



B.E DEGREE EXAMINATIONS: NOV/DEC 2022

(Regulation 2018)

Seventh Semester

MECHATRONICS ENGINEERING

U18MCE0004:Artificial Intelligence and Machine Learning

COURSE OUTCOMES

- CO1:** Express the basic concepts of Artificial Intelligence.
CO2: Demonstrate the usage of planning and decision making.
CO3: Interpret the ideas of machine learning by supervised and unsupervised learning Methods.
CO4: Apply Linear Regression and Logistic Regression machine learning methods.
CO5: Summarize the concepts of Artificial Neural Networks.
CO6: Describe various Artificial Neural Networks methodology.

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

(Answer not more than 40 words)

- | | | |
|--|-----|-------------------|
| 1. Define agent with an example. | CO1 | [K ₁] |
| 2. State PEAS description for Internet Shopping system with its complete state space? | CO1 | [K ₂] |
| 3. State the limitations of propositional logic when it is used for knowledge representation | CO2 | [K ₂] |
| 4. List the steps involved in knowledge engineering process | CO2 | [K ₁] |
| 5. Comment on problem of generalization. | CO3 | [K ₂] |
| 6. Enumerate the techniques used to select an optimal number of clusters in a dataset. | CO3 | [K ₁] |
| 7. Recall the cost function for Multivariate Linear Regression. | CO4 | [K ₁] |
| 8. Comment on Gradient Decent for Linear Regression | CO4 | [K ₁] |
| 9. What is a multilayer perceptron? | CO5 | [K ₁] |
| 10. Outline the role of activation function in a neural network? | CO6 | [K ₁] |

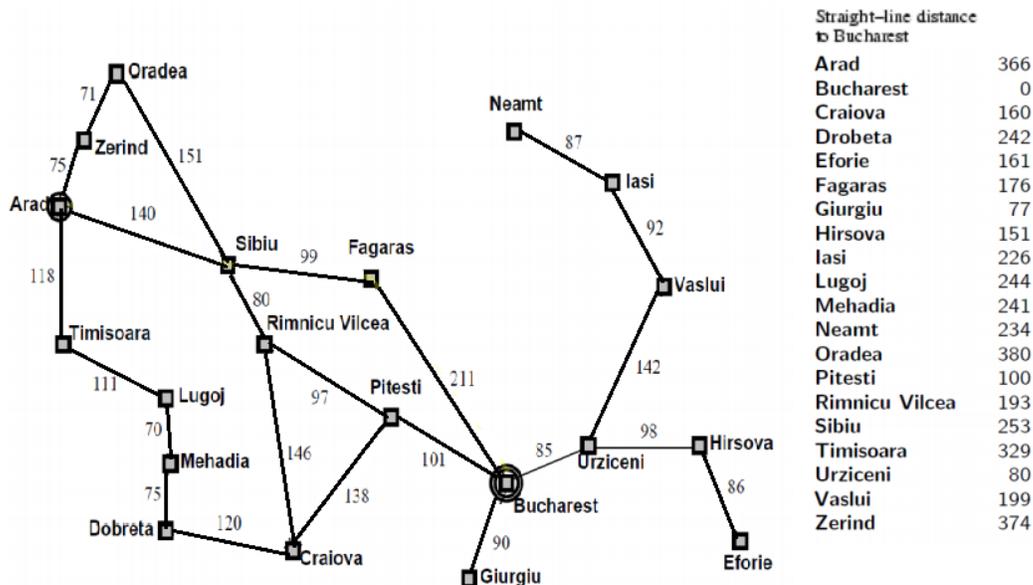
Answer any FIVE Questions:-

PART B (5 x 16 = 80 Marks)

(Answer not more than 400 words)

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|--|----|-----|-------------------|
| 11. a) Name the properties of task environments. Give a brief description about each of
it. Write the characteristics of the following task environments. | 16 | CO1 | [K ₁] |
| i) Medical diagnosis | | | |
| ii) Image analysis | | | |
| iii) Crossword puzzle | | | |
| iv) Interactive English tutor | | | |

12. a) Explain the structure of a goal based agent 6 CO1 [K₁]
 b) Analyze the greedy best first and A* heuristic search strategies for the given graph to find an optimal search path between “Arad to Bucharest”. 10 CO1 [K₂]



13. a) Differentiate Forward and backward reasoning. 8 CO2 [K₁]
 b) List the planning steps in Air Cargo Transport Problem and apply PDDL to describe the problem domain. 8 CO2 [K₃]
14. a) Explain how color quantization problem can be solved using k-means algorithm 12 CO3 [K₂]
 b) Compare Supervised and Unsupervised Learning Methods. 4 CO3 [K₁]
15. a) Elaborate on Hypothesis representation of logistic regression. Recall the cost function of logistic regression model using maximum likelihood theory and present the intuition behind choosing the cost function. 10 CO4 [K₃]
 b) List down the techniques used to address the issues of over fitting. 6 CO6 [K₂]
16. a) What are the different layers in Convolution Neural Network? Explain its working with an example. 10 CO5 [K₂]
 b) What is tensorflow? Explain the application of tensor flow. 6 CO6 [K₂]
