Sample Question Paper 1 (Solved)

Artificial Intelligence

Time : 2 hrs | M.M. : 50

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

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

(i) Physical exercise is used as a stress management technique because
(a) it improves blood circulation
(b) improves self-image
(c) makes us feel better
(d) All of the above

(ii) Self-awareness refers to
(a) our knowledge and understanding of ourselves
(b) systematic efforts to direct thoughts and actions
(c) ability to identify effective methods to move from thought to action.
(d) None of the above

(iii) To find a suitable market an entrepreneur performs the functions of
(a) advertisement and publicity
(b) appointment of selling agents
(c) new organisation structure
(d) Both (a) and (b)

(iv) It provides scheduling to each process to be run on.
(a) Time sharing OS (b) Distributed OS
(c) Real-time OS (d) Single-user OS

(v) Visual communication among the people are dependent on ..... .
(a) Signs, symbols and pictures
(b) Text messages
(c) Posture
(d) Body language

(vi) Assertion (A): With increasing population and income, the consumption of goods is increasing day by day.
Reason (R): This has led to increase in production and utilisation of natural resources, which are required for producing goods.
(a) Both A and R are true and R is the correct explanation for A.
(b) Both A and R are true and R is not the correct explanation of A.
(c) A is true, but R is false.
(d) A is false, but R is true.

2. 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 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 the above

(II) Which of the following algorithms is commonly used for image classification?

(a) K-means clustering
(b) Decision trees
(c) Convolutional Neural Networks (CNN)
(d) Support Vector Machines (SVM)

(III) Matplotlib is

(a) Multi-platform
(b) A data visualization and graphical plotting library for Python and NumPy
(c) Neither (a) nor (b)
(d) Both (a) and (b)

(IV) A business problem where in we categorize whether an observation is "Safe," "AtRisk," or "Unsafe" is an example of

(a) Classification
(b) Clustering
(c) Regression
(d) Dimensionality Reduction

(V) 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.

(VI) Chatbots are AI systems which

(a) Interact with humans through text or speech
(b) Are able to offer round the clock responses and handle multiple queries simultaneously
(c) Both (a) and (b)
(d) Neither (a) nor (b)

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

(I) What do we call the process of dividing a string into component words?

(a) Regression (b) Word Tokenisation
(c) Classification (d) Clustering

(II) Which of the following is not one of the components of data science?

(a) Structuring (b) Visualization
(c) Machine learning (d) Deep learning

(III) Unscramble the letters and find the correct answer

DATA + _____ = AI MACHINE

(a) SMEGSEA (b) IMLHOMRGAT
(c) RROER (d) TSMMCOE

(IV) 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.

(V) _____ helps us to summarise all the key points into one single outline so that in future, whenever there is need to look back at the basis of the problem, we can take a look at it and understand the key elements of it.

(a) 4W Problem canvas
(b) Problem Statement Template
(c) Data Acquisition
(d) Algorithm

(VI) Which of the following is an Applications of Computer Vision?

(a) Robotics (b) Medicine
(c) Security (d) All of these

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

(I) Which of the following scenario result in a high false positive cost?

(a) Viral outbreak (b) Forest fire
(c) Flood (d) Spam filter

(II) _____ 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

(iii) What is the primary purpose of a Convolutional Neural Network (CNN)?
(a) Object detection
(b) Image classification
(c) Text generation
(d) Reinforcement learning

(iv) Which of the following function will create an area plot?
(a) area()
(b) stack()
(c) stackplot()
(d) areap()

(v) Which of the following represent a machine that is smart but not considered Artificial Intelligence (AI) enabled?
(a) A robotic vacuum cleaner that can navigate and clean floors autonomously.
(b) A chatbot that engages in natural language conversations and answers questions.
(c) A smartphone with facial recognition for unlocking the device.
(d) A digital alarm clock that rings at a set time every morning.

