SAMPLE QUESTION PAPER
CLASS X
ARTIFICIAL INTELLIGENCE (CODE 417)

Time: 2 Hours **Maximum 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):**
   (a) This section has 5 questions.
   (b) Marks allotted are mentioned against each question/part.
   (c) There is no negative marking.
   (d) Do as per the instructions given.
7. **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

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

(i) "M D Gulati started with a small shop. With his focus, dedication and clear ideas, MDH became one of the most popular brands in India besides, having a good reputation all over the world."

Which self-management skill is clearly visible in the given statement? (1)

Ans. Self-Motivation

(ii) When you bring the mouse over a file in File Explorer, it will show the details of that file. This is known as—

(a) Drag and drop (b) Double click
(c) Hover (d) Single click (1)

Ans. (c) Hover

(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 (1)

Ans. (a) Both A and R are correct and R is the correct explanation of A

(iv) _____ the work is all about identifying and noting how we spent our time and analyzing how to spend our time effectively.

(a) Organizing (b) Prioritizing
(c) Controlling (d) Tracking (1)

Ans. (d) Tracking

(v) Remya travelled to Sweden from India to pursue her higher education. But she does not 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) Organizational barrier (d) Linguistic barrier (1)

Ans. (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 (1)

Ans. (c) Affordable and clean energy

2. Answer any 5 out of the given 6 questions **(1 × 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 intelligence 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 (1)

Ans. (a) Both A and R are correct and R is the correct explanation of A

(ii) 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 (1)

Ans. (b) Data Privacy

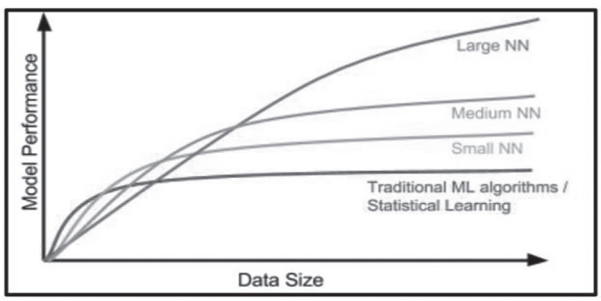
(iii) **Statement 1:** There are four layers in a neural network.

Statement 2: The first layer of the neural network is known as the output layer.

(a) Both Statement 1 and Statement 2 are correct
(b) Both Statement 1 and Statement 2 are incorrect
(c) Statement 1 is correct but Statement 2 is incorrect
(d) Statement 2 is correct but Statement 1 is incorrect (1)

Ans. (a) Both Statement 1 and Statement 2 are correct

(iv) Observe the given graph and fill in the blank:



_____ the neural network, better is the performance. (1)

Ans. Larger

(v) _____ is a simple file format that stores data separated by commas.

(a) .jpg
(b) .doc
(c) .csv
(d) .png (1)

Ans. (c) .csv

(vi) A corpus contains 4 documents in which the word 'diet' was appearing once in document 1. Identify the term in which we can categorize the word 'diet'.

(a) Stop word
(b) Rare word
(c) Frequent word
(d) Removable word (1)

Ans. (b) Rare word

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

(i) Read the examples given below—

(i) Using ChatGPT 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) (i) and (iii)

(c) (iii) and (iv) (d) (i), (iii) and (iv) (1)

Ans. (c) (iii) and (iv)

(ii) _____ refer to the type of features that we want to collect. (1)

Ans. Data Features/Data

(iii) Which of the following is an application of data science?

(a) Text Summarization (b) Target Advertisements

(c) Face Lock in Smartphones (d) Email Filters (1)

Ans. (b) Target Advertisements

(iv) _____ 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 (1)

Ans. (b) Object Detection

(v) Identify the given Chatbot type:

It learns from its environment and experience. It also builds on its capabilities based on the knowledge. These can collaborate with humans, working along-side them and learning from their behaviour. (1)

Ans. Smart Bot

(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 (1)

Ans. (b) Precision and Recall

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

(i) Srishti had learnt about AI terminologies but was not able to recollect the term that is used to refer to machines that perform tasks with vast amounts of data using neural networks. Help her with the correct term. (1)

Ans. Deep Learning

(ii) **Statement 1:** The output given by the AI model is known as reality.

