

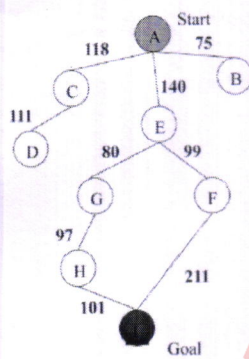
(2 ½ Hours)

[Total Marks: 75]

- N.B. 1) All questions are compulsory.
 2) Figures to the right indicate marks.
 3) Illustrations, in-depth answers and diagrams will be appreciated.
 4) Mixing of sub-questions is not allowed.

Q. 1 Attempt ANY FOUR from the following: (20M)

- Write States, Initial States, Actions, Transition Model, Goal Test and Path Cost for 8-puzzle problem.
- How do Mathematics and Psychology serve as foundational pillars of Artificial Intelligence?
- Write short note on Simple Reflex Agents.
- Explain Iterative Deepening Depth First Search strategy with suitable example.
- What do you mean by PEAS? Mention it for Medical diagnosis system and Part Picking Robot.
- Consider the below search problem along with heuristic values:



State	Heuristic: h(n)
A	366
B	374
C	329
D	244
E	253
F	178
G	193
H	98
I	0

$f(n) = h(n) =$ straight-line distance heuristic

Find the path using Greedy Best First Search Algorithm.

Q. 2 Attempt ANY FOUR from the following: (20M)

- Explain the architecture of Fuzzy Logic System.
- Explain the concept of Polynomial Regression.
- What is a Backpropagation Neural Network and how does it work?
- What do you mean by Knowledge Representation? Explain any two types of Knowledge.
- Explain the concept of Decision Tree. Build a decision tree for the restaurant waiting problem.
- What is overfitting and underfitting in machine learning? How do they affect model performance?

Q. 3 Attempt ANY FOUR from the following:**(20M)**

- Explain Bayesian Learning with an example.
- Write a short note on Passive Reinforcement Learning.
- Explain Q- Learning in detail.
- Explain the concept of Unsupervised Learning.
- Explain Maximum-likelihood parameter learning for Continuous models.
- Consider the database given below.

Transaction ID	Items
T1	Idli, Dosa, Vada, Payasam
T2	Idli, Pongal, Dosa, Filter Coffee
T3	Idli, Filter Coffee, Kesari
T4	Filter Coffee, Pongal, Kesari
T5	Kesari, Dosa, Payasam, Filter Coffee
T6	Pongal, Filter Coffee, Idli

Calculate:

- Support (Dosa)
- Support (Idli, Dosa)
- Confidence (Filter Coffee \Rightarrow Kesari)
- Confidence (Idli \Rightarrow Pongal)
- Lift (Dosa, Payasam)

Q. 4 Attempt ANY FIVE from the following:**(15M)**

- Define heuristic function. Give an example heuristic function.
- Describe problem formulation of vacuum world problem
- Write note on -
 - Universal Quantifier
 - Existential Quantifier
- What is an Artificial Neural Network
- Write in short about hidden and Latent Variables.
- Write a note on Naive Bayes models.
