SAMPLE QUESTION PAPER (SOLVED)-I
CLASS IX (SESSION 2024-2025)

Max. Time Allowed: 2 Hours **Maximum Marks: 50**

A. Fill in the Blanks

1. _____ is intangible so it varies from person to person.

Ans. Intelligence

2. Problem solving also involves _____, where one finds the best solution to a given problem among the various alternatives available.

Ans. decision making

3. Artificial Intelligence is made up of two words Artificial and Intelligence, where Artificial means _____, and _____ means "ability to understand and think".

Ans. "man-made", Intelligence

4. Speech recognition aims to understand and grasp _____ was spoken.

Ans. what

5. Allen Newell and Herbert A. Simon created the "first artificial intelligence program" which was named _____.

Ans. Logic Theorist

6. Data _____ empowers individuals and organizations to utilize the full potential of data and minimize risks by enabling them to ask questions, collect, analyze, interpret, and communicate about data.

Ans. literacy

7. _____ can be categorized into three groups: structured, unstructured, and semi-structured.

Ans. Data

8. The _____ model stands for Data, Information, Knowledge, and Wisdom.

Ans. DIKW

9. _____ is data that has been organized, processed, and interpreted to create meaning.

Ans. Information

10. _____ data includes text, audio, and video information and requires alternative platforms for storing and managing it compared to structured data.

Ans. Unstructured

11. Linear algebra is fundamental for AI because it involves the study of _____, _____, and _____.

Ans. vectors, matrices, linear transformations

12. Descriptive statistics summarize data characteristics, while inferential statistics are used to make predictions based on _____.

Ans. data

13. _____ is the average value of a dataset calculated by adding up all values and dividing by the total number of values.

Ans. Mean

14. Probability theory deals with uncertainty and _____ in real-world data.

Ans. randomness

15. Differential calculus helps in finding the _____ for machine learning models.

Ans. optimal weights

16. The term "artificial intelligence" was first introduced in _____ during the Dartmouth Summer Research Project on Artificial Intelligence.

Ans. 1956

17. Generative AI models aim to understand and model the fundamental distribution of _____.

Ans. data

18. One of the most notable generative AI models is the _____ Adversarial Networks (GANs).

Ans. Generative

19. ChatGPT, an example of generative AI, stands for Chat Generative _____ Transformer.

Ans. Pre-trained

20. GitHub Copilot integrates with popular code editors and enhances developer _____ and learning.

Ans. productivity

21. Python is a general-purpose interpreted, interactive, object-oriented, and _____ programming language.

Ans. high-level

22. Python was created by _____ and released in 1991.

Ans. Guido Van Rossum

23. Python source code is available under the _____.

Ans. GNU General Public License (GPL)

24. Python is _____, meaning it is processed at runtime by the interpreter.

Ans. interpreted

25. Python supports _____ style or technique of programming that encapsulates code within objects.

Ans. Object-Oriented

B. Multiple Choice Questions (MCQ)

1. **What is data literacy?**
   (a) The ability to understand and interpret data
   (b) The ability to write code for data analysis
   (c) The ability to collect data efficiently
   (d) The ability to communicate with computers

Ans. (a) The ability to understand and interpret data

2. **Which of the following is an example of unstructured data?**
   (a) Excel spreadsheet (b) Relational database
   (c) PDF document (d) SQL database

Ans. (c) PDF document

3. **What is the primary purpose of the DIKW model?**
   (a) To analyze structured data (b) To organize unstructured data
   (c) To transform data into wisdom (d) To collect data efficiently

Ans. (c) To transform data into wisdom

4. **What role does data literacy play in organizations?**
   (a) It improves employee salaries
   (b) It enhances innovation and decision-making
   (c) It reduces the need for data analysis
   (d) It increases data privacy risks

Ans. (b) It enhances innovation and decision-making

5. **Which type of data includes text, audio, and video information?**
   (a) Quantitative (b) Qualitative
   (c) Discrete (d) Continuous

Ans. (b) Qualitative

6. **What is the foundation of AI, machine learning, and data science?**
   (a) Probability (b) Calculus
   (c) Linear algebra (d) Statistics

Ans. (c) Linear algebra

7. What type of calculus deals with rates of change and slopes of functions?

(a) Integral calculus (b) Multivariable calculus
(c) Differential calculus (d) None of the above