(vi) Sentence segment is the _____ step for building the NLP model.
(a) First (b) Second
(c) Third (d) Fourth

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

(i) _____ is the first stage of the AI project Life Cycle.
(a) Problem Scoping (b) Evaluation
(c) Modelling (d) Data Acquisition

(ii) The last stage of an AI Project Life Cycle is:
(a) Problem Scoping (b) Data Exploration
(c) Modelling (d) Evaluation

(iii) Email filters, spam filters, smart assistants are the examples of
(a) Pocket Assistants (b) CV
(c) NLP (d) Evaluation

(iv) Priya was confused with the terms used in the evaluation stage suggest her the term used for the percentage of correct predictions out of all the observations.
(a) Accuracy (b) Precision
(c) Recall (d) F1 score

(v) Which of these is not a stopwords?
(a) This (b) Things
(c) Is (d) Do

(vi) Which of these is not a data collection source?
(a) Surveys (b) Interview
(c) Questionnaire (d) Debate

Section B Subjective Type Questions

Answer any 3 out of the given 5 questions in 20 - 32 words each on Employability Skills (2 × 3 = 6 marks)

6. Why is self-regulation important in life?

7. Explain the short-term solutions related to sustainable development.

8. Which measures must be adopted to overcome the factors causing communication barriers?

9. Describe the advantages of entrepreneurship.

10. What is an operating system?

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

11. Differentiate between Classification and Regression.

12. How are NumPy arrays better than Python lists?

13. 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?

14. How Google translate uses computer vision?

15. Give an example of a situation where in false positive would have a high cost associated with it.

16. Write down the steps to implement bag of words algorithm.

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

17. What is the significance of AI project cycle? Also explain in detail about how Data Acquisition is different from Data Exploration.

18. With reference to NLP, explain the following terms in details with the help of suitable example:
(i) Term Frequency
(ii) Inverse Document Frequency

19. Give any four examples of applications of AI that we see around us.

20. Traffic Jams have become a common part of our lives nowadays. Living in an urban area means you have to face traffic each and every time you get out on the road. Mostly, school students opt for buses to go to school. Many times, the bus gets late due to such jams and the students are not able to reach their school on time. Thus, AI model is created to predict explicitly if there would be traffic jam on their way to school or not. The Confusion Matrix for the same is:

The Confusion Matrix	Actual: 1	Actual: 0
Predicted: 1	50	50
Predicted: 0	0	0

Explain the process of evaluating F1 score for the given problem.

21. What are Neural networks? Briefly explain all the layers of a neural network.

Answers

1. (i) (d) (ii) (a) (iii) (d) (iv) (a) (v) (a) (vi) (a)
2. (i) (c) (ii) (c) (iii) (d) (iv) (a) (v) (a) (vi) (c)
3. (i) (b) (ii) (d) (iii) (b) (iv) (c) (v) (b) (vi) (d)
4. (i) (d) (ii) (c) (iii) (b) (iv) (c) (v) (d) (vi) (a)
5. (i) (a) (ii) (d) (iii) (c) (iv) (a) (v) (b) (vi) (d)
6. Self-regulation is important in life due to following reasons:
   (i) Self-regulation allows you to keep a tab on your own emotions.
   (ii) Self-regulation enables to develop the idea about 'what is appropriate behaviour' and 'what is inappropriate behaviour' in a given social condition.
   (iii) It helps in controlling negative impulses and reciprocate emotions for actualising set goals.
7. The short-term solutions to sustainable development are as follows:
   (i) The practice of illegal deforestation and smuggling of forest resources should be stopped.
   (ii) Proper balance ought to be maintained between deforestation and afforestation.
   (iii) Planning and building of industrial zones to manage and process are types of wastes.
   (iv) Proper treatment system, recycling of waste and their proper disposal should be undertaken.
8. Some measures must be adopted to overcome the factors causing communication barriers and these include:
   (i) Be prepared before communicating the message to the receiver.
   (ii) The message should not be communicated fast so sufficient time must be taken to communicate the message correctly to the receiver.
   (iii) It is better to use simplified language with easily understood words and simple ideas.
   (iv) There should be mutual respect for each other by the sender and the receiver for a message to be successfully communicated.
9. The main advantages of adopting entrepreneurship are discussed below :
   - An entrepreneur is himself a boss or owner and he can take all the decisions independently.
   - Entrepreneurship can be very exciting with many entrepreneurs considering their ventures highly enjoyable. Every day will be filled with new opportunities to challenge your determination, skills and abilities.
   - The principal focus of entrepreneurship is wealth creation and improved livelihood by means of making available goods and services. Entrepreneurial ventures generates new wealth.
   - New and improved products, services or technology from entrepreneurs, enable new markets to be developed and new wealth to be created.
10. Operating system is the system software that performs all the basic tasks of a computer system. It works like an interface between the user and the computer hardware resources. An operating system is a collection of programs that controls and coordinates all the tasks and functions in a computer system. It mainly provides an

environment to run the software and serves services to the computer hardware.

