

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 + 10 =) 15 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 05 questions.
 - (b) Marks allotted are mentioned against each question/part.
 - (c) There is no negative marking.
 - (d) Do as per the instructions given.
- (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)

1. Answer any 4 out of the given 6 questions :

4 × 1 = 4

(i) SMART method can be used to set goals to make you successful in your career and personal life. What does 'A' in SMART stand for ?

- | | |
|----------------|-----------------|
| (a) Abrupt | (b) Accountable |
| (c) Achievable | (d) Admirable |

(ii) Which of the following is not a key element of self-management skills ?

- (a) Prioritising your work
- (b) Not taking feedback
- (c) Goal setting
- (d) Staying updated about new practices

(iii) Which of the following is a quality of successful entrepreneurs ?

- (a) Hard working
- (b) Resistance to change
- (c) Lazy
- (d) Less-confident

(iv) The most important software in any computer is the _____. This is the software that starts working as soon as we switch on a computer.

- | | |
|---------------------|------------------------|
| (a) Web Browsers | (b) Operating System |
| (c) Office Software | (d) Designing Software |

(v) Which of the following types of communication takes place when one individual addresses a large gathering ?

- (a) Written communication
- (b) Public communication
- (c) Small group communication
- (d) Interpersonal communication

- (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.

5 × 1 = 5

2. Answer any 5 out of given 6 questions :

- (i) Which of the following contributes to the efficiency of an AI project ?
 - (a) High Model Complexity
 - (b) Relevant and Authentic Training Data
 - (c) Minimal Preprocessing
 - (d) Limited Hardware Resources
- (ii) This real life application of NLP is used to provide an overview of a news item or blog post, while avoiding redundancy from multiple sources and maximising the diversity of content obtained. Which is this application ?
 - (a) Chatbot
 - (b) Virtual Assistant
 - (c) Sentiment Analysis
 - (d) Automatic Summarisation
- (iii) 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.
- (iv) Which of the following words represent an example of a lemma resulting from lemmatisation for "caring" in context to Natural Language Processing (NLP) ?
 - (a) Care
 - (b) Cared
 - (c) Cares
 - (d) Car

- (v) Intrapersonal Intelligence is a concept that :
- (a) Measures an individual's ability to understand others' emotions and feelings.
 - (b) Assesses one's proficiency in mathematics and logical reasoning.
 - (c) Describes the level of self-awareness someone has, starting from realizing weaknesses, strengths, to recognizing their own feelings.
 - (d) Evaluates an individual's spatial navigation and visualisation skills.
- (vi) For Data Science, usually the data is collected in the form of tables. These tabular datasets can be stored in different formats. Which of the following formats is not used for storing data in a tabular format ?
- (a) CSV
 - (b) Website
 - (c) SQL
 - (d) Spreadsheet

3. Answer any 5 out of given 6 questions :

5 × 1 = 5

- (i) _____ 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
- (ii) In the AI project cycle, which of the following represents the correct order of steps ?
- (a) Data Exploration, Problem Scoping, Modelling, Evaluation, Data Acquisition.
 - (b) Problem Scoping, Data Acquisition, Data Exploration, Modelling, Evaluation.
 - (c) Modelling, Data Acquisition, Evaluation, Problem Scoping, Data Exploration.
 - (d) Data Acquisition, Data Exploration, Problem Scoping, Modelling, Evaluation.

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- (iii) _____ is a concept to unify statistics, data analysis, machine learning and their related methods in order to understand and analyse actual phenomena with data.
- (a) Computer Vision (b) Natural Language Processing
(c) Data Science (d) Computer Science
- (iv) In computer vision which of the following tasks is used for multiple objects ?
- (a) Classification (b) Classification + Localisation
(c) Instance Segmentation (d) Localisation
- (v) 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.
- (vi) Which of the following applications is not associated with Natural Language Processing (NLP) ?
- (a) Sentiment Analysis (b) Speech Recognition
(c) Spam Filtering in emails (d) Stock Market Analysis

4. Answer any 5 out of the given 6 questions :

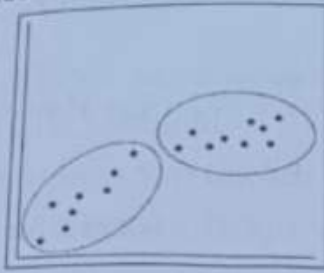
5 × 1 = 5

(i) **Statement 1** : Confusion matrix is an evaluation metric.

Statement 2 : Confusion Matrix is a record which helps in evaluation.

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

- (ii) Which form of unsupervised learning does the following diagram indicate ?



