**Indian School Al Wadi Al Kabir**

**REHEARSAL – 1**

**ARTIFICIAL INTELLIGENCE (CODE:417)**

**SET-II**

Class: X Time: 2 Hours

Date: 07/12/2023 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.

### 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.

1. All questions of a particular section must be attempted in the correct order.

### SECTION A - OBJECTIVE TYPE QUESTIONS (24 MARKS):

* 1. This section has 05 questions.
  2. Marks allotted are mentioned against each question/part.
  3. There is no negative marking.
  4. Do as per the instructions given.

### SECTION B – SUBJECTIVE TYPE QUESTIONS (26 MARKS):

* 1. This section has 16 questions.
  2. A candidate has to do 10 questions.
  3. Do as per the instructions given.
  4. Marks allotted are mentioned against each question/part.

**SECTION A: OBJECTIVE TYPE QUESTIONS**

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| **Q. 1** | **Answer any 4 out of the given 6 questions on Employability Skills (1 x 4 = 4 marks)** | |
| **i.** | Which one of the following is an example of Operating System?  a) Microsoft Word  b) Microsoft Windows  c) Microsoft Excel  d) Microsoft Access  **Answer:** b) Microsoft Windows | **1** |
| **ii.** | When you bring the mouse over a file in File Explorer, it will show the details of that file.  This is known as   1. Drag and drop 2. Double click 3. Hover 4. Single click   **Answer**: (c) Hover | **1** |
| **iii.** | Assertion(A): A doctor works for a renowned hospital.  Reason(R): The statement given above is an example of wage employment.   1. Both A and R are correct and R is the correct explanation of A 2. Both A and R are correct but R is NOT the correct explanation of A 3. A is correct but R is not correct 4. A is not correct but R is correct   **Answer:** (a) Both A and R are correct and R is the correct explanation of A | **1** |
| **iv.** | the work is all about identifying and noting how we spent our time, and analysing how to spend our time effectively.   1. Organising 2. Prioritising 3. Controlling 4. Tracking   **Answer:** (d) Tracking | **1** |
| **v.** | Remya traveled to Sweden from India to pursue her higher education. But she doesn't know how to speak Swedish (language of Sweden). Because of this, she was unable to find a part time job. This is an example of   1. Interpersonal barrier 2. Physical barrier 3. Organisational barrier 4. Linguistic barrier   **Answer:** (d) Linguistic barrier | **1** |
| **vi.** | “Efforts are made to increase the solar power generation so that our electricity needs are met and at the same time we do not pollute the environment or use up natural resources”.  Which SDG can you relate this statement to?   1. Life on land 2. Clean water and sanitation 3. Affordable and clean energy 4. Reduced inequalities   **Answer:** (c) Affordable and clean energy | **1** |
| **Q. 2** | **Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)** |  |
| **i.** | Assertion (A)– One can be a good singer while the other can be a great athlete. Reason(R) – Humans possess different types of intelligences but at different levels.   1. Both A and R are correct and R is the correct explanation of A 2. Both A and R are correct but R is not the correct explanation of A 3. A is correct but R is not correct 4. A is not correct but R is correct.   **Answer:** (a) Both A and R are correct and R is the correct explanation of A | **1** |
| **ii.** | 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?   1. AI Ethics 2. Data Privacy 3. AI Bias 4. AI Access   **Answer:** (b) Data Privacy | **1** |
| **iii.** | Statment1: There are four layers in a neural network.  Statement2:The first layer of the neural network is known as the output layer.   1. Both Statement1 and Statement2 are correct 2. Both Statement1 and Statement2 are incorrect 3. Statement1 is correct but Statement2 is incorrect 4. Statement2 is correct but Statement1 is incorrect   **Answer:** (a) Both Statement1 and Statement2 are incorrect | **1** |
| **iv.** | Which of the following is correct about the rule-based approach?  a) We cannot provide enough rules to the machine.  b) A drawback/feature for this approach is that the learning is static.  c) Once the rules are fed into the system, it takes into consideration any changes made in the original training dataset.  d) It can improve itself based on the feedbacks.  Answer: b) A drawback/feature for this approach is that the learning is static. | **1** |

