

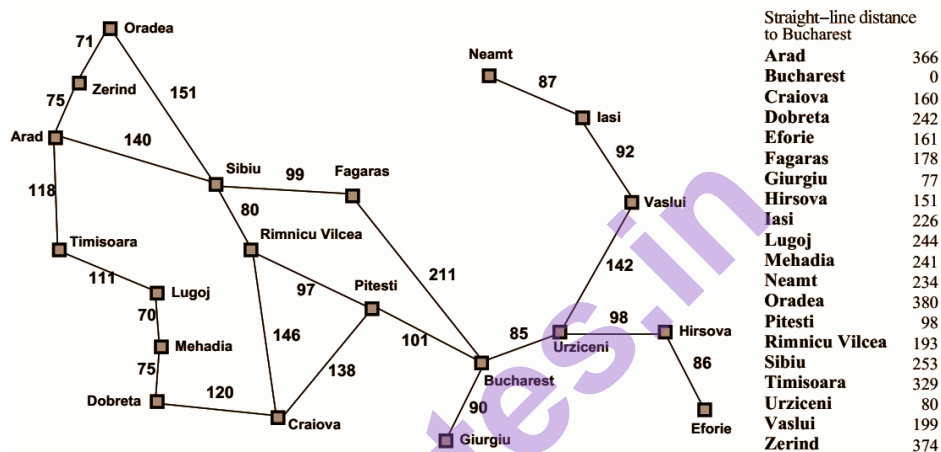
(3 Hours)

[Total Marks: 80]

- Note: 1. Question number 1 is **compulsory**.
 2. Solve any **three** questions out of the remaining **five** questions
 3. Assume suitable data if necessary.
 4. Figure to the right indicates full marks.

Q.1 Solve any **Four** of the following.

- (a) Consider the graph shown in figure below. Assume that the initial state is Arad and the goal state is Bucharest. Create a search tree to find a path from the initial state to the goal state using Greedy Best First Search. Generate the solution cost using the straight line distance mentioned. **05**



- (b) List different types of neural networks and explain any one in detail. **05**
 (c) Compare supervised and unsupervised machine learning. **05**
 (d) Calculate root mean square error for following electricity consumption dataset **05**

Area	Actual Demand (kW)	Forecasted Demand (kW)
A	56	58
B	45	42
C	68	65
D	49	47
E	26	29
F	40	46
G	52	50
H	38	33
I	30	31
J	48	47

- (e) Demonstrate that data cleansing is an important aspect for unsupervised learning. **05**
- Q.2** (a) Describe McCulloch-Pitts neuron model and discuss its performance for the implementation of NOT, OR, and AND operations. **10**
- (b) Develop the perceptron training rule and state the limitations of it. **10**
- Q.3** (a) Define SVM? Explain the following terms: hyperplane, separating hyperplane, margin, and support vectors with suitable examples. **10**
- (b) Consider the following dataset in Table, from a motor maintenance department based on the high voltage/impulse test performed on the machine. The data set contains three attributes and one class, use Naïves Bayes classifier to evaluate the class (Broken/ Healthy) of status for a {Red, AC motor, Domestic}.

Machine No	Core Color	Type	Origin	Status
1.	Red	DC motor	Domestic	Broken
2.	Red	DC motor	Domestic	Healthy
3.	Red	DC motor	Domestic	Broken
4.	Yellow	DC motor	Domestic	Healthy
5.	Yellow	DC motor	Imported	Broken
6.	Yellow	AC motor	Imported	Healthy
7.	Yellow	AC motor	Imported	Broken
8.	Yellow	AC motor	Domestic	Healthy
9.	Red	AC motor	Imported	Healthy
10.	Red	DC motor	Imported	Broken

- Q.4** (a) Describe different types of clustering methods. **10**
- (b) Examine the role of deep learning in contrast to machine learning with the help of an example. **10**

- Q.5** (a) With the help of a suitable constrained power system model, discuss the challenges in static security assessment. **10**
- (b) Analyze in detail the impact of cyberattack on power system operation and comment on how machine learning methods can address this issue? **10**

Q.6 Write short notes on any **Four**

- (a) Informed and uninformed strategies **05**
- (b) Diversity of data: Structured and unstructured **05**
- (c) Overfitting, bias, and variance **05**
- (d) Confusion matrix **05**
- (e) Wind speed forecasting using machine learning **05**