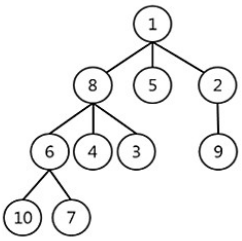
BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: M.Tech/Pre-PhD **SEMESTER : I**
BRANCH: ECE **SESSION : MO/2025**

SUBJECT: EC509 ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	Compare the informed and non-informed search method. Discuss the Breadth first and Depth First search strategies. Using Breadth first search method, determine the order of the vertices to be visited in the below graph. 	[5]	CO1	BL3
Q.1(b)	Describe the exploration and exploitation property of genetic algorithm. Explain the operation of particle swarm optimization.	[5]	CO1	BL2
Q.2(a)	Define regression. Differentiate between linear regression and logistic regression with example. Compare the different learning strategies of the neural network.	[5]	CO2, CO3	BL3
Q.2(b)	Describe the ANOVA test. The manager of a theatre complex with four theatres wanted to see whether there was a difference in popularity of the four movies currently showing for Saturday afternoon with the following results: 86, 77,84,81 customers viewed movies 1,2,3, and 4 respectively. Obtain the test to see whether there is a difference in popularity of the movies at 5% level of significance. (Chi-squared value at α=0.05 is 7.815)	[5]	CO2	BL4
Q.3(a)	Discuss the overfitting in neural network and its causes. Define Cover's theorem. State the role of radial basis functions in exact interpolation in RBFNN.	[5]	CO2	BL2
Q.3(b)	Describe the backpropagation learning method of neural network and its limitations.	[5]	CO3	BL3
Q.4(a)	State the deep learning concept. Describe the convolutional neural network for classification.	[5]	CO4	BL2
Q.4(b)	Outline the concept of Autoencoder network. Describe the Siamese deep network with its learning strategy.	[5]	CO4	BL4
Q.5(a)	Compare Fuzzy logic with crisp logic with example. Explain various elements of Fuzzy expert system.	[5]	CO5	BL2
Q.5(b)	State the difference between Mamdani and Sugeno Fuzzy inference System. Describe the Mamdani Fuzzy inference system with suitable example.	[5]	CO5	BL3

::::24/11/2025:::::