Statement 2: The real scenario is known as Prediction.

(a) Both Statement 1 and Statement 2 are correct

(b) Both Statement 1 and Statement 2 are incorrect

(c) Statement 1 is correct but Statement 2 is incorrect

(d) Statement 2 is correct but Statement 1 is incorrect (1)

Ans. (b) Both Statement 1 and Statement 2 are incorrect

(iii) Rajat has made a model which predicts the performance of the Indian cricket players in the 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. (1)

Ans. (a) Data gathered with respect to stadium, bowlers, opponent team and health is known as Testing Data.

(iv) How many channels does a color image have? (1)

Ans. Three Channels

(v) Which feature of NLP helps in understanding the emotions of the people mentioned with the feedback?

(a) Virtual Assistants (b) Sentiment Analysis
(c) Text Classification (d) Automatic Summarization (1)

Ans. (b) Sentiment Analysis

(vi) Sarthak made a face mask detector system for which he had collected the dataset and used all the dataset to train the model. Then, he used the same data to evaluate the model which resulted in the correct answer all the time but was not able to perform with unknown dataset.

Name the concept. (1)

Ans. Overfitting

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

(i) Aditi, a student of class XII, developed a chatbot that clarifies the doubts of Economics students. She trained the software with lots of datasets 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 (1)

Ans. (c) Natural Language Processing

(ii) Which evaluation parameter takes into consideration all the correct predictions? (1)

Ans. Accuracy

(iii) _____ means a picture element which is the smallest unit of information that makes up a picture.

(a) Vision (b) Pics
(c) Pixel (d) Piskel (1)

Ans. (c) Pixel

(iv) What do you mean by syntax of a language?

(a) Meaning of a sentence (b) Grammatical structure of a sentence
(c) Semantics of a sentence (d) Synonym of a sentence (1)

Ans. (b) Grammatical structure of a sentence

(v) Which algorithms result in two things—a vocabulary of words and frequency of the words in the corpus?

(a) Sentence segmentation (b) Tokenization
(c) Bag of words (d) Text normalization (1)

Ans. (c) Bag of words

(vi) Which one of the following scenarios results in a high False Positive cost?

(a) Viral Outbreak (b) Forest Fire
(c) Flood (d) Spam Filter (1)

Ans. (d) Spam Filter

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. List two best practices for effective communication. (2)

Ans.
1. Use simple language
2. Be respectful to others' opinions
3. Do not form assumptions on culture, religion or geography
4. Try to communicate in person as much as possible
5. Use visuals
6. Take help of a translator to overcome differences in language

(2 marks for any two correct points from the above)

7. What is the importance of setting goals in life? (2)

Ans.
1. The process of goal-setting in your life helps you decide on how to live your life, where you want to be and how you want to be in the future.
2. It helps you focus on the end result instead of less important work.
3. This will make you successful in your career and personal life.

(2 marks for any one valid justification given above or any relevant answer)

8. "The Trojan Horse was a wooden horse said to have been used by the Greeks during the Trojan War to enter the city of Troy and win the war."

What does Trojan horse mean in computer terminology? (2)

Ans. A Trojan Horse is a type of malware which disguises itself *i.e.*, it appears to be a useful software program, but once it reaches a computer, it starts behaving like a virus and destroys data.

(1 mark for acting like useful program and 1 mark for the words destroying/corrupting/deleting data)

or

(only ½ mark will be allotted if only malware/harmful program/virus/ term is mentioned)

9. How is society helping entrepreneurs in their business? (2)

Ans. Society is helping entrepreneurs by

1. Creating needs
2. Providing raw material
3. Buying/selling of items
4. Making money

(2 marks for any two valid points)

10. Mention any two human activities that lead to environmental degradation. (2)

Ans.
1. Use of fertilizers, pesticides, etc., for increasing the production of crops.
2. Cutting down of forests for personal use such as construction of buildings, factories etc.

(1 mark for each valid point or any two relevant answers other than the above)

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

11. All of us use smartphones. When we install a new app, it asks us for several permissions to access our phone's data in different ways. Why do apps collect such data? (2)

Ans.
1. To provide customized notifications and recommendations.
2. To improve the efficiency and accuracy of the app.

