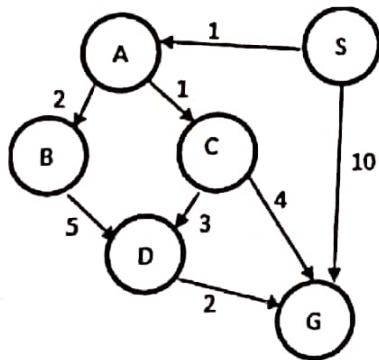(2 ½ Hours) [Total Marks: 75]

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)
(a) What is PEAS? Give a PEAS description for playing a tennis match and vacuum cleaner problem.
(b) Define AI? Explain any 2 foundations of AI
(c) Explain the 8-Queens Problem and write the States, Initial state, Actions, Transition Model, Goal state & Path cost to formulate it.
(d) Explain Depth First Strategy along with pseudocode.
(e) Write a short note on model based agent.
(f) Find the optimal path & path cost for the following graph using A* search algorithm. (S is a Start state & G is a Goal State)

State	h(n)
S	5
A	3
B	4
C	2
D	6
G	0

Q. 2 Attempt **ANY FOUR** from the following: (20M)
(a) Describe knowledge representation. Explain frame representation technique of knowledge representation in detail.
(b) Write a note on Multilayer Feed Forward Neural Network.
(c) Explain the concept of Overfitting and Underfitting of model.
(d) What is Regression? Explain Simple Linear Regression with example.
(e) Define Ensemble Learning. Explain Boosting technique in detail.
(f) Explain KNN classifier with example.

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Q. 3   Attempt **ANY FOUR** from the following: (20M)
(a)   Write a short note on Q learning.
(b)   Differentiate between reinforcement and unsupervised learning.

(c)   For the given transaction dataset-

TID	Items Bought
100	Bread, Cheese
200	Bread, Cheese, Juice
300	Bread, Milk
400	Cheese, Juice, Milk

Calculate the following :-
i)   Support(bread)   ii) Support(bread->milk)
iii) Confidence(bread->cheese)   iv) Confidence(bread->milk)
v)   Lift(bread->cheese)

(d)   Explain Hidden Markov Model in detail.
(e)   What is Clustering? Explain with example.
(f)   Write a short note on association rule mining.

Q. 4   Attempt **ANY FIVE** from the following: (15M)
(a)   Explain Turing Test Approach in AI.
(b)   Explain Deterministic vs Stochastic Task Environment with suitable example.
(c)   Write a note on Active Reinforcement learning.
(d)   Explain Bellman Equation in detail.
(e)   What is the role of Reasoning in AI?
(f)   Explain the concept of gradient descent.

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