TERM-1 EXAMINATION (2025-26)
ARTIFICIAL INTELLIGENCE (843) / SUBJECT-05

MARKING SCHEME

Class : XII A/B/C | **Duration : 2 Hrs.**
Date : 05-09-2025 | **Max. Marks : 50**
Admission No.: | **Roll No.:**

General Instructions:
(i) Please read the instructions carefully.
(ii) This question paper consists of 21 questions in two Sections: Section – A & Section – B.
(iii) Section – A has Objective type questions whereas Section – B contains Subjective type questions.
(iv) Out of the given (5 + 16) = 21 questions, a candidate has to answer (5 + 11) = 16 questions in the allotted (maximum) time of 2 hours.
(v) All questions of a particular section must be attempted in the correct order.

(vi) Section – A: Objective Type Questions (24 marks)
(a) This section has 5 questions.
(b) There is no negative marking.
(c) Do as per the instructions given.
(d) Marks allotted are mentioned against each question/part.

(vii) 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

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

i. Which of the following is NOT a phase of active listening ? 1
a. Evaluating b. Receiving c. Understanding **d. Post**

ii. MINTS is a simple set of rules that assist you in correctly _____ the words. 1
a. Capitalising b. Punctuating c. Joining d. Interjecting

iii. "When will aunt Suman visit us " ? is a _____. 1
a. Declarative Sentence b. Imperative Sentence c. Exclamatory Sentence
d. Interrogative Sentence

iv. What type of motivation drives people to accomplish something because it gives them pleasure ? 1
a. Externally **b. Internally** c. Both (a) and (b) d. None of these

v. In SMART goals, T stands for Time Bound. This means _____. 1
a. Set realistic goals **b. Set a deadline and adhere to it**. C. Track your goals.
d. Avoid unnecessary stress.

vi. Which of the following sentences shows intrinsic motivation ? 1
a. Reema helps others as it gives her satisfaction.
b. Rajesh serve in a restaurant for extra income.
c. Sunil planned maximum trees to get the first prize in a plantation drive.
d. Saksham visits old age home for his social science project.

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

i. Which platform allows users to write and execute Python code directly in a web browser without installation ? 1
a. Jupyter Notebook b. Visual Studio Code **c. Google Colab** d. Python IDLE

ii. Which type of Numpy array represents a two-dimensional table of array ? 1
a. Rank 0 array b. Rank 1 array **c. Rank 2 array** d. Rank 3 array

iii. Which function can be used to export a DataFrame to a CSV file ? 1
a. export_csv() b. to_file **c. to_csv()** d. save_csv()

iv. Who introduced the Data Science Methodology, also known as the Foundational Methodology for Data Science ? 1
a. Andrew Ng **b. John Rollins** c. Geoffrey Hinton d. Yann Lecun

v. Which of the following are common forms of feedback in the AI model life cycle ? 1
a. User reviews b. Performance reports c. Error logs **d. All of these**

vi. It consist of four statements – Assertion (A) and Reasoning (R). 1
Answer these questions by selecting the appropriate option given below:
(a) Both A and R are True, and R is the correction explanation of A.
(b) Both A and R are True , but R is not the correction explanation of A.
(c) A is true but R is false (d) A is false but R is true.
Assertion (A): Data Visualization helps in understanding trends, patterns and relationships in data.
Reasoning (R): Data Visualization reduces the need for data cleaning and preparation.

Ans: (c)

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

i. Which formula correctly represents Recall in a classification model ? 1
a. TP /(TP + FP) b. TP / (TP + FN) c. TN / (TN + FP) d. TN / (TN + FN)

ii. What is the mail goal of Computer Vision ? 1
a. To make computers understand spoken language.
b. To enable computers to see, observe and understand the visual world.
c. To teach computers how to write poetry.
d. To improve internet speed.

iii. Which colour model is commonly used in Computer Vision for coloured images ? 1
a. CMYK b. HSV **c. RGB** d. Greyscale

iv. In self-driving cars, how does Computer Vision contribute to safety ? 1
a. By analysing and detecting road signs, pedestrians, and vehicles.
b. Br providing voice navigation.
c. By connecting to the internet for live weather updates.
d. By predicting fuel consumption

v. What is the main advantage of using Big data in business ? 1
a. It reduces the need for employees b. It simplifies data entry for businesses.
c. It helps find patterns, make smart predictions and improve decision-making
d. It replaces customer service departments.

vi. Which of the following is a common example of semi-structured data ? 1
a. SQL database **b. XML file** c. Audio recording d. Printed document