(2 marks for any one correct point with explanation)

12. Sirisha and Divisha 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? (2)

Ans. Clustering model/Unsupervised learning is used to organize the unlabelled input data into groups based on features.

Clustering is an unsupervised learning algorithm which can cluster unknown data according to the patterns or trends identified out of it. The patterns observed might be the ones which are known to the developer or it might even come up with some unique patterns out of it.

(1 mark for identifying the name of the algorithm and 1 mark for explanation)

13. Ajay wants to access data from various sources. Suggest him any two points that he needs to keep in mind while accessing data from any data source. (2)

Ans. While accessing data from any of the data sources, the following points should be kept in mind:

1. Data which is available for public usage only should be taken up.
2. Personal datasets should only be used with the consent of the owner.
3. One should never breach someone's privacy to collect data.
4. Data should only be taken from reliable sources as the data collected from random sources can be wrong or unusable.
5. Reliable sources of data ensure the authenticity of data which helps in the proper training of the AI model.
6. Data should be relevant to the problem.

(Any two; 1 mark for each valid point)

14. Explain the term Resolution with an example. (2)

Ans. Resolution of an image refers to the number of pixels in an image across the width and height.

For example, a monitor resolution of 1280 × 1024. This means there are 1280 pixels from one side to the other and 1024 from top to bottom.

(1 mark for explanation; 1 mark for example)

15. Identify any two stop words which should not be removed from the given sentence and why?

Get help and support whether you're shopping now or need help with a past purchase.

Contact us at *abc@pwershel.com* or on our website *www.pwershel.com* (2)

Ans. Stopwords in the given sentence which should not be removed are:

@, . (fullstop) ,_(underscore) , 123(numbers)

These tokens are generally considered as stopwords, but in the above sentence, these tokens are part of an email ID. Removing these tokens may lead to invalid website address and email ID. So these words should not be removed from the above sentence.

(1 mark for identifying any two stop words from the above and 1 mark for the valid justification.)

16. 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 (2)

Ans.

Confusion Matrix		Reality	
		Yes	**No**
Prediction	**Yes**	100	62
	No	290	47

*(½ mark each for mapping the values in the correct section, ½ *4=2 marks)*

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

17. Your grandmother watches you use AI applications. She wants to understand more about it. Help her understand the term Artificial Intelligence by giving the right definition and explain to her with an example of how machines become artificially intelligent. (4)

Ans. When a machine possesses the ability to mimic human traits, *i.e.*, **make decisions, predict the future, learn and improve on its own,** it is said to have Artificial Intelligence. In other words, you can say that a machine is artificially intelligent when it can **accomplish tasks by itself—collect data, understand it, analyze it, learn from it and improve it.**

Machines become intelligent once they are **trained with some data** which helps them achieve their tasks. AI machines also keep updating their knowledge to optimize their output. For example, Netflix gives us recommendations on the basis of what we like. Whenever we start liking a new genre, it updates and gives better suggestions.

(2 marks for definition of Artificial Intelligence which includes any of the highlighted terms, 2 marks for an example explanation of how machines become intelligent)

or

(only 1 mark for any AI machine example which mimic human traits without explanation)

18. Akhil wants to learn how to scope the problem for an AI Project. Explain him the following:

(a) 4Ws Problem Canvas

(b) Problem Statement Template (4)

Ans. (a) The 4Ws Problem Canvas helps in identifying the key elements related to the problem. The 4Ws are Who, What, Where and Why

- The "Who" block helps in analyzing the people getting affected directly or indirectly due to the problem.

- The "What" block helps us to determine the nature of the problem.
- The "Where" block helps us to look into the situation in which the problem arises, the context of it and the locations where it is prominent.
- The "Why" block suggests to us the benefits which the stakeholders would get from the solution and how it will benefit them as well as the society.

