sciences
- Chatbots - NLP
- Faceapps -NLP
- Snapchat Filters - Machine Learning

20. Create a 4W Project Canvas for the following.

As more and more new technologies get into play, risks will get more concentrated into a common network. Cybersecurity becomes extremely complicated in such scenarios and goes beyond the control of firewalls. It will not be able to detect unusual activity and patterns including the movement of data.

Think how AI algorithms can scrape through vast amounts of logs to identify susceptible user behaviour. Use an AI project cycle to clearly identify the scope, how you will collect data, model and evaluation parameters.

Ans:

OUR	[stakeholders] People who are using the new technology	WHO
HAS/ HAVE PROBLEM THAT	[issue, problem, need] Cyber security is the need when so much of the flow of data is not monitored or escapes the antiviruses/ firewall systems.	WHAT
WHEN/ WHILE	[context/situation] The problem is in the use of the latest technology where vast amounts of data is at risk.	WHERE
AN IDEAL SOLUTION WOULD	[benefit of solution to them] An effective AI system which is able to detect the flow of data and also report unusual activity	WHY

21. Calculate Accuracy, Precision, Recall and F1 Score for the following Confusion Matrix on Water Shortage in Schools: Also suggest which metric would not be a good evaluation parameter here and why?

The Confusion Matrix (Water Shortage in School)	Reality: 1	Reality: 0
Prediction: 1	75	5
Prediction: 0	5	15

	Reality: 1	Reality: 0	
Prediction: 1	75	5	80
Prediction: 0	5	15	20
	80	20	100

Ans:

Calculation:

Accuracy

Accuracy is defined as the percentage of correct predictions out of all the observations

$$Accuracy = \frac{\text{Correct prediction}}{\text{Total cases}} * 100\%$$

$$Accuracy = \frac{(TP + TN)}{(TP + TN + FP + FN)} * 100\%$$

Where True Positive (TP), True Negative (TN), False Positive (FP) and False Negative (FN).

$$= (75+15) / (75+15+5+5)$$

$$= (90 / 100)$$

$$= 0.9$$

Precision:

Precision is defined as the percentage of true positive cases versus all the cases where the prediction is true.

$$Precision = \frac{\text{True Positive}}{\text{All Predicted Positives}} * 100\%$$

$$Precision = \frac{TP}{TP + FP} * 100\%$$

$$= 75 / (75+5)$$

$$= 75 / 80$$

$$= 0.9375$$

Recall:

It is defined as the fraction of positive cases that are correctly identified.

$$\text{Recall} = \frac{\text{True Positive}}{\text{True Positive} + \text{False Negative}}$$

$$\text{Recall} = \frac{TP}{TP + FN}$$

$$= 75 / (75+5)$$

$$= 75 / 80$$

$$= 0.9375$$

F1 Score:

F1 score is defined as the measure of balance between precision and recall.

$$\text{F1 Score} = 2 * \frac{\text{Precision} * \text{Recall}}{\text{Precision} + \text{Recall}}$$
$$= 2 * ((0.9375 * 0.9375) / (0.9375 + 0.9375))$$

Therefore,

$$= 2 * (0.8789 / 1.875)$$

$$= 2 * 0.46875$$

$$= 0.9375$$

Accuracy= 0.9% Precision=0.9375% Recall=0.9375%

F1 Score=0.

Here precision, recall, accuracy, F1 score all are same

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