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| **v.** | is a simple file format that stores data separated by commas?   1. jpg 2. doc 3. csv 4. png   **Answer:** (c) csv | **1** |
| **vi.** | Tom is a student of grade five. He likes to move constantly at his desk. He plays with pencils and taps his fingers, stands up in his place any time he gets a chance. He enjoys playing basketball, and likes to play in the classroom. Which of the following intelligence does he demonstrate?  a) Linguistic  b) Logical-Mathematical  c) Musical  d) Kinesthetic  Answer: d) Kinesthetic | **1** |
| **Q. 3** | **Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)** |  |
| **i.** | Read the examples given below-   1. Using Chat GPT to write an email 2. Face unlock technology of mobile phones using camera 3. Turning off lights with IoT device 4. Hand sanitizer dispenser having sensor Choose the options that are **not** AI 5. i and ii 6. iii and i 7. iii and iv 8. i, iii and iv   **Answer:** (c) iii and iv | **1** |
| **ii.** | When a machine possesses the ability to mimic the following human traits, it is said to have artificial intelligence. Identify the positive traits that an AI machine should possess.   1. make decisions ii. bias iii. predict iv. learn and improve on its own   a) i), and iii) only  b) i) , iii) and iv) only  c) ii) and iv) only  d) i) ,ii), and iv) only  Answer: b) i) , iii) and iv) only | **1** |
| **iii.** | Which of the following is an application of data science?   1. Text summarization 2. Target Advertisements 3. Face lock in smartphones 4. Email filters     **Answer:** (b) Target Advertisements | **1** |
| **iv.** | is the process of finding instances of real-world objects in images or videos?   1. Instance segmentation 2. Object detection 3. Classification 4. Image segmentation   **Answer:** (b) Object Detection | **1** |
| **v.** | Which Python package helps in accessing structured data (in tabular form)?  (a) CSV Reader  (b) Spreadsheet Parser  (c) SQL Integrator  (d) Pandas  **Answer:** (d) Pandas | **1** |
| **vi.** | F1 Score is the measure of the balance between   1. Accuracy and Precision 2. Precision and Recall 3. Recall and Accuracy 4. Recall and Reality   **Answer:** (b) Precision and Recall | **1** |
| **Q. 4** | **Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)** |  |
| **i.** | How many tokens are there in the sentence given below?  **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.**  (a) 46 (b) 42 (c) 31 (d) 35  **Answer**: a) 46 | **1** |
| **ii.** | 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, favoriting/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  Answer: d) YouTube | **1** |

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| **iii.** | 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?   1. Data gathered with respect to stadium, bowlers, opponent team and health is known as Testing Data. 2. Data given to an AI model to check accuracy and precision is Testing Data. 3. Training data and testing data are acquired in the Data Acquisition stage. 4. Training data is always larger as compared to testing data.   **Answer:** (a)Data gathered with respect to stadium, bowlers, opponent team and health is known as Testing Data. | **1** |
| **iv.** | Answer: b) 1 -> (ii) ; 2 -> (i) ; 3 -> (ii) ; 4 -> (i) | **1** |
| **v.** | Which feature of NLP helps in understanding the emotions of the people mentioned with the feedback?   1. Virtual Assistants 2. Sentiment Analysis 3. Text classification 4. Automatic Summarization   **Answer:** (b) Sentiment Analysis | **1** |
| **vi.** | What will be the output of the word “studies” if we do the following:  a. Lemmatization  b. Stemming  (a) study , studi  (b) studi , study  (c) study , study  (d)studi , studi  **Answer:** (a)study , studi | **1** |