(b) Problem Statement Template

Our	[stakeholders]	Who
Have a problem that	[need]	What
When/while	[context/ location/ situation]	Where
An ideal solution would be	[solution]	Why

(½ mark each for explanation of 4Ws; 2 marks for drawing the problem statement template with correct words in it or explaining the problem statement template)

or

(1 mark to be allotted if only 4Ws are written without explanation)

19. Identify and explain the types of the learning-based approaches in the figures given below. (4)

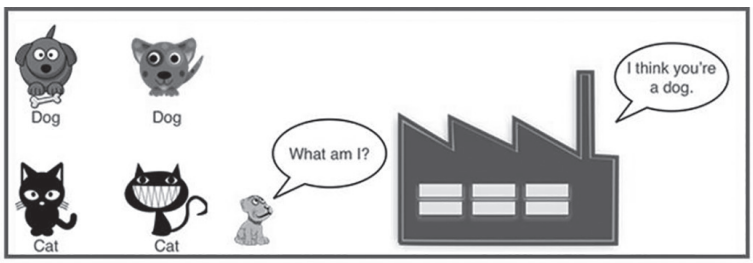


Fig. 1

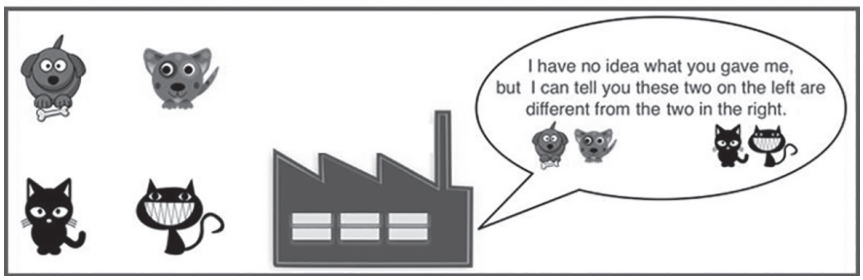


Fig. 2

Ans. The learning-based approaches shown in the given figures are Supervised learning and Unsupervised learning.

Figure 1: In a Supervised learning model, the dataset which is fed to the machine is **labelled**. In other words, we can say that the **dataset is known to the person** who is training the machine and only then he/she is able to label the data. A label is some information which can be used as a tag for data.

Here, labelled images of dogs and cats are fed into the model and trained. The model correctly identifies the given input as a dog.

Figure 2: An Unsupervised learning model works on **unlabelled dataset**. This means that the data which is fed to the machine is random and there is a possibility that the person who is training the model does not have any information regarding it. The **unsupervised learning models are used to identify relationships, patterns and trends out of the data which is fed into it.** It helps the user in understanding what the data is about and what are the major features identified by the machine in it.

Here, images of a set of animals are fed into the AI model and the model clusters them based on similar features.

(1 mark each for identifying each term—supervised learning and Unsupervised learning; 1 mark per explanation of each term)

20. We, human beings, can read, write and understand many languages. But computers can understand only machine language. Do you think we might face challenges if we try to teach computers how to understand and interact in human languages? Explain. (4)

Ans. Yes, we might face challenges if we try to teach computers how to understand and interact in human languages. The possible difficulties are:

1. Arrangement of the words and meaning—the computer has to identify the different parts of a speech. Also, it may be extremely difficult for a computer to understand the meaning behind the language we use.
2. Multiple meanings of a word, the same word can be used in a number of different ways, which according to the context of the statement changes its meaning completely.
3. Perfect syntax, no meaning, sometimes a statement can have a perfectly correct syntax but it does not mean anything. For example, take a look at this statement:

   Chickens feed extravagantly while the moon drinks tea.

   This statement is grammatically correct but does this make any sense? In a human language, a perfect balance of syntax and semantics is important for better understanding.

   (1 mark for Yes and 1 mark each for the points on possible difficulties)

21. An AI model made the following sales prediction for a new mobile phone which they have recently launched:

Confusion Matrix		**Reality**	
		Yes	**No**
Prediction	**Yes**	50	40
	No	12	10

(a) Identify the total number of wrong predictions made by the model.

(b) Calculate Precision, Recall and F1 Score. (4)

Ans. (a) The total number of wrong predictions made by the model is the sum of False Positive and False Negative.
FP + FN = 40 + 12 = 52

(b) Precision = TP/(TP + FP)

= 50/(50 + 40)

50/90

= 0.55

Recall = TP/(TP + FN)

= 50/(50 + 12)

= 50/62

= .81

F1 Score = 2*Precision*Recall/(Precision+Recall)

= 2*0.55*.81/(.55 + .81)

= .891/1.36

= 0.65

(1 marks for part (i) and ½ mark for each formula and ½ mark each for substitution of values in part(ii))

Please note: the mathematical calculations can be ignored