Ans. (c) Differential calculus

8. Which statistical tool is most commonly used to find the average value of a dataset?

(a) Median (b) Mode
(c) Mean (d) Standard deviation

Ans. (c) Mean

9. What does probability theory help AI systems to understand?

(a) Randomness (b) Certainty
(c) Linearity (d) Precision

Ans. (a) Randomness

10. Which branch of mathematics focuses on modeling complex relationships in AI using networks?

(a) Probability theory (b) Graph theory
(c) Calculus (d) Linear algebra

Ans. (b) Graph theory

11. When was the term "artificial intelligence" first introduced?

(a) 1945 (b) 1956
(c) 1965 (d) 1980

Ans. (b) 1956

12. What does the "G" in GANs stand for?

(a) General (b) Generative
(c) Graphic (d) Global

Ans. (b) Generative

13. ChatGPT stands for Chat Generative _____ Transformer.

(a) Pre-trained (b) Post-trained
(c) Parallel (d) Pre-test

Ans. (a) Pre-trained

14. What is GitHub Copilot primarily used for?

(a) Gaming (b) Coding
(c) Designing (d) Music

Ans. (b) Coding

15. Deepfakes are created using which type of machine learning model?

(a) Regression (b) Decision Trees
(c) Generative Adversarial Networks (d) K-means Clustering

Ans. (c) Generative Adversarial Networks

16. Who created Python?

(a) Dennis Ritchie (b) Bjarne Stroustrup
(c) Guido Van Rossum (d) James Gosling

Ans. (c) Guido Van Rossum

17. Which of the following is a feature of Python?

(a) Case-sensitive (b) Platform-dependent
(c) Compiled (d) Complex syntax

Ans. (a) Case-sensitive

18. Python's source code is available under which license?

(a) MIT License (b) GNU General Public License
(c) Apache License (d) BSD License

Ans. (b) GNU General Public License

19. Which library is used for scientific computation in Python?

(a) pandas (b) NumPy
(c) matplotlib (d) seaborn

Ans. (b) NumPy

20. What does 'nltk' stand for?

(a) Natural Language Toolkit (b) Numerical Language Toolkit
(c) New Language Toolkit (d) None of the above

Ans. (a) Natural Language Toolkit

Short Questions with Answers

1. What are the important threats to AI?

Ans.
- AI bias and discrimination.
- Threats to privacy and security.
- AI-induced unemployment.
- Autonomous weapons and AI in military applications.

2. Why AI work is more successful in the Expert Tasks domain?

Ans. AI excels in expert tasks because these tasks require processing large amounts of data and identifying patterns, which AI can do more accurately and efficiently than humans. Expert tasks also have well-defined rules and parameters that AI systems can be trained on.

3. What are mundane tasks?

Ans. Mundane tasks are ordinary tasks that humans perform daily, such as perception, natural language processing, and basic motor activities.

4. What is the Turing test? How do you perform a Turing test?

Ans. The Turing test is a method of inquiry to determine whether a computer can exhibit intelligent behavior equivalent to, or indistinguishable from, that of a human. It is performed by having a human evaluator interact with a machine and a human through a computer interface. If the evaluator cannot reliably tell the machine from the human, the machine is considered to have passed the test.

5. What is the difference between Reactive and Limited Memory Machines?

Ans. **Reactive Machines:** Such machines react to current situations without using past experiences to inform present actions.

Limited Memory Machines: These machines use past experiences to inform future decisions, often seen in self-driving cars that observe and learn from the environment over time.

6. How did Deep Blue defeat Gary Kasparov in chess?

Ans. Deep Blue defeated Gary Kasparov by leveraging its immense computational power to evaluate millions of possible moves per second, employing advanced algorithms and extensive databases of chess games to make optimal moves.

7. What is Data Literacy and why is it important?

Ans. Data Literacy refers to a set of skills that are needed to understand, interpret, and communicate about data. It is important because it empowers individuals and organizations to make informed decisions based on data-driven insights.

8. What are the components of Data Literacy?

Ans. The components of Data Literacy include understanding data, data analysis, data interpretation, and data ethics.

9. How is data categorized and what are the characteristics of each category?

Ans. Data is categorized into structured data (organized in a predefined format), unstructured data (not organized in a predefined manner), and semi-structured data (has organizational properties but does not fit into a relational database).

10. How does differential calculus contribute to machine learning models?

Ans. Differential calculus deals with rates of change and slopes of functions, thus allowing us to find the optimal weights for machine learning models.

11. What role does probability theory play in AI?

Ans. Probability theory helps in understanding data by finding out the chances of any event to occur, thus modeling uncertainty and randomness in AI.

12. How is linear algebra fundamental to AI?

Ans. Linear algebra is fundamental because it involves the study of vectors, matrices, and linear transformations, which are essential for efficiently representing and manipulating data.

13. What is the difference between descriptive and inferential statistics?

Ans. Descriptive statistics summarize data characteristics, while inferential statistics are used to make predictions based on data.

14. What is Generative AI?

Ans. Generative AI refers to a subset of artificial intelligence techniques that focus on creating new data or content, such as images, text, audio, or videos, that resembles data that is produced by humans.

15. What is the primary difference between conventional AI and generative AI?

Ans. Conventional AI relies on predefined rules and logic, while generative AI learns patterns and structures from large datasets to generate new content or make decisions.