11.

Classification	Regression
This model works on a discrete dataset which means the data need not be continuous.	This model works on continuous data.
For example, in the grading system, students are classified on the basis of the grades they obtain with respect to their marks in the examination.	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.

12. NumPy arrays offer several advantages over Python lists.
    - NumPy arrays are more efficient in terms of memory usage and computational performance, especially for large datasets. They are implemented in C and optimized for numerical operations, making them faster and more suitable for numerical computing tasks.
    - NumPy arrays support vectorized operations, allowing for element-wise operations and broadcasting, which can lead to concise and efficient code compared to iterating over lists.
13. The apps collect such data
    - To provide customized notifications and recommendations.
    - To improve the efficiency and accuracy of the app.
14. Google Translate employs computer vision to enable instant translation of text captured through a smartphone camera. Using optical character recognition (OCR) technology, the app recognises and extracts text from images, such as signs, menus, or documents. Then, machine translation algorithms process the extracted text to provide translations in real-time, facilitating communication across languages.
15. Let us consider a model that predicts that a mail is spam or not. If the model always predicts that the mail is spam, people would not look at it and eventually might lose important information. Here False Positive condition (Predicting the mail as spam while the mail is not spam) would have a high cost.
16. The steps to implement bag of words algorithm are as follows
    1. **Text Normalisation** Collect data and pre-process it
    2. **Create Dictionary** Make a list of all the unique words occurring in the corpus. (Vocabulary)
    3. **Create document vectors** For each document in the corpus, find out how many times the word from the unique list of words has occurred.
    4. Create document vectors for all the documents.
17. The AI (Artificial Intelligence) project cycle is a structured approach to developing and deploying AI solutions. It encompasses various stages from problem identification and data collection to model development, deployment, and monitoring. The significance of the AI project cycle lies in its ability to guide teams through a systematic process, ensuring that AI projects are well-planned, executed efficiently, and yield meaningful results.

    Data Acquisition differs from Data Exploration as

Data Acquisition	Data Exploration
Data Acquisition is the process of gathering raw data from various sources, such as databases, APIs, sensors, or external datasets.	Data Exploration is the process of analyzing and understanding the characteristics, patterns, and relationships within the collected data.
It involves identifying and accessing relevant datasets that contain information necessary for solving the problem at hand.	It involves visualizing and summarizing the data to gain insights into its structure, distribution, and potential biases.
Data Acquisition focuses on obtaining the required data in its raw form, without significant manipulation or analysis.	Data Exploration aims to uncover hidden patterns, anomalies, or interesting trends that may inform subsequent modeling decisions.
Data Acquisition ensures that the collected data is of sufficient quantity, quality, and diversity to support subsequent analysis and modeling tasks.	Data Exploration helps identify data preprocessing steps, feature engineering strategies, and suitable modeling approaches based on the observed patterns in the data.

18. (i) **Term Frequency:** Term Frequency (TF) is a measure used in natural language processing to

quantify the frequency of a term (word) in a document relative to the total number of terms in that document. It indicates how often a particular term appears within a document.

Example: Suppose we have a document containing 100 words, and the word "apple" appears 5 times in that document. The term frequency of "apple" in this document would be:

TF("apple", document) = 5/100 = 0.05

(ii) **Inverse Document Frequency:** Inverse Document Frequency (IDF) is a measure used to determine the importance of a term in a collection of documents. It quantifies how rare or common a term is across all documents in the corpus. Terms that occur frequently in many documents are considered less important, while terms that occur rarely in few documents are considered more important.

Example: Suppose we have a corpus containing 1,000 documents, and the term "apple" appears in 100 of these documents. The inverse document frequency of "apple" would be:

IDF ("apple") = log (1000/100)

= log (10) = 1

19. **Virtual Assistants** Virtual assistants like Siri, Alexa, and Google Assistant use AI to understand and respond to user queries or commands. They help with tasks such as setting reminders, answering questions, and controlling smart home devices.