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| **Q. 5** | **Answer any 5 out of the given 6 questions (1 x 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.   1. Computer Vision 2. Data Science 3. Natural Language Processing 4. None of these   **Answer:** (c) Natural Language Processing | **1** |
| **ii.** | Imagine a model telling you that there exists treasure at a point and you keep on digging there but it turns out that it is a false alarm. The prediction result in this case is  (a)True positive  (b)True negative  (c)False positive  (d)False negative  **Answer**: (c) False positive | **1** |
| **iii.** | means a picture element which is the smallest unit of information that makes up a picture.   1. Vision 2. Pics 3. Pixel 4. Piskel   **Answer:** (c) Pixel | **1** |
| **iv.** | What do you mean by syntax of a language?   1. Meaning of a sentence 2. Grammatical structure of a sentence 3. Semantics of a sentence 4. Synonym of a sentence   **Answer:** (b) Grammatical structure of a sentence | **1** |

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| **v.** | Which algorithms result in two things, a vocabulary of words and frequency of the words in the corpus?   1. Sentence segmentation 2. Tokenisation 3. Bag of words 4. Text normalisation   **Answer:** (c) Bag of words | **1** |
| **vi.** | Assume that you are working at MyFlight which is a major airlines company and that you have noticed that the way passengers board your planes is an inefficient use of time and resources. On an average, the current boarding system wastes about four minutes per boarding. This wastes about 35000 rupees per day across all flights. The boarding protocols make the company less competitive and thus create an unfavorable brand image. Using a modified boarding, passengers can board the plane from the sides rather than from the back to the front. This will eliminate four minutes of waste. Taking this as the problem, choose which of the following would be the ideal problem statement template.  a) Our passengers have a problem that it takes more time when one has to board the plane. An ideal solution would be to use different airlines.  b) Our passengers have a problem that the current boarding system wastes time while waiting in the airport. An ideal solution would be to board the plane before the airline crew gets into the plane.  c) Our airlines have a problem that the current boarding system wastes four minutes of time when passengers aboard the plane. An ideal solution would be to board the plane from the sides rather than from the back to the front.  d) Our airlines have a problem that it takes more time when passengers have to board the plane. An ideal solution would be to sell the airlines.  Answer: c) Our airlines have a problem that the current boarding system wastes four minutes of time when passengers aboard the plane. An ideal solution would be to board the plane from the sides rather than from the back to the front. | **1** |

**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.

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| **Q. 6** | List two best practices for effective communication.  **Answer:**   1. Use simple language 2. Be respectful of others’ opinions 3. Do not form assumptions on culture, religion or geography 4. Try to communicate in person as much as possible 5. Use visuals 6. Take help of a translator to overcome differences in language   (2 marks for any two correct points from the above) | **2** |
| **Q. 7** | What is the importance of setting goals in life?  **Answer:**   1. The process of goal setting in your life helps you decide on how to live your life, where you want to be, and how you want to be in the future. 2. It helps you to focus on the end result instead of less important work. 3. This will make you successful in your career and personal life.   (2 marks for any one valid justification given above or any relevant answer) | **2** |
| **Q. 8** | “*The Trojan Horse was a wooden horse said to have been used by the Greeks during the Trojan War to enter the city of Troy and win the war”.*  What does Trojan horse mean in computer terminology?  **Answer:**  A Trojan Horse is a type of malware which  disguises itself i.e., it appears to be a useful software program but once it reaches a computer it starts behaving like a virus and destroys data.  (1 mark for acting like useful program and, 1 mark for the words destroying/corrupting/deleting data)  or  (only ½ marks will be allotted if only malware/harmful program/virus/ term is mentioned) | **2** |
| **Q. 9** | How is society helping entrepreneurs in their business?  **Answer:**  Society is helping entrepreneurs by   1. Creating needs 2. Providing raw material 3. buying/selling of items 4. making money   (2 marks for any two valid points) | **2** |
| **Q. 10** | Mention any two human activities that lead to environmental degradation.  **Answer:**  1.Use of fertilisers, pesticides, etc. for increasing the production of crops.  2.Cutting down of forests for personal use such as construction of buildings, factories etc  (1 mark for each valid point, or any two relevant answers other than the above) | **2** |

