

# CBSE | DEPARTMENT OF SKILL EDUCATION

## ARTIFICIAL INTELLIGENCE (SUBJECT CODE 843)

### MARKING SCHEME FOR CLASS XII (SESSION 2022-2023)

Max. Time: 2 Hours

Max. Marks: 50

#### General Instructions:

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. There is no negative marking.
  - iii. Do as per the instructions given.
  - iv. Marks allotted are mentioned against each question/part.
7. **SECTION B – SUBJECTIVE TYPE QUESTIONS (26 MARKS):**
  - i. This section contains 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

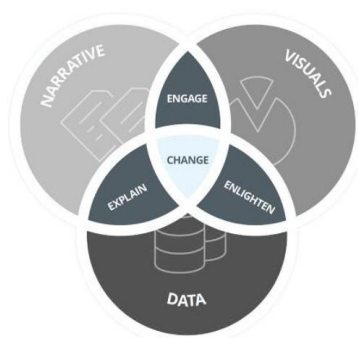
| Q. No.      | QUESTION   | Source Material (NCERT/PSSCIVE/ CBSE Study Material) | Unit/ Chap. No. | Page no. of source material | Marks    |
|-------------|--|--|-----------------|-----------------------------|----------|
| <b>Q. 1</b> | <b>Answer any 4 out of the given 6 questions on Employability Skills (1 x 4 = 4 marks)</b> |  |                 |                             |          |
| i.          | d). All of the above   |  |                 |                             | <b>1</b> |
| ii.         | b). An opportunity   |  |                 |                             | <b>1</b> |
| iii.        | b). CTRL + A   |  |                 |                             | <b>1</b> |
| iv.         | h). All of the above   |  |                 |                             | <b>1</b> |
| v.          | i). Self-confident   |  |                 |                             | <b>1</b> |
| vi.         | d). All of the above   |  |                 |                             | <b>1</b> |
| <b>Q. 2</b> | <b>Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)</b>                         |  |                 |                             |          |
| i.          | (b) Test   | CBSE Study Material                                  | 1               | 5                           | <b>1</b> |
| ii.         | (c) Understanding the audience   | CBSE Study Material                                  | 3               | 35                          | <b>1</b> |
| iii.        | (a) 1=D, 2=B, 3=E, 4=A, 5=C  | CBSE Study Material                                  | 1               | 5                           | <b>1</b> |
| iv.         | (d) 1 & 4  | CBSE Study Material                                  | 2               | 33                          | <b>1</b> |
| v.          | (b) MSE can here be used as the loss function.   | CBSE Study Material                                  | 1               | 29                          | <b>1</b> |
| vi.         | (d) iterative  | CBSE Study Material                                  | 2               | 33                          | <b>1</b> |
| <b>Q. 3</b> | <b>Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)</b>                         |  |                 |                             |          |
| i.          | (c) Data Understanding   | CBSE Study Material                                  | 1               | 12                          | <b>1</b> |

|             |  |                     |   |    |   |
|-------------|--|---------------------|---|----|---|
| ii.         | (d) engaging   | CBSE Study Material | 3 | 35 | 1 |
| iii.        | (b) Scoping  | CBSE Study Material | 2 | 33 | 1 |
| iv.         | b. Both A and R are true and R is not the correct explanation of A                             | CBSE Study Material | 3 | 35 | 1 |
| v.          | (c ) Lower RMSE values are not good for the AI model.  | CBSE Study Material | 1 | 28 | 1 |
| vi.         | (c) deploy   | CBSE Study Material | 2 | 32 | 1 |
| <b>Q. 4</b> | <b>Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)</b>                             |                     |   |    |   |
| i.          | (d) Testing  | CBSE Study Material | 2 | 34 | 1 |
| ii.         | (a) Narrative (b) Data   | CBSE Study Material | 3 | 39 | 1 |
| iii.        | (c ) As we need to train on many training sets, cross-validation is computationally expensive. | CBSE Study Material | 1 | 21 | 1 |
| iv.         | (a) True   | CBSE Study Material | 3 | 38 | 1 |
| v.          | d) 3-1-2-4   | CBSE Study Material | 2 | 33 | 1 |
| vi.         | (a)Regression functions predict a quantity, and classification functions predict a label.      | CBSE Study Material | 1 | 23 | 1 |
| <b>Q. 5</b> | <b>Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)</b>                             |                     |   |    |   |
| i.          | (d) facts  | CBSE Study Material | 3 | 35 | 1 |
| ii.         | (a ) RMSE  | CBSE Study Material | 1 | 28 | 1 |
| iii.        | (b) 1) and 2) only   | CBSE Study Material | 2 | 34 | 1 |
| iv.         | (c ) Weather forecast  | CBSE Study Material | 1 | 13 | 1 |
| v.          | d. (1), (2) and (4)  | CBSE Study Material | 2 | 34 | 1 |
| vi.         | c) pattern   | CBSE Study Material | 1 | 4  | 1 |