Recommendation Systems AI-powered recommendation systems analyze user preferences and behavior to suggest relevant products, services, or content. Examples include Netflix recommending movies and Amazon suggesting products based on past purchases.

Autonomous Vehicles AI plays a crucial role in autonomous vehicles, enabling them to perceive their environment, make decisions, and navigate safely. Companies like Tesla and Waymo are developing self-driving cars that use AI for real-time driving tasks.

Healthcare Diagnostics AI is used in healthcare for medical image analysis, disease diagnosis, and personalized treatment recommendations. AI algorithms can analyze medical images like X-rays and MRI scans, assist radiologists in detecting abnormalities, and predict patient outcomes based on clinical data.

20. From the confusion matrix provided:

Now, let's calculate the precision, recall, and F1 score:

$$\text{Precision} = \frac{TP}{TP+FP}$$

$$= \frac{50}{50+50} = \frac{50}{100} = 0.5$$

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

$$= \frac{50}{50+0} = \frac{50}{50} = 1$$

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

$$= 2 \times \frac{0.5 \times 1}{0.5+1} = 2 \times \frac{0.5}{1.5} = 0.67$$

21. Neural networks are a type of machine learning model inspired by the structure and function of the human brain. They consist of interconnected nodes, called neurons, organized in layers.

Here's a brief explanation of the layers commonly found in a neural network:

Input Layer: This layer consists of neurons that receive the raw input data. Each neuron in the input layer represents a feature or attribute of the input data. The number of neurons in the input layer corresponds to the dimensionality of the input data.

Hidden Layers: Hidden layers are intermediary layers between the input and output layers. These layers perform transformations on the input data through a series of weighted computations and activation functions. Deep neural networks have multiple hidden layers, hence the term "deep learning."

Output Layer: The output layer produces the final predictions or outputs of the neural network. The number of neurons in the output layer depends on the nature of the task. For example, in a binary classification task, there may be a single neuron representing the probability of one class, while in a multi-class classification task, there may be multiple neurons, each corresponding to a different class.

Sample Question Paper 2 (Unsolved)

Artificial Intelligence

Time : 2 hrs | M.M. : 50

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

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

(i) Which one of the following is a symptom of stress?

(a) Increased sweating (b) Dry mouth
(c) Cold hands or feet (d) All of these

(ii) It uses pictures (called Icons) and menus displayed on the screen to send commands to the computer system.

(a) Command-based user interface
(b) GUI
(c) System Utility
(d) API

(iii) Which of the following is the process in which the receiver interprets and understands the message?

(a) Decoding (b) Encoding
(c) Feedback (d) None of these

(iv) How can entrepreneur can get the work done from his/her team?

(a) By creating a spirit of teamwork
(b) By motivation
(c) Using harsh words and actions
(d) Both (a) and (b)

(v) We have the ability to work independently, if we ..... .

(a) need regular feedback to make progress in our work
(b) work best at our own pace
(c) need a structured environment to work efficiently
(d) need to be prodded to work faster

(vi) Assertion (A): Organic farming technique is an example of a green skill that is essential for sustainable agriculture.
Reason (R) Organic farming technique prioritise environment friendly and sustainable practices such as using natural fertilisers, avoiding synthetic pesticides and promoting soil health.

(a) Both (A) and (R) are true and (R) is the correct explanation for (A).
(b) Both (A) and (R) are true and (R) is not the correct explanation of (A).
(c) (A) is true, but (R) is false.
(d) (A) is false, but (R) is true.

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

(i) 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

(ii) Big data can be

(a) Structured (b) Unstructured
(c) Semi-structured (d) All of these

(iii) Which of the following is true about neural networks?

(a) Neural Networks tend to perform better with larger amounts of data.
(b) Neural Networks tend to perform poorer with larger amounts of data.
(c) Neural Networks tend to perform better with smaller amounts of data.
(d) Neural Networks need no data

(iv) Which of the following is open source computer vision library?

(a) SimpleCV (b) OpenCV
(c) ComplexCV (d) BoofCV

(v) Which domain of AI is used for interacting with virtual assistants such as Siri and Alexa?