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

i. Which of the following is a common Big Data tool used for managing large datasets ? 1

a. Photoshop **b. Hadoop** c. Canva d. Excel

ii. Which of the following everyday applications is powered by Neural Networks ? 1
a. Facial recognition on smartphones b. Manual calendar entries
c. Static road maps without updates d. Basic text editors without predictive features

iii. What happens when a neural network has more hidden layers ? 1
a. The network becomes faster but less accurate. b. The network's learning process becomes simpler. **c. The learning process becomes deeper and more complex.**
d. The network stops learning altogether.

iv. Which application commonly uses Artificial Neural Networks (ANNs) ? 1
a. Calendar reminders **b. Spam filtering in emails**. c. Calculator functions
d. Digital locks

v. In a neural network, which layer is responsible for transferring data and recognising patterns ? 1
a. Input Layer **b. Hidden Layer** c. Output Layer d. Data Storage Layer

vi. Which technique does Generative AI commonly used to create content ? 1
a. Spreadsheets **b. Deep learning and neural networks** c. Binary coding
d. Data Compression.

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

i. What type of AI model is ChatGPT ? 1
a. Large Language Model b. Image recognition model
c. Data analysis tool d. Voice recognition system

ii. Which of the following generative AI tools is known for enabling video editing and artistic rendering ? 1
a. Jukebox **b. Runway and Stable Diffusion** c. DALL-E d. AlphaGo

iii. Which storytelling method combines visuals, sound and narratives for an immersive experience ? 1
a. Films b. Novels c. Plays d. Handwritten copies of stories

iv. What serves as the backbone of every data-driven story by providing essential evidence for insights and conclusions ? 1
a. Visuals b. Narrative **c. Data** d. Charts

v. Which of the following is a factor that makes storytelling powerful ? 1
a. It promotes uniform thinking **b. It facilitates openness for embracing differences.**
c. It limits creative expression d. It avoids reflecting on past events.

vi. Which form of storytelling uses modern technology to create interactive and multimedia narratives? 1
a. Epics b. Folklore **c. Digital Storytelling** d. Courtly Romances

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.

Q 6. What does 'P' stand for in the acronym 'RESPECT' used to ensure active listening? Explain. 2

Ans: P in Respect stands for - Pay attention and focus on what the speaker is saying.
(1 mark for the word 'Pay'; and 1 mark for explanation)

Q 7. Ishaan is working in a multinational company. He is working from home today. He has to attend a very important meeting where he must listen and jot points. What should Ishaan do to listen effectively ? 2

Ans: Ishaan should practice active listening by removing all distractions, maintaining eye contact on screen, and staying mentally focused. He should keep a notepad or digital tool ready to take clear notes. He must avoid interrupting, show engagement through facial expressions or nods, and give verbal or written feedback if needed. This helps him understand key points and respond appropriately.

Q 8. Write about any two factors influencing self-motivation. 2

Ans: 1. Finding and Listing Motives 2. Finding Sources of Motivation and Inspiration
Example (1): A student preparing for an AI competition lists motives such as learning new algorithms, improving teamwork, and gaining recognition.
Example (2): A student interested in robotics follows stories of innovators like Elon Musk or visits tech exhibitions to stay inspired.

Q 9. Samarth works hard for every exam but is not getting the desired results. Now, he is losing hope. What advice would you give him so that Samarth continues to work hard? 2

Ans: Samarth should practice positive thinking and self-awareness. He must reflect on his strengths and learn from past mistakes. Setting SMART goals can help him break big tasks into achievable steps. Seeking guidance, maintaining a routine, and staying motivated will help him regain confidence and continue working hard.

Q 10. Compare Numpy arrays and Pandas DataFrames. 2

Ans:

NumPy Arrays	Pandas DataFrames
Store data in a **single data type** (homogeneous).	Can store data of **different types** (heterogeneous).
Indexed by **integer positions**.	Indexed by **labels** and integer positions.

Answer any 4 out of the given 5 questions in 20 – 30 words each (2 x 4 = 8 marks)

Q 11. An automobile company wants to predict the maintenance needs of its electric vehicle fleet. They plan to use IoT sensor data such as battery performance, engine temperature and mileage. What type of analytical model should be used ? 2

Ans: Use a predictive analytics model.

Reason: It helps forecast maintenance using sensor data like battery, temperature, and mileage.

Q 12. Write any four applications of computer vision. 2

Ans: **Facial Recognition** – Used in security systems, attendance tracking, and unlocking devices. **Medical Imaging** – Helps doctors detect diseases from X-rays, MRIs, and CT scans. **Autonomous Vehicles** – Enables self-driving cars to detect roads, traffic signs, and obstacles. **Quality Inspection in Manufacturing** – Checks products for defects on production lines.