## **SECTION B: SUBJECTIVE TYPE QUESTIONS**

| Q. No.   | QUESTION  | Source Material (NCERT/PSSCIVE/ CBSE Study Material) | Unit/ Chap. No. | Page no. of source material | Marks |
|--|---|--|-----------------|-----------------------------|-------|
| <b>Answer any 3 out of the given 5 questions on Employability Skills in 20 – 30 words each (2 x 3 = 6 marks)</b> |   |  |                 |                             |       |
| Q. 6   | Self-management skills are an important part of showing that you're a reliable employee. Those without these skills may be unpredictable, which can make an employer nervous. For instance, when someone has a hard time controlling their emotions, they could snap at a customer or say something hurtful to another employee.  |  |                 |                             | 2     |
| Q. 7   | <p><b>a. Paranoid</b><br/>Paranoid personality disorder (PPD) is a mental health condition marked by a pattern of distrust and suspicion of others without adequate reason to be suspicious. People with PPD are always on guard, believing that others are constantly trying to demean, harm or threaten them.</p> <p><b>b. Anti-social</b><br/>Antisocial personality disorder is a particularly challenging type of personality disorder characterised by impulsive, irresponsible and often criminal behaviour. Someone with antisocial personality</p> |  |                 |                             | 2     |

|  |  |                            |          |           |          |
|--|--|----------------------------|----------|-----------|----------|
|  | disorder will typically be manipulative, deceitful and reckless, and will not care for other people's feelings.<br><b>c. Obsessive Compulsive</b><br>Obsessive-Compulsive Disorder (OCD) is a common, chronic, and long-lasting disorder in which a person has uncontrollable, reoccurring thoughts (obsessions) and/or behaviors (compulsions) that he or she feels the urge to repeat over and over.   |                            |          |           |          |
| <b>Q. 8</b>  | Ctrl+s<br>File→save  |                            |          |           | <b>2</b> |
| <b>Q. 9</b>  | Entrepreneurial skills are those normally associated with being an entrepreneur, although anyone can develop them. Being an entrepreneur usually means starting and building your own successful business, but people with entrepreneurial skills can thrive within larger organizations, too.   |                            |          |           | <b>2</b> |
| <b>Q. 10</b>   | 1. Opportunity recognition<br>Do you recognize an opportunity when you see it? Our lives are constantly offering new opportunities, but most of us are generally too afraid or distracted to recognize them. Instead, we see them as problems. A successful entrepreneur is able to look at a problem and envision the potential to create a solution.<br><br>2. Initiative<br>Identifying opportunities, however, is not enough. A true entrepreneur has the confidence to take the leap and jump into action, often without without a previous point of reference. They can proactively and independently address an issue that they care about, rather than waiting for others to solve it. |                            |          |           | <b>2</b> |
| <b>Answer any 4 out of the given 6 questions in 20 – 30 words each (2 x 4 = 8 marks)</b> |  |                            |          |           |          |
| <b>Q. 11</b>   | A capstone project is a project where students must research a topic independently to find a deep understanding of the subject matter. It gives an opportunity for the student to integrate all their knowledge and demonstrate it through a comprehensive project.  | <b>CBSE Study Material</b> | <b>1</b> | <b>3</b>  | <b>2</b> |
| <b>Q. 12</b>   | The MSE value cannot be negative. The difference between projected and actual values are always squared. As a result, all outcomes are either positive or negative.  | <b>CBSE Study Material</b> | 1        | 28        | <b>2</b> |
| <b>Q. 13</b>   | Stories are more likely to drive action than are statistics and numbers. Therefore, when told in the form of a narrative, it reduces ambiguity, connects data with context, and describes a specific interpretation – communicating the important messages in most effective ways.   | <b>CBSE Study Material</b> | <b>3</b> | <b>35</b> | <b>2</b> |