(a) Machine Learning (ML)
(b) Computer Vision (CV)
(c) Natural Language Processing (NLP)
(d) Technical Vision (TV)

(vi) Which of the following is used for finding the frequency of words in some given text sample?

(a) Stemming
(b) Lemmatisation
(c) Bag of words
(d) None of the above

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

(i) SQL is

(a) A domain-specific language used in programming
(b) Is incapable of handling structured data
(c) Is a simple file, which allows data to be saved in a tabular format
(d) Not a domain specific language used in programming

(ii) Name any 2 methods of collecting data.

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

(iii) Search engines not only predict what popular searches may apply to your query as you start typing, but it looks at the whole picture and recognizes what you're trying to say rather than the exact search words. This is an example of

(a) Computer Vision
(b) Data Sciences
(c) Natural Language Processing
(d) Natural Language Understanding

(iv) Machine translation feature converts _____.

(a) One language to another
(b) Human language to machine language
(c) Any human language to English
(d) Machine language to human language

(v) Which is the most common pixel format where this number is stored as an 8-bit integer giving a range of possible values from 0 to 255?

(a) Byte image (b) Resolution
(c) Pixel (d) Grayscale

(vi) In spam email detection, which of the following will be considered as "False Negative"?

(a) When a legitimate email is accurately identified as not spam.
(b) When a spam email is mistakenly identified as legitimate.
(c) When an email is accurately recognised as spam.
(d) When an email is inaccurately labelled as important.

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

(i) Which of the following comes under NLP?

(a) Chatbots
(b) Price comparison websites
(c) Facial recognition
(d) All of the above

(ii) For which of the following is data visualization is used?

(a) Data modelling (b) Data exploration
(c) Data formation (d) Data identification

(iii) _____ 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

(iv) .....is one of the parameter for evaluating a model's performance and is defined as the fraction of positive cases that are correctly identified.
(a) Precision (b) Accuracy
(c) Recall (d) F1

(v) Which layer is CNN is responsible for increasing the non-linear properties of the trained networks?
(a) ReLU (b) Input layer
(c) Pooling layer (d) Output layer

(vi) 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

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

(i) _____ is the NLTK tool in Python.
(a) Natural Linguistic Tool
(b) Natural Language Toolkit
(c) Neutral Language Kit
(d) Neutral Language Toolkit

(ii) ..... is defined as the percentage of correct predictions out of all the observations.
(a) Predictions
(b) Accuracy
(c) Reality
(d) F1 Score

(iii) Which of the following is defined as the measure of balance between precision and recall?
(a) Accuracy (b) F1 Score
(c) Reliability (d) Punctuality

(iv) _____ is a concept to unify statistics, data analysis, machine learning and their related methods in order to understand and analyze actual phenomena with data.
(a) Computer Vision
(b) Natural Language Processing
(c) Data Science
(d) Computer Science

(v) What is the lemma of the word "Making"?
(a) Mak (b) Make
(c) Making (d) Maker

(vi) Raunak was learning the conditions that make up the confusion matrix. He came across a scenario in which the machine that was supposed to predict an animal was always predicting not an animal. What is this condition called?
(a) False Positive (b) True Positive
(c) False Negative (d) True Negative

Section B Subjective Type Questions

Answer any 3 out of the given 5 questions in 20 - 32 words each on Employability Skills (2 × 3 = 6 marks)

6. What are the techniques that are used to manage stress?

7. "Entrepreneurs are born, not made." Do you agree with this statement? Justify your answer.

8. In a communication cycle, explain the term 'medium'. What problems may the medium create and how?

9. What general precautions should you take while cleaning the computer/components?

10. Why there is a need for sustainable development? Give reasons.

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

11. Define Chatbot. What are its types?

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.

13. AI can capture data for personality prediction from various sources using certain techniques. Write about any two such techniques.

14. Give an example of a situation where in false positive would have a high cost associated with it.

15. What do you mean by Evaluation of an AI model ? Also explain the concept of overfitting with respect to AI model Evaluation.

16. Name the four important layers in CNN.

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

17. Akhil wants to learn how to scope the problem for an AI Project. Explain him the following:
    (a) 4W Problem Canvas
    (b) Problem Statement Template

18. 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 the daily life which are commonly misunderstood as AI.

