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TCS–421

B. TECH. (CSE) (FOURTH SEMESTER)

END SEMESTER EXAMINATION, June, 2023

FUNDAMENTALS OF STATISTICS AND ARTIFICIAL INTELLIGENCE

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty.**

(iv) Each sub-question carries 10 marks.

1. (a) "Artificial Intelligence is a field of Computer Science that is used almost in every filed." Comment on the above statement explaining the advantages and

challenges of AI. Explain the application and usage of Artificial Intelligence in Medical Diagnosis and Education. (CO1)

(b) Explain various components of any Artificial Intelligence Program. Discuss the Intelligent Agents in detail by specifying the various types of agents in AI. (CO1)

(c) What do you mean by State Space diagram ? How state diagram can be helpful in building an AI application ? Explain with the help of an example. (CO1)

2. (a) What do you understand by Problem Solving Methodology ? Explain the structure of Problem-Solving Agent with the help of diagram. Also explain the steps to be followed for formulating any problem and its solution. (CO2)

(b) What do you mean by obtaining the optimized solution to any AI Problem ? Explain Hill Climb Algorithm with algorithm. Also explain all variants of Hill Climb Algorithm. (CO2)

(c) "Expert Systems are the important aspects of AI application." Comment of the above statement. Explain the components of any expert System. Also give the working of any *one* expert system. (CO2)

3. (a) Explain the term Data Science in detail. Explain all the phases of data science life cycle. (CO3)

(b) "Artificial Intelligence can be useful for enhancing the capabilities of business organizations." Comment on the above statement specifying the benefit of AI in decision making process for any business organization. Also give the difference between Business Intelligence and Data Science. (CO3)

(c) What is Data Scientist ? Explain all the role and responsibilities of Data Scientist also specify the difference between Data Scientist, Data Engineer, and Data Analyst with example of each. (CO3)

4. (a) Explain all Statistical Modelling techniques in detail with the help of an examples for each of them. (CO4)

(b) Define the terms Standard Deviation and Variance. Calculate the Standard Deviation and Variance for the following data : (CO4)

Class	Frequency
10	32
20	53
30	27
40	18
50	20
60	19

(c) Discuss the following functions in detail with the help of an example : (CO4)

(i) dtypes()
(ii) drop()
(iii) query()
(iv) iloc()

5. (a) What do you mean by Descriptive Statistics ? Name and explain *two*

approaches for descriptive statistics. With respect to analysis explain the difference between univariate, bivariate and multivariate analysis. (CO5)

(b) Assume that you have a dataset (Data1.csv) downloaded to your system. Give the code to implement two ML algorithm Decision Tree and Random Forest. Give all the code statement to Load the dataset, Display the information about dataset, Divide the dataset into test and training set, implement random forest and decision tree calculate, and display the accuracy of both. (CO5)

(c) Write short notes on the following : (CO5)

(i) ANOVA
(ii) Correlation and Covariance
(iii) Exponential Regression