| Q. 14  | <p>To decompose this task, you would need to know the answer to a series of smaller problems:</p> <ul style="list-style-type: none"> <li>• what kind of app you want to create?</li> <li>• what will your app will look like?</li> <li>• who is the target audience for your app?</li> <li>• what will the graphics will look like?</li> <li>• what audio will you include?</li> </ul>  | CBSE Study Material   | 1  | 6                        | 2  |                          |   |    |    |     |      |                     |   |    |   |
|--|---|-----------------------|--|--------------------------|--|--------------------------|---|----|----|-----|------|---------------------|---|----|---|
| Q. 15  | <p>A training set is a set of historical data in which the outcomes are already known. Train Dataset: Used to fit the machine learning model.</p> <p>Test Dataset: Used to evaluate the fit machine learning model.</p>   | CBSE Study Material   | 1  | 14                       | 2  |                          |   |    |    |     |      |                     |   |    |   |
| Q. 16  | <p>The Design phase is essentially an iterative process comprising all the steps relevant to building the AI or machine learning model: data acquisition, exploration, preparation, cleaning, feature engineering, testing and running a set of models to try to predict behaviors or discover insights in the data.</p>  | CBSE Study Material   | 2  | 33                       | 2  |                          |   |    |    |     |      |                     |   |    |   |
| <b>Answer any 3 out of the given 5 questions in 50– 80 words each (4 x 3 = 12 marks)</b> |   |                       |  |                          |  |                          |   |    |    |     |      |                     |   |    |   |
| Q. 17  | <p>Data storytelling is a structured approach for communicating insights drawn from data, and invariably involves a combination of three key elements: <b>data</b>, <b>visuals</b>, and <b>narrative</b>. When the narrative is accompanied with data, it helps to <b>explain</b> the audience what’s happening in the data and why a particular insight has been generated. When visuals are applied to data, they can <b>enlighten</b> the audience to the insights that they wouldn’t perceive without the charts or graphs.</p> <p>Finally, when narrative and visuals are merged together, they can <b>engage</b> or even entertain an audience. When you combine the right visuals and narrative with the right data, you have a data story that can influence and drive <b>change</b>.</p>  | CBSE Study Material   | 3  | 37                       | 4  |                          |   |    |    |     |      |                     |   |    |   |
| Q. 18  | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;"></th> <th style="width: 15%;">y<br/>(observe<br/>d)</th> <th style="width: 15%;">y'<br/>(predicte<br/>d)</th> <th style="width: 15%;">Residual<br/>(predicted<br/>-<br/>observed)</th> <th style="width: 15%;">Squared<br/>Residua<br/>ls</th> </tr> </thead> <tbody> <tr> <td>x</td> <td>44</td> <td>47</td> <td>1.6</td> <td>2.56</td> </tr> </tbody> </table>  |                       | y<br>(observe<br>d)                      | y'<br>(predicte<br>d)    | Residual<br>(predicted<br>-<br>observed) | Squared<br>Residua<br>ls | x | 44 | 47 | 1.6 | 2.56 | CBSE Study Material | 1 | 24 | 4 |
|  | y<br>(observe<br>d)   | y'<br>(predicte<br>d) | Residual<br>(predicted<br>-<br>observed) | Squared<br>Residua<br>ls |  |                          |   |    |    |     |      |                     |   |    |   |
| x  | 44  | 47                    | 1.6                                      | 2.56                     |  |                          |   |    |    |     |      |                     |   |    |   |

|              |  |                            |          |           |          |
|--------------|--|----------------------------|----------|-----------|----------|
|              | 46      48      50      2      4<br>48      55      51.4      -3.6      12.96<br>50      58      52.8      -5.2      27.04<br>52      49      54.2      5.2      27.04<br><br><b>RMSE      3.836</b>   |                            |          |           |          |
| <b>Q. 19</b> | <p>Considerations:</p> <ul style="list-style-type: none"> <li>• The volume of test data can be large, which presents complexities.</li> <li>• Human biases in selecting test data can adversely impact the testing phase, therefore, data validation is important.</li> <li>• Your testing team should test the AI and ML algorithms keeping model validation, successful learnability, and algorithm effectiveness in mind.</li> <li>• Regulatory compliance testing and security testing are important since the system might deal with sensitive data, moreover, the large volume of data makes performance testing crucial.</li> </ul> | <b>CBSE Study Material</b> | <b>2</b> | <b>34</b> | <b>4</b> |
| <b>Q. 20</b> | <p>In cross-validation, we run our modeling process on different subsets of the data to get multiple measures of model quality.</p> <p>In k-fold cross-validation, the original dataset is equally divided into k subparts or folds. Out of the k-folds, for each iteration, one group is selected as test data, and the remaining (k-1) groups are selected as training data. This process is repeated for k times. The final accuracy of the model is calculated by taking the mean accuracy.</p> <p>When the dataset is smaller, cross-validation procedure should be selected for higher accuracy.</p>                                 | <b>CBSE Study Material</b> | <b>1</b> | <b>20</b> | <b>4</b> |
| <b>Q. 21</b> | <p>(a) The steps involved in telling an effective data story are given below:</p> <ul style="list-style-type: none"> <li>• Understanding the audience</li> <li>• Choosing the right data and visualisations</li> <li>• Drawing attention to key information</li> <li>• Developing a narrative</li> <li>• Engaging your audience</li> </ul> <p>(b) <b>Option A</b> is a better data story.<br/>Reasons<br/>1. The insight given at the bottom of the visual is giving a clear idea about context which is not there in Option B.<br/>2. Option A visual provides a compelling narrative.</p>  | <b>CBSE Study Material</b> | <b>3</b> | <b>35</b> | <b>4</b> |