

CBCS SCHEME

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21CS54

Fifth Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026 Artificial Intelligence and Machine Learning

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Define and explain AI. (10 Marks)
- b. Discuss the stages of vacuun world with diagrammatic representation and also discuss the stages involved in solving the vacuun world problem. (10 Marks)

OR

- 2 a. Explain breadth first search and design an algorithm for the same. (12 Marks)
- b. Explain the components involved in the structure of search algorithms. (08 Marks)

Module-2

- 3 a. Illustrate how A* search can be applied to the Romanian problem to obtain minimized estimated cost while havelling from Arad to Bucharest.

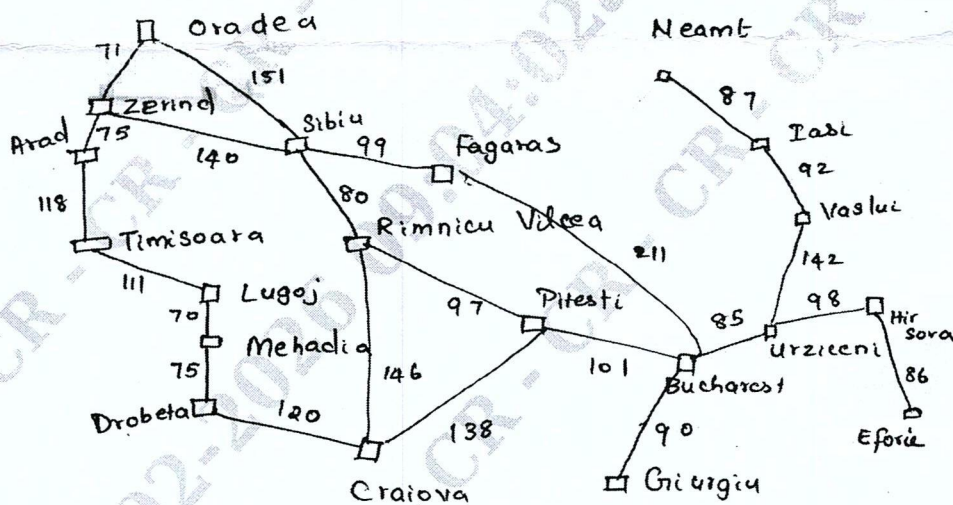


Fig.Q.3(a)

Values of h_{SLD} – Straight Line Distances to Bucharest

Arad 366	Mehadia – 241
Bucharest 0	Neamt – 234
Craiova 160	Ordea 380
Drobeta 242	Pitesti 100
Eforce 161	Rimnicu Vilcea 193
Fagaras 176	Sibiu 253
Giurgiu 77	Timisoara 329
Hirsova 151	Urziceni 80
I a S _L 226	Vablui 199
Lugoj 244	Zerind 374

(14 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

- b. Explain the conditions of optimality in A* search.

(06 Marks)

OR

- 4 a. Discuss :

- i) Skewness
- ii) Kurtosis
- iii) Mean absolute deviation
- iv) Coefficient of variation

(10 Marks)

- b. Discuss the characteristics of Big Data along with the definition of data.

(10 Marks)

Module-3

- 5 a. Discuss candidate elimination algorithm.

(12 Marks)

- b. Differentiate between instance based learning and model based learning.

(08 Marks)

OR

- 6 a. Consider the training dataset which describes the award performance of individual students based on GPA and number of projects done.

Sl. No.	GPA	No. of projects done	Award
1	9.5	5	Yes
2	8.0	4	Yes
3	7.2	1	No
4	6.5	5	Yes
5	9.5	4	Yes
6	3.2	1	No
7	6.6	1	No
8	5.4	1	No
9	8.9	3	Yes
10	7.2	4	Yes

Given a test instance (GPA = 7.8, No. of projects done = 4), use the training set to classify the test instance using K-nearest neighbor classifier, choose K = 3. (15 Marks)

- b. Explain classical and adaptive machine learning systems.

(05 Marks)

Module-4

- 7 a. Assess a students performance using Naïve Baye's algorithm for the following data set:

	CGPA	Interactiveness	Practical knowledge	Communication skills	Job offer
1.	≥ 9	Yes	Very good	Good	Yes
2.	≥ 8	No	Good	Moderate	Yes
3.	≥ 9	No	Average	Poor	No
4.	< 8	No	Average	Good	No
5.	≥ 8	Yes	Good	Moderate	Yes
6.	≥ 9	Yes	Good	Moderate	Yes
7.	< 8	Yes	Good	Poor	No
8.	≥ 9	No	Very good	Good	Yes
9.	≥ 8	Yes	Good	Good	Yes
10.	≥ 8	Yes	Average	Good	Yes

(12 Marks)

- b. Discuss validation and pruning of decision trees.

(08 Marks)

OR

- 8 a. Discuss structure of decision tree along with its advantages and disadvantages. (10 Marks)
b. Design an algorithm for the construction of regression trees. (10 Marks)

Module-5

- 9 a. Discuss the types of ANN along with the activation functions. (14 Marks)
b. Discuss the advantages and disadvantages of clustering algorithms. (06 Marks)

OR

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- 10 a. Design an algorithm for self organized features Map. (12 Marks)
b. Discuss the advantages and disadvantages of ANN along with its limitations. (08 Marks)