16. What are GANs and how do they work?

Ans. Generative Adversarial Networks (GANs) consist of two neural networks—a generator and a discriminator—that are trained simultaneously. The generator creates new data samples, while the discriminator evaluates their realism.

17. What is Python?

Ans. Python is a general-purpose interpreted, interactive, object-oriented, and high-level programming language.

18. Who created Python and when?

Ans. Python was created by Guido Van Rossum and released in 1991.

19. What does it mean that Python is interpreted?

Ans. It means that Python code is processed at runtime by the interpreter without the need to compile it before execution.

Long Questions and Answers

1. Explain the role of data acquisition in an AI project and how it impacts the overall success of the AI model. Provide a detailed example of how data acquisition is critical in a real-world AI application.

Ans. Data acquisition is the process of gathering and measuring information about targeted variables to establish a database for analysis. In the AI project cycle, data acquisition is crucial because the quality and quantity of the data that is collected directly impacts the performance and accuracy of the AI model. High-quality data

ensures that the AI system can learn effectively and make accurate predictions or decisions.

Example: In healthcare, an AI model was designed to predict patient readmissions which relied heavily on accurate and comprehensive patient data. This includes medical histories, treatment plans, lifestyle information, and other health records. For instance, if the data acquisition process misses critical information such as medication adherence or follow-up visit compliance, the model is said to underperform. A notable example is the use of AI in predicting diabetic complications. Comprehensive data collection from electronic health records, patient surveys, and wearable devices provided a robust dataset that enhanced the prediction accuracy of the AI model, thus leading to better patient management and care outcomes.

2. Discuss the ethical considerations involved in deploying AI systems in high-stakes domains like healthcare and criminal justice. How can these ethical challenges be mitigated?

Ans. Ethical considerations in deploying AI systems in high-stakes domains like healthcare and criminal justice include bias, transparency, accountability, and the potential for harm. AI systems inadvertently perpetuate existing biases in data, leading to unfair treatment or decisions. Transparency is necessary to understand how AI systems make decisions, but AI models are often complex and difficult to interpret. Accountability is crucial, as it must be clear who is responsible for the decisions made by AI systems. Finally, the potential for harm must be minimized, especially in areas where decisions can significantly impact lives.

Mitigation Strategies:

Bias Mitigation: Regular audits of AI systems should be done to detect and correct biases. Diverse and representative datasets should be used for training AI models.

Transparency: Developing interpretable AI models and documenting decision-making processes to ensure that they are understandable to stakeholders.

Accountability: Establishing clear guidelines on who is responsible for AI decisions and ensuring robust governance frameworks.

Harm Reduction: Implementing rigorous testing and validation of AI systems before deployment, and maintaining oversight mechanisms to continuously monitor AI performance and its impacts.

3. How can AI be used to enhance personalized learning experiences in education? Provide an example of an AI application that has been successfully implemented in this field.

Ans. AI enhances personalized learning experiences by analyzing students' learning patterns, preferences, and performance data to tailor educational content and teaching methods to individual needs. AI systems identify knowledge gaps, suggest resources, and provide real-time feedback, thereby optimizing the learning process for each student.

Example: The AI-driven platform "Knewton" uses machine learning algorithms to provide personalized learning experiences. Knewton analyzes student interactions with educational content, assesses their strengths and weaknesses, and adapts the curriculum accordingly. It recommends specific exercises and materials that will address the individual learning gaps, thereby enhancing student engagements and improving the learning outcomes.

4. Explain the steps to install Python on a Windows operating system.

Ans. To install Python on Windows:

1. Open a web browser and go to the Python download page (https://www.python.org/downloads/).
2. Download the Windows installer (python-XYZ.msi) where XYZ is the version you need.
3. Run the downloaded installer file. The Python Install Wizard will open.
4. Follow the instructions in the wizard, accept the default settings, and complete the installation.

5. Describe the process of writing and running a Python program in script mode.

Ans. To write and run a Python program in script mode:

(a) Open a text editor and write your Python code, saving the file with a .py extension.

(b) Ensure Python is set in your PATH variable.

(c) Open a terminal or command prompt.

(d) Navigate to the Directory where your script is saved.

(e) Run the script by typing python filename.py.

6. How does Python handle memory management for variables? Give examples.

Ans. Python automatically handles memory management. Variables do not require explicit declaration. For example:

```
python
a = 10
b = "Hello"
```

Here, a is an integer, and b is a string. Python automatically allocates the necessary memory.

7. Write a program in python to find maximum among 3 numbers.

Ans.

```
# Input three numbers
num1 = float(input("Enter first number: "))
num2 = float(input("Enter second number: "))
num3 = float(input("Enter third number: "))

# Determine the maximum number
if num1 >= num2 and num1 >= num3:
    max_num = num1
elif num2 >= num1 and num2 >= num3:
    max_num = num2
else:
    max_num = num3

# Print the maximum number
print("The maximum number is:", max_num)
```

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