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

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| **Q. 11** | | 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.  Answer: The four steps of effective time management which Sameera must have followed are: (i) Organise (ii) Prioritise (iii) Control (iv) Track | **2** | |
| **Q. 12** | | Sirisha and Divisha want to make a model which will organize the unlabeled input data into groups based on features. Which learning model should they use and why?  **Answer:**  Clustering model/Unsupervised learning is used to organize the unlabeled input data into groups based on features.  Clustering is an unsupervised learning algorithm which can cluster unknown data according to the patterns or trends identified out of it. The patterns observed might be the ones which are known to the developer or it might even come up with some unique patterns out of it.  (1 mark for identifying the name of the algorithm and 1 mark for explanation) | **2** | |
| **Q. 13** | | Ajay wants to access data from various sources. Suggest him any two points that he needs to keep in mind while accessing data from any data source.  **Answer:**  While accessing data from any of the data sources, following points should be kept in mind:   1. Data which is available for public usage only should be taken up. 2. Personal datasets should only be used with the consent of the owner. 3. One should never breach someone’s privacy   to collect data.   1. Data should only be taken from reliable sources as the data collected from random sources can be wrong or unusable. 2. Reliable sources of data ensure the authenticity of data which helps in the proper training of the AI model. 3. Data should be relevant to the problem.   (any two; 1 mark for each valid point) | **2** | |
| **Q. 14** | | Explain the term resolution with an example.  **Answer:**  Resolution of an image refers to the number of pixels in an image, across the width and height. For example, a monitor resolution of 1280×1024. This means there are 1280 pixels from one side to the other, and 1024 from top to bottom.  (1 mark for explanation; 1 mark for example) | **2** | |
| **Q. 15** | | Identify any two stop words which should not be removed from the given sentence and why?  Get help and support whether you're shopping now or need help with a past purchase. Contact us at [abc@pwershel.com](mailto:abc@powershell.com) or on our website [www.pwershel.com](http://www.powershell.com/)  **Answer:**  Stopwords in the given sentence which should not be removed are:  @, . (fullstop) ,\_(underscore) , 123(numbers) These tokens are generally considered as stopwords, but in the above sentence, these tokens are part of email id. removing these tokens may lead to invalid website address and email ID. So, these words should not be removed from the above sentence.  (1 mark for identifying any two stop words from the above, and 1 mark for the valid justification.) | **2** | |
| **Q. 16** | | Draw the confusion matrix for the following data   * the number of true positive = 100 * the number of true negative 47 * the number of false positive = 62 * the number of false negative = 290   **Answer:**   |  |  |  |  | | --- | --- | --- | --- | | *Confusion Matrix* | | *Reality* | | | *Yes* | *No* | | *Prediction* | *Yes* | *100* | *62* | | *No* | *290* | *47* |   (½ marks each for mapping the values in the correct section, ½ \*4=2 marks) | **2** | |
| **Answer any 3 out of the given 5 questions in 50– 80 words each (4 x 3 = 12 marks)** | | |  | |
| **Q. 17** | | Samarth attended a seminar on Artificial Intelligence and has now been asked to write a report on his learnings from the seminar. Being a non-technical person, he understood that the AI enabled machine uses data of different formats in many of the daily based applications but failed to sync it with the right terminologies and express the details. Help Samarth define Artificial Intelligence, list the three domains of AI and the data that is used in these domains.  Answer:  Artificial Intelligence (AI) refers to any technique that enables computers to mimic human intelligence i.e., make decisions, predict the future, learn and improve on its own. With respect to the type of data fed in the AI model, AI models can be broadly categorized into three domains: 1. Data sciences 2. Computer vision 3. Natural Language Processing Data Science takes input in the form of numeric and alphanumeric data. Computer Vision takes input in the form of images and videos. Natural Language Processing takes input in the form of text and speech. (1 mark for definition of AI; ½ mark each for the names of the domains; ½ mark each for the type of data input to domains) | **4** | |