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

20. What are Neural networks? Briefly explain all the layers of a neural network.

21. A lot of times people face the problem of sudden downpower. People wash clothes and put them out to dry but due to unexpected rain, their work gets wasted. Thus, an AI model has been created which predicts if there will be rain or not. The confusion matrix for the same is:

The Confusion Matrix	Actual: 1	Actual: 0
Predicted: 1	0	3
Predicted: 0	3	94

Find the F1 score for the above problem.

Answers

1. (i) (d) (ii) (b) (iii) (a) (iv) (d) (v) (b) (vi) (a)
2. (i) (b) (ii) (d) (iii) (a) (iv) (b) (v) (c) (vi) (c)
3. (i) (a) (ii) (a) (iii) (c) (iv) (a) (v) (d) (vi) (d)
4. (i) (a) (ii) (b) (iii) (d) (iv) (c) (v) (a) (vi) (a)
5. (i) (b) (ii) (b) (iii) (b) (iv) (c) (v) (b) (vi) (c)

Sample Question Paper 3 (Unsolved)

Artificial Intelligence

Time : 2 hrs | M.M. : 50

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

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

(I) Stress management is vital because it leads to following benefits:
(a) Improves mood
(b) Promotes longevity
(c) Boosts immune system
(d) All of the above

(II) Which of the following is an inner urge to do something, achieve their goals without any external pressure I lure for award or appreciation?
(a) Self-awareness
(b) Self-motivation
(c) Self-regulation
(d) Self-control

(III) 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

(IV) A _____ is a software program that attaches itself to other programs and alters their behavior.
(a) Operating system
(b) Firewall
(c) Antivirus
(d) Computer Virus

(V) Identify the object, verb and subject in the sentence,
'The car crashed into a tree.'
(a) Object: a tree; Verb: crashed; Subject: the car
(b) Object: The car; Verb: crashed; Subject: a tree
(c) Object: crashed; Verb: the tree; Subject: the car
(d) Object: crashed; Verb: the car; Subject: the tree

(VI) Assertion (A) Organic farming technique is an example of a green skill that is essential for sustainable agriculture.
Reason (R) Organic farming technique prioritise environment friendly and sustainable practices such as using natural fertilisers, avoiding synthetic pesticides and promoting soil health.

(a) Both A and R are true and R is the correct explanation for A.
(b) Both A and R are true and R is not the correct explanation of A.
(c) A is true, but R is false.
(d) A is false, but R is true.

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

(I) An AI system uses two broad classes of data namely content data which includes the raw video streams title, description, etc, and user activity data that includes rating a video, liking a video, or subscribing to an uploader, and watch time. Based on this, the AI system measures a user's engagement and happiness. It then starts computing personalized recommendations to the user. Which of the following applications can you relate to this?
(a) self-driving car (b) Siri
(c) email filters (d) YouTube

(II) Which are pros of data visualization?
(a) It can be accessed quickly by a wider audience.
(b) It can misrepresent information
(c) It can be distracting
(d) None of the above

(III) 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

(IV) Name any two methods of collecting data.
(a) Surveys and Interviews
(b) Rumors and Myths
(c) AI models and applications
(d) Imagination and thoughts

(V) The last stage of an AI Project Life Cycle is
(a) Problem Scoping
(b) Data Exploration
(c) Modelling
(d) Evaluation

(VI) Which layer type is typically used to extract local features in a CNN?
(a) Convolutional layer
(b) Pooling layer
(c) Fully connected layer
(d) Activation layer

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

(I) Amazon had been working on a secret AI recruiting tool. The machine-learning specialists uncovered a big problem: their new recruiting engine did not like women. The system taught itself that male candidates were preferable. It penalized resumes that included the word "women". This led to the failure of the tool. This is an example of
(a) Data Privacy (b) AI access
(c) AI Bias (d) Data Exploration

(II) Data visualization is also an element of the broader ..... .
(a) deliver presentation architecture
(b) data presentation architecture
(c) dataset presentation architecture
(d) data process architecture

(III) What is the lemma of the word "Making"?
(a) Mak (b) Make
(c) Making (d) Maker

(IV) Prediction and Reality can be easily mapped together with the help of
(a) Prediction (b) Reality
(c) Accuracy (d) Confusion Matrix

