VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY (VSSUT), ODISHA

Odd Mid Semester Examination for Academic Session 2025-26

COURSE NAME: **B.TECH** SEMESTER: **5th**

BRANCH NAME: **IT**

SUBJECT NAME: **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING**

FULL MARKS: **30** TIME: **90 Minutes**

Answer **All** Questions.

The figures in the right hand margin indicate Marks. *Symbols carry usual meaning.*

Q1. Answer all Questions. **[2 × 3]**

a) Define Artificial Intelligence and its applications. - CO1

b) What is free variable and bound variable? - CO2

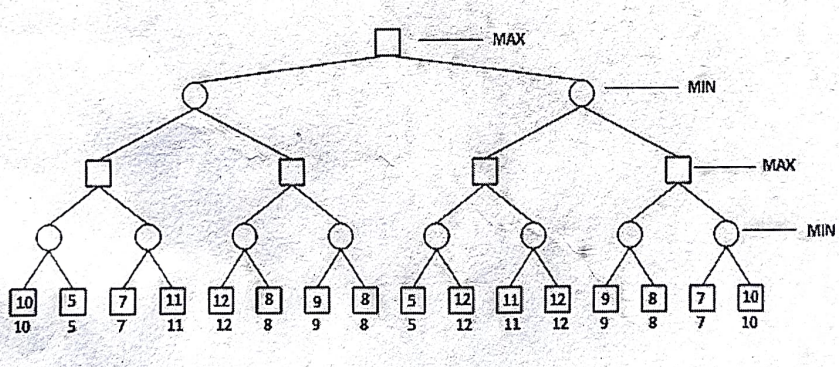
c) Write down the K-Means Clustering algorithm. - CO3

Q2. **[8]**

Explain the working of the Simple Hill Climbing algorithm, including its limitations and how it can be improved. - CO1

OR

Solve the following game tree using Alpha-Beta Pruning. - CO1



Q3. **[8]**

Convert the following sentences to Predicate Logic - CO2

(i) Marcus was a man.

(ii) Marcus was a Pompeian.

(iii) All Pompeians were Romans.

(iv) Caesar was a ruler.

(v) All Pompeians were either loyal to Caesar or hated him.

(vi) Everyone is loyal to someone.

(vii) People only try to assassinate rulers they are not loyal to.

(viii) Marcus tried to assassinate Caesar.

(ix) All men are people.

Using Predicate Logic to prove that,

Was Marcus hates Caeser?

OR

Define Resolution. Write the algorithm to convert the well-formed formulas (WFFS) to Clause Form. - CO2

Q4. **[8]**

Consider the following dataset of points in a 2D space: - CO3

(1,2), (2,3), (3,3), (6,5), (8,8), (9,7), (10,7)

Compute the pairwise Euclidean distances between all data points and Perform Agglomerative Hierarchical Clustering with Single Linkage.

OR

Given the points A(3, 7), B(4, 6), C(5, 5), D(6, 4), E(7, 3), F(6, 2), G(7, 2) and H(8, 4), Find the core points and outliers using DBSCAN. Consider the $\varepsilon = 2.5$ and MinPts = 3. - CO3