| **Q. 18** | | Akhil wants to learn how to scope the problem for an AI Project. Explain him the following:   1. 4W Problem Canvas 2. Problem Statement Template   **Answer:**  The 4Ws Problem canvas helps in identifying the key elements related to the problem. The 4Ws are Who, What, Where and Why   * The “Who” block helps in analysing the people getting affected directly or indirectly due to the problem. * The “What” block helps us to determine   the nature of the problem.   * The “Where” block helps us to look into the situation in which the problem arises, the context of it, and the locations where it is prominent. * The “Why” block suggests to us the benefits which the stakeholders would get from the solution and how it will benefit them as well as the society   **Problem Statement Template**   |  |  |  | | --- | --- | --- | | Our | [stakeholders] | Who | | Have a problem that | [need] | What | | When/while | [context/ location/ situation] | Where | | An ideal solution would be | [solution] | Why |   (½ mark each for explanation of 4w s; 2 marks for drawing the problem statement template with correct words in it or explaining the problem statement template)  or  (1 mark to be allotted if only 4Ws are written without explanation) | **4** | |
| **Q. 19** | | Identify and explain the types of the learning-based approaches in the figures given below.  Figure1        Figure 2  **Answer:**  The learning-based approaches shown in the given figures are Supervised learning and Unsupervised learning.  Figure 1: In a supervised learning model, the dataset which is fed to the machine is **labelled**. In other words, we can say that the **dataset is known to the person** who is training the machine only then he/she is able to label the data. A label is some information which can be used as a tag for data.  Here, labelled images of dog and cat are fed into the model and trained. The model correctly identifies the given input as dog.  Figure 2: An unsupervised learning model works on **unlabelled dataset**. This means that the data which is fed to the machine is random and there is a possibility that the person who is training the model does not have any information regarding it. The **unsupervised learning models are used to identify relationships, patterns and trends out of the data which is fed into it.** It helps the user in understanding what the data is about and what are the major features identified by the machine in it.  Here, images of a set of animals are fed into the AI model and the model clusters them based on similar features  (1 mark each for identifying each term supervised learning and unsupervised learning; 1 mark per explanation of each term) | **4** | |
| **Q. 20** | 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.  **Answer:**  Yes, we might face any challenges if we try to teach computers how to understand and interact in human languages.  The possible difficulties are:   1. Arrangement of the words and meaning - the computer has to identify the different parts of a speech. Also, it may be extremely difficult for a computer to understand the meaning behind the language we use. 2. Multiple Meanings of a word - same word can be used in a number of different ways which according to the context of the statement changes its meaning completely. 3. Perfect Syntax, no Meaning - Sometimes, a statement can have a perfectly correct   syntax but it does not mean anything. For example, take a look at this statement:  *Chickens feed extravagantly while the moon drinks tea.*  This statement is correct grammatically but does this make any sense? In Human language, a perfect balance of syntax and semantics is important for better understanding.  (1 mark for Yes and 1 mark each for the points on possible difficulties) | | **4** |
| **Q. 21** | | An AI model made the following sales prediction for a new mobile phone which they have recently launched:   |  |  |  |  | | --- | --- | --- | --- | | Confusion Matrix | | Reality | | | Yes | No | | Prediction | Yes | 50 | 40 | | No | 12 | 10 |  1. Identify the total number of wrong predictions made by the model. 2. Calculate precision, recall and F1 Score.   **Answer:**  Ans: (i)the total number of wrong predictions made by the model is the sum of false positive and false negative. FP+FN=40+12= 52  (ii) Precision=TP/(TP+FP)  =50/(50+40) 50/90  =0.55  Recall=TP/(TP+FN)  =50/(50+12)  =50/62  =.81  F1 Score = 2\*Precision\*Recall/(Precision+Recall)  =2\*0.55\*.81/(.55+.81)  =.891/1.36  =0.65  (1 marks for part (i) and ½ mark for each formula and ½ mark each for substitution of values in part(ii))  Please note: the mathematical calculations can be ignored | 4 | |