(V) What is the purpose of the pooling layer in a CNN?
(a) To reduce the spatial dimensions of the feature maps
(b) To introduce non-linearity to the network
(c) To adjust the weights and biases of the network
(d) To compute the gradients for backpropagation

(VI) ..... is a concept to unify statistics, data analysis, machine learning and their related methods in order to understand and analyze actual phenomena with data.
(a) Computer Vision
(b) Natural Language Processing
(c) Data Science
(d) Computer Science

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

(I) Email filters, spam filters, smart assistants are the examples of
(a) Pocket Assistants
(b) CV
(c) NLP
(d) Evaluation

(ii) **Which of the following is defined as the measure of balance between precision and recall?**
(a) Accuracy
(b) F1 Score
(c) Reliability
(d) Punctuality

(iii) **.....is one of the parameter for evaluating a model's performance and is defined as the fraction of positive cases that are correctly identified.**
(a) Precision (b) Accuracy
(c) Recall (d) F1

(iv) **Give two examples of Supervised Learning models.**
(a) Classification and Regression
(b) Clustering and Dimensionality Reduction
(c) Rule Based and Learning Based
(d) Classification and Clustering

(v) **What is the stem of the word "Making"?**
(a) Mak (b) Make
(c) Making (d) Maker

(vi) **Which activation function is commonly used in the convolutional layers of a CNN?**
(a) ReLU (Rectified Linear Unit)
(b) Sigmoid
(c) Tanh (Hyperbolic Tangent)
(d) Softmax

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

(i) **Which of the following represent a machine that is smart but not considered Artificial Intelligence (AI) enabled?**
(a) A robotic vacuum cleaner that can navigate and clean floors autonomously.
(b) A chatbot that engages in natural language conversations and answers questions.
(c) A smartphone with facial recognition for unlocking the device.
(d) A digital alarm clock that rings at a set time every morning.

(ii) **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.

(iii) **In spam email detection, which of the following will be considered as "False Negative"?**
(a) When a legitimate email is accurately identified as not spam.
(b) When a spam email is mistakenly identified as legitimate.
(c) When an email is accurately recognised as spam.
(d) When an email is inaccurately labelled as important.

(iv) **..... is the last stage of the AI project life cycle.**
(a) Problem Scoping
(b) Evaluation
(c) Modelling
(d) Data Acquisition

(v) **Sentence segment is the _____ step for building the NLP model.**
(a) First (b) Second
(c) Third (d) Fourth

(vi) **Which of these is not a stopwords?**
(a) This (b) Things
(c) Is (d) Do

Section B Subjective Type Questions

Answer any 3 out of the given 5 questions in 20 - 32 words each on Employability Skills (2 × 3 = 6 marks)

6. Why there is a need for sustainable development? Give reasons.
7. "Entrepreneurs are born, not made." Do you agree with this statement? Justify your answer.
8. Describe the three types of barriers to communication in one sentence each with examples.
9. 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.
10. What general precautions should you take while cleaning the computer/components?

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

11. What programming languages does computer vision support?
12. What is Dimensionality Reduction?
13. With reference to data processing, expand the term TF-IDF. Also give any two applications of TF-IDF.
14. What is a pie plot?
15. Does human machine interaction make us slow and inefficient? Express your view in brief.
16. Give an example of a situation where in false positive would have a high cost associated with it.

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

17. Explain what are neural network and write some of its features.
18. AI is a bigger picture in machine learning and deep learning as its subsets. Explain.
19. Differentiate between musical intelligence and logical-mathematical intelligence.
20. Differentiate between data acquisition and data exploration.
21. Automated trade industry has developed an AI model which predicts the selling and purchasing of automobiles during testing the AI model game with the following predictions.

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

(a) How many total tests have been performed in the above scenario?
(b) Calculate precision, recall and F1 score.

Answers

1. (i) (d) (ii) (b) (iii) (b) (iv) (d) (v) (a) (vi) (a)
2. (i) (d) (ii) (a) (iii) (c) (iv) (a) (v) (d) (vi) (a)
3. (i) (c) (ii) (b) (iii) (b) (iv) (d) (v) (a) (vi) (c)
4. (i) (c) (ii) (b) (iii) (c) (iv) (a) (v) (a) (vi) (a)
5. (i) (d) (ii) (a) (iii) (b) (iv) (b) (v) (a) (vi) (b)