



B.K. BIRLA CENTRE FOR EDUCATION

SARALA BIRLA GROUP OF SCHOOLS
A CBSE DAY-CUM-BOYS' RESIDENTIAL SCHOOL



MID-APRIL EXAMINATION 2025
ARTIFICIAL INTELLIGENCE (843)

Class : XII A/B/C (SUBJECT-05)

Date : 17-04-2025

Admission No.:

Duration : 1 Hr

Max. Marks : 25

Roll No.:

General Instructions:

Try to attempt all questions as per given order.

All questions are compulsory.

The Question Paper is divided into three sections Section A to C.

- Section A has 7 questions and carry 1 mark each.
- Section B has 6 questions and carry 2 marks each.
- Section C has 2 questions and carry 3 marks each.

MARKING SCHEME

Section-A

1. To create an empty series object, we can use:
(a) pd.Series(empty) (b) pd.Series(np.NaN) (c) **pd.Series()** (d) All of these 1
2. To get the size of the datatype of the items in Series object, we can display ____ attribute.
(a) index (b) size (c) **itemsizes** (d) ndim 1
3. To get the number of elements in a Series object, ____ attribute is displayed.
(a) index (b) **size** (c) itemsizes (d) ndim 1
4. Which is the hardest stage in the foundational methodology of Data Science?
(a) **Business Understanding** (b) Data collection (c) Modelling (d) Evaluation 1
5. Match the following and choose the correct options:
i. Descriptive approach A. Statistical Analysis 1
ii. Diagnostic approach B. Current Status
iii. Predictive approach C. How to solve it?
iv. Prescriptive approach D. Probabilities of action
(a) (i)—A , (ii)—B, (iii) – C , (iv)—D (b) **(i)—B , (ii)—A, (iii) – D , (iv)—C**
(c) (i)—D , (ii)—B, (iii) – A , (iv)—C (d) (i)—A , (ii)—C, (iii) – B , (iv)—D
6. The process of capturing a digital image or video using a digital camera, a scanner, or other imaging devices is related to _____. 1
(a) **Image Acquisition** (b) Pre-processing (c) Feature Extraction (d) Detection

7. Choose the incorrect statement related to pre-processing stage of computer vision : 1
- (a) It enhances the quality of acquired image
 - (b) Noise reduction and Image normalization is often employed with images
 - (c) Techniques like histogram equalization can be applied to adjust the distribution of pixel intensities

(d) Edge detection and corner detection are ensured in images

SECTION - B

8. How Series data structure is different from dataframe ? Give example also. 2

Ans: Series: 1 dimensional, Value mutable, size immutable,
DataFrame: 2 D, Both size and value mutable

9. Write a python a code to create a Series S1 object using an array. Write all the necessary libraries for the same. 2

Ans: `import pandas as pd
import numpy as np
arr1=np.array(10,20,30)
s1=pd.Series(arr1)
print(s1)`

10. How can we add new rows and columns to an existing DataFrame 'df1'? Explain with code examples. 2

Ans: **Add a column:**
`df1['new_column'] = [value1, value2, value3]`
Add a row:
`df1.loc[len(df)] = [value1, value2, value3]`

11. How many steps are there in Data Science Methodology? Name them in order. 2

Ans: (1) Business Understanding – Define the problem and objectives from a business perspective.
(2) Analytic Approach – Determine whether a descriptive, predictive, or prescriptive approach is needed.
(3) Data Requirements – Identify the data needed to solve the problem.
(4) Data Collection – Gather data from various sources (databases, APIs, web scraping, etc.).
(5) Data Understanding – Explore the data using statistical summaries and visualization.
(6) Data Preparation – Clean and preprocess the data (handle missing values, remove duplicates, etc.).
(7) Modeling – Apply machine learning or statistical models to analyze the data.
(8) Evaluation – Assess model performance using metrics like accuracy, precision, recall, or RMSE.
(9) Deployment – Implement the model in a real-world scenario (e.g., a web app or business process).
(10) Feedback & Iteration – Monitor the model's performance and improve it based on new data.

12. Write a comparative study on train-test split and cross validation. 2

Train-Test Split	Cross Validation
Normally applied on large datasets	Normally applied on small datasets
Divides the data into training data set and testing dataset.	Divides a dataset into subsets (folds), trains the model on some folds, and evaluates its performance on the remaining data.
Clear demarcation on training data and testing data.	Every data point at some stage could be in either testing or training data set.

13. Write any four applications of computer vision. Explain each type.

2

Ans: 1)Facial recognition: Popular social media platforms like Facebook uses facial recognition to detect and tag users.
2)Healthcare: Helps in evaluating cancerous tumours, identify diseases or abnormalities.
Object detection & tracking in medical imaging

3)Surveillance: Live footage from CCTV cameras in public places helps to identify suspicious behaviour, identify dangerous objects, and prevent crimes by maintaining law and order.
4)Fingerprint recognition and biometrics: Detects fingerprints and biometrics to validate a user's identity.

Section-C

14. (a) Name the methods used to import & export CSV file from local drive and back to back to drive.

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(b) Write a python code to create a DataFrame df1 object from a dictionary.

Column labels : Admno, Name, Marks1

Row index: 0,1,2,3

Values for Admno = 11,12,13,14

Values for Name = Rajat, Amrita, kartik, Shiva

Values for Marks1 = 22,21,19,25

Ans: (a) read_csv() and to_csv()

(b)

```
import pandas as pd
```

```
data={'admno':[11,12,13,14], 'Name':['Rajat', 'Amrita', 'kartik', 'Shiva'],
```

```
Marks1':[22,21,19,25]}
```

```
df1=pd.DataFrame(Marks1)
```

```
print(df1)
```

15. 1. Calculate MSE and RMSE values for the data given below:

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Actual (A)	Predicted (P)
100	110
120	125
150	145
170	165
200	190
210	205
220	225
250	240
300	310
350	340

Ans:

	Actual (A)	Predicted (P)	residual	squared
1	100	110	10	100
2	120	125	5	25
3	150	145	-5	25
4	170	165	-5	25
5	200	190	-10	100
6	210	205	-5	25
7	220	225	5	25
8	250	240	-10	100
9	300	310	10	100
10	350	340	-10	100
				625
			MSE	62.5
			RMSE	7.91

***** BEST OF LUCK *****