- (a) Clustering (b) Regression
(c) Reinforcement learning (d) Classification
- (iii) Bag of Words is a _____ model which helps in extracting features out of the text which can be helpful in machine learning algorithms.
- (a) Data Science (DS)
(b) Virtual Reality (VR)
(c) Natural Language Processing (NLP)
(d) Computer Vision (CV)
- (iv) Which of the following represents an example of a recommendation system ?
- (a) An online clothing store that offers a wide variety of clothing options.
(b) A search engine that retrieves relevant web pages based on user queries.
(c) An e-commerce website that displays customer reviews and ratings for products.
(d) A music streaming platform that suggests songs and playlists based on user listening history.
- (v) Name any two search engines.
- (vi) What is the primary need for evaluating an AI model's performance in the AI Model Development process ?
- (a) To increase the complexity of the model.
(b) To visualize the data.
(c) To assess how well the chosen model will work in future.
(d) To reduce the amount of data used for training.

5. Answer any 5 out of the given 6 questions :

(i) **Assertion (A)** : The term used to refer to the number of pixels in an image is resolution.

Reason (R) : Resolution in an image denotes the total number of pixels it contains, usually represented as height × width.

- (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 for (A).
 (c) (A) is true, but (R) is false.
 (d) (A) is false, but (R) is true.
- (ii) 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 :
- (a) Computational Skills (b) Learning Capability
 (c) Artificial Intelligence (d) Cognitive Processing
- (iii) **Statement 1** : To evaluate a models' performance, we need either precision or recall.

Statement 2 : When the value of both Precision and Recall is 1, the F1 score is 0.

- (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 1 is incorrect, but statement 2 is correct.
- (iv) The concept of _____ is used to apply face filters on various social media platforms.
- (a) NLP (b) Computer Vision
 (c) Data Science (d) Block chain Technology
- (v) The 4 W's Problem Canvas helps in identifying the key elements related to the given problem.
 Which of the following is NOT one of the blocks of the Problem Canvas ?
- (a) When (b) Where
 (c) What (d) Why

(vi) 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)

Section - B

(Subjective Type Questions)

Answer any 3 out of given 5 questions on Employability Skills. Answer each question in 20-30 words. 3 × 2 = 6

6. Give any two examples of how individual choices and behaviours can contribute in achieving sustainable development.
7. List any two common misconceptions about entrepreneurship.
8. What is the importance of time management in effectively dealing with stress ? Provide any one strategy for improving time management skills to reduce stress.
9. Mention any two measures that individuals or organisations can take to protect their data from theft and viruses.
10. The method of communication that you choose could affect the relationship with your peers, superiors and customers. Write the four factors on the basis of which you can choose the right method of communication.

Answer any 4 out of given 6 questions in 20-30 words each. 4 × 2 = 8

11. Differentiate between Machine Learning (ML) and Deep Learning (DL).
12. What are the primary differences between Script-bots and Smart-bots ?
13. What do you mean by Evaluation of an AI model ? Also explain the concept of overfitting with respect to AI model Evaluation.

14. For a healthcare organisation's objective of predicting disease outbreaks and efficiently allocating resources through the analysis of medical records, would you recommend using supervised learning or unsupervised learning as the preferred machine learning approach ? Explain your choice briefly.
15. What role does data play in AI based applications ? Name any two sources of online data collection for building any AI based application.
16. Differentiate between grayscale and RGB images.

Answer any 3 out of given 5 questions in 50-80 words each.

$3 \times 4 = 12$

17. What are Neural networks ? Briefly explain all the layers of a neural network.
18. Give any four examples of applications of AI that we see around us.
19. Consider the following two documents :

Document 1 : ML and DL are part of AI.

Document 2 : DL is a subset of ML.

Implement all four steps of the Bag of Words (BoW) model to create a document vector table. Depict the outcome of each step.

20. Consider the following graphs (Figure 1 and Figure 2) that demonstrate the two types of Supervised Learning Models of Artificial Intelligence. Identify and explain each model giving suitable examples of each.

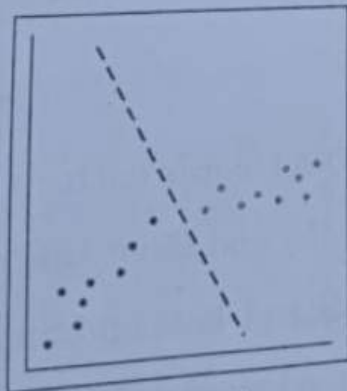


Figure 1

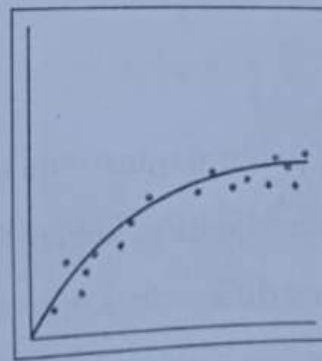


Figure 2

21. A binary classification model has been developed to classify news articles as either "Fake News" or "Real News". The model was tested on a dataset of 500 news articles, and the resulting confusion matrix is as follows :

| Confusion Matrix | | Reality | |
|------------------|-----|---------|-----|
| | | Yes | No |
| Predicted | Yes | 45 | 15 |
| | No | 20 | 420 |

- (A) How many total cases are True Negative in the above scenario?
(B) Calculate Precision, Recall and F1-Score.
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