Reg. No. : | | | | | | | | | | |

Question Paper Code: 98602

B.E./B.Tech. DEGREE EXAMINATION, MAY 2024

Sixth Semester

Information technology

19UIT602- Artificial Intelligence

(Regulations 2019)

Duration: Three hours Maximum: 100 Marks

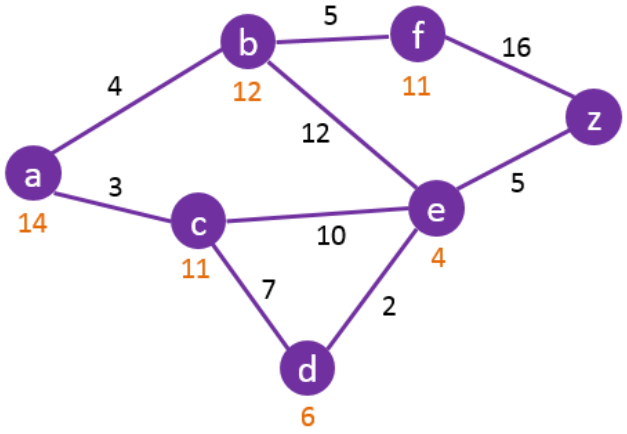
Answer All Questions

PART A - (5x 5 = 25 Marks)

1.	What is an intelligent agent? Define the structure of Intelligent agents.	CO1- U
2.	List the types of Hill Climbing search techniques and explain with example.	CO1- U
3.	How does certainty factor help in dealing with uncertainty? Explain with reference to rule based system.	CO1- U
4.	How the decision is improved with a Utility Function?	CO1- U
5.	When using features to represent the Q-function is it guaranteed that the feature-based Q-learning finds the same optimal Q* as would be found when using a tabular representation for the Q-function?.	CO3- Ana

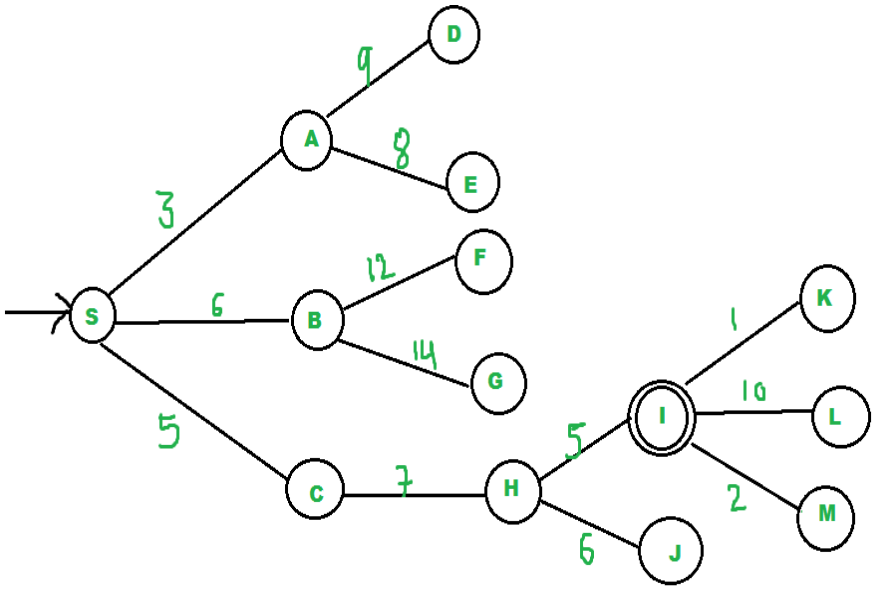
PART – B (5 x 15= 75 Marks)

6.	(a)	What do you mean by Intelligent Agent? Explain its types and state the limitation of each and how it overcome in another type agent	CO1-App	(15)
		Or		
	(b)	Write a short notes on state space representation and explain the terms goal test, path, initial state and successor function for toy problems	CO1-App	(15)
7.	(a)	Consider the search problem below with start state S and goal state G. The transition costs are next to the edge and the heuristic values are next to the states. What is the final cost using A* Search.	CO2-App	(15)



Or

(b) Consider the graph given in figure below. Assume that the initial state is S and goal state is I. Find a path from the initial state to the goal state using Best First Search. Also report the solution cost. CO2-App (15)



8. (a) You have two neighbours, John and Mary, who have promised to call you at work when they hear the alarm. John always calls when he hear the alarm, but sometimes confuses the telephone ringing with the alarm and calls then, too. Mary on the other hand, likes rather loud music and sometimes misses the alarm altogether. Given the evidence of who has or has not called, we would like to estimate the probability of a burglary. Draw a Bayesian network for this domain with suitable probability tables. CO2-App (15)

Or

(b) Consider a situation in which we want to reason about the relationship between smoking and lung cancer. Intuitively, we know that whether or not a person has cancer in directly influenced by whether he is exposed to second-hand smoke and whether he smokes. Both of these things are affected by whether his parents smoke. Cancer reduces a person's life expectancy. CO2-App (15)

(i) Draw the Bayesian network

(ii) How many independent values are required to specify all the conditional probability tables (CPTs) for your network?

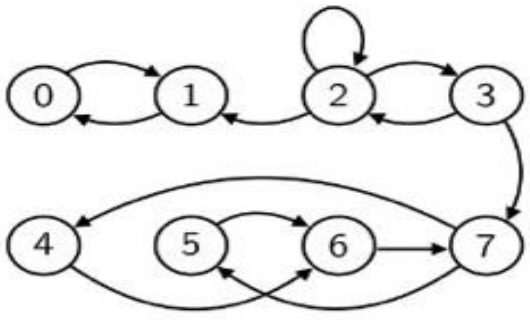
9. (a) Consider the Markov Chain with three states, S={1,2,3}, that has the following transition matrix CO1-U (15)

$$P=\begin{bmatrix} 1/2 & 1/4 & 1/4 \\ 1/3 & 0 & 2/3 \\ 1/4 & 1/2 & 0 \end{bmatrix}$$

a. Draw the state transition diagram for this chain.
b. If we know $P(X_1=1)=(P(X_1=2)=1/4$, find $P(X_1=3,X_2=2, X_3=1)$

Or

(b) Consider the following Markov Chain. For each of the parts below, you only need to know that each are represents a positive probability. CO1-U (15)



(a) Determine the communicating classes
(b) Determine the period for each communicating classes
(c) Determine which communicating classes are recurrent and which ones are transient

10. (a) Explain various techniques involved in active reinforcement learning. CO2- App (15)

Or

(b) Discuss in detail about Q Learning with example. CO2- App (15)