Q 13. Explain the working of a Neural Network. 2

Ans: A Neural Network works by passing data through a series of interconnected nodes or neurons arranged in layers. Each node acts as a small processing unit that receives inputs, multiplies each input by a specific weight, adds a bias (a constant value that shifts the result), and then applies an activation function to produce an output. This output is then passed forward to the next layer of nodes in what is known as a feedforward network. The bias is always present and plays a key role in adjusting the position of the activation function, allowing the network to learn more effectively. During training, the values of weights and bias are continuously updated to improve the model's predictions. A threshold is often used as a decision boundary to determine whether the node should be activated or not. Through this layered process of computation and learning, the neural network is able to recognise patterns, make decisions, and generate predictions based on the input data

Q 14. Write about any two ethical principles that should be followed in data storytelling. 2

Ans: Two ethical principles are as follows:

• Accuracy: Ensure data is factual and not misleading.

• Transparency: Clearly explain sources and methodology behind the data presented.

Q 15. Explain any two advantages of Big data. 2

Ans: **Real-Time Intelligence:** Big Data Analytics enables organisations to process vast amounts of data as it is generated, providing real-time insights.

Better Decision-Making: By uncovering hidden patterns and trends, Big Data Analytics empowers decision-makers with actionable insights.

Cost Efficiency: Identifying inefficiencies and waste, Big Data Analytics helps streamline operations and reduce expenses.

Enhanced Customer Engagement: Understanding customer behaviour, preferences, and sentiment allows businesses to personalise marketing strategies.

Answer any 4 out of the given 6 questions in 50– 80 words each (3 x 4 = 12 marks)

Q 16. Write a python program to create a dataframe(df) using dictionary. The dictionary will contain following keys “Name”, “Age” and “City” and assume five values for each key. It should display full dataframe and also bottom three. 3

Ans:
```
import pandas as pd
# Creating dictionary
data = {
   "Name": ["Amit", "Neha", "Ravi", "Pooja", "Karan"],
   "Age": [25, 28, 22, 30, 27],
   "City": ["Delhi", "Mumbai", "Kolkata", "Chennai", "Bengaluru"]
}
# Creating DataFrame from dictionary
df = pd.DataFrame(data)
# Display full DataFrame
print("Full DataFrame:")
print(df)
# Display bottom three rows
print("\nBottom Three Rows:")
print(df.tail(3))
```

Q 17. Consider the following data: 3

x	y
44	47
46	48
48	55
50	58
52	49

Regression Equation: 0.7x + 17.8

Calculate the RMSE (Root means Square Error) for the above data.

Ans:

x	y (observed)	y' (predicted)	Residual (predicted-observed)	Squared Residuals
44	47	48.6	1.6	2.56
46	48	50	2	4
48	55	51.4	-3.6	12.96
50	58	52.8	-5.2	27.04
52	49	54.2	5.2	27.04
			RMSE	**3.836**

Q 18. Discuss the future of Big Data Analytics and the key technological advancements that will shape its growth. 3

Ans: The future of Big Data Analytics is very promising, with rapid growth expected globally, including in India. It will help businesses make smarter decisions, improve efficiency, and drive innovation. Key technological advancements shaping its growth include:

- **Real-Time Analytics:** Enables instant data processing for immediate decision-making.
- **Advanced Predictive Models:** Uses AI and Machine Learning to forecast trends accurately.
- **Quantum Computing:** Will significantly speed up data processing and solve complex problems.

These developments will transform industries, create new job opportunities, and continue to drive digital innovation.

Q 19. What are the three main layers of a Convolutional Neural Network (CNN) ? Explain any two. 3

Ans: The three main layers of a Convolutional Neural Network (CNN) are the Convolutional Layer, Pooling Layer, and Fully Connected Layer. These help in feature extraction, data reduction, and final classification.

1. Convolutional Layer:

It applies filters to the input image to detect features such as edges, shapes, and textures. It helps in extracting spatial features.

2. Pooling Layer:

It reduces the spatial size of the feature maps by summarizing regions (e.g., max pooling), which decreases computation and prevents overfitting.

Q 20. What are Variational Autoencoder (VAEs), and how do the encoder and decoder function within them ? 3

Ans: VAEs are a type of generative model that learn to represent data in a lower-dimensional latent space and can generate new, similar data. They use probability distributions rather than fixed encodings, making them effective for generating variations of input data.

Encoder:

The encoder maps input data to a latent space by learning the parameters (mean and variance) of a probability distribution, from which latent vectors are sampled.

Decoder:

The decoder takes the sampled latent vector and reconstructs data that is similar to the original input.

Q 21. List any six key benefits of storytelling. 3

Ans: Enhances understanding of concepts. Improves memory retention.
Engages and captures attention. Develops creativity and imagination.
Builds emotional connection with the audience.
Makes complex information easier to relate to.

***** "ALL THE BEST !" *****