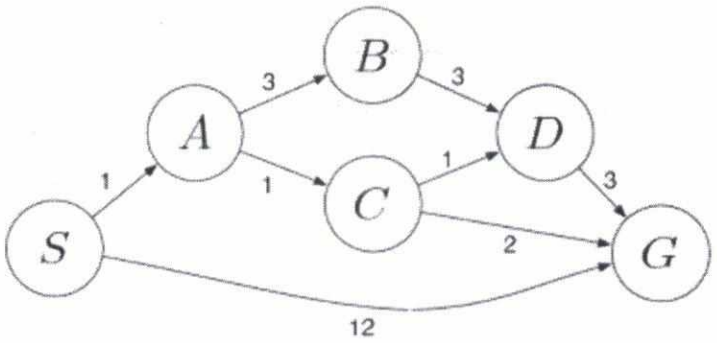
Roll Number:_____

Thapar Institute of Engineering & Technology, Patiala

Department of Computer Science and Engineering

BE	Course Code: UCS411 Course Name: Artificial Intelligence
March 1, 2023	Duration 5:30-8:30pm
Time: 3 Hours, M. Marks: 100	Name Of Faculty: Dr. Swati Kumari

Note: All questions are compulsory. Attempt question in sequence.

Q1	For the search space shown below, find the optimal path from S to G using uniform cost search algorithm. Also discuss the performance evaluation of UCS algorithm. 	15(8+7)
Q2	Discuss about the performance evaluation and limitations of DFS algorithm with example. Also state the difference between DFS and DFS-ID algorithm	15(9+6)
Q3	A) State the difference between independent and mutually exclusive event? B) Discuss the concept of replacement about the event. C) Let R be raining and C be cloudy. The probability of raining is 0.0001, probability of cloudy is 0.1 and probability of cloudy given raining is 0.8. Find what is the probability of raining given cloudy is.	12(4+3+5)
Q4	A) Identify the type of data (Nominal/Ordinal/Discrete/Continuous)? a) Number of computers in each department b) Names of car brands c) Daily wind speed d) Names of month B) What is the role of training and testing data? C) Briefly discuss about the tasks of supervised learning with example.	13(4+4+5)
Q5	Consider the following dataset and use the K-Nearest Neighbor (KNN) to compute the weight of the test instance given in the dataset (set k=3, distance=Euclidean).	10

		Sr. No.	Height	Age	Weight	
		1	5	45	77	
		2	5.11	26	47	
		3	5.6	30	55	
		4	5.9	34	59	
		5	4.8	40	72	
		6	5.8	36	60	
		7	5.3	19	40	
		8	5.8	28	60	
		9	5.5	23	45	
		10	5.6	32	58	
		Test Instance	5.5	38	Weight?	
Q6.	.A) State the attribute selection measures used in the ID3 to construct decision tree? B) Consider the following data and find the root node attribute of the decision tree?					20(8+12)
		Age	Income	Student	Credit_rating	Buys_computer
		<=30	Hight	No	Fair	No
		<=30	Hight	No	Excellent	No
		31...40	Hight	No	Fair	Yes
		>40	Medium	No	Fair	Yes
		>40	Low	Yes	Fair	Yes
		>40	Low	Yes	Excellent	No
		31...40	Low	Yes	Excellent	Yes
		<=30	Medium	No	Fair	No
		,=30	Low	Yes	Fair	Yes
		>30	Medium	Yes	Fair	Yes
		<=30	Medium	Yes	Excellent	Yes
		31...40	Medium	No	Excellent	Yes
		31...40	High	Yes	Fair	Yes
		>40	Medium	No	Excellent	No
Q7	Discuss and illustrate the structure of rule based expert system for medical diagnosis. Also compare the expert system with respect to human experts and conventional programs.					15