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BDS602

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025

Artificial Intelligence and Machine Learning

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.**2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1			M	L	C
Q.1	a.	Define Artificial Intelligence (AI). Explain the history of AI in brief and also describe the four categories of AI.	10	L2	CO1
	b.	Discuss PEAS description in the context of AI with suitable examples.	10	L2	CO1
OR					
Q.2	a.	Explain the agent program for a simple reflex agent in a two-state vacuum environment with a schematic diagram.	10	L2	CO1
	b.	With a neat schematic diagram, discuss a model based-goal based agent.	10	L2	CO1
Module – 2					
Q.3	a.	Explain the informal description of the tree search problem and graph search problem with their functions.	10	L2	CO2
	b.	Describe toy problems and real world problems with an example each. Explain the 8-puzzle problem solved by a problem-solving AI agent and show action sequences. Using a state space tree.	10	L2	CO2
OR					
Q.4	a.	Solve the following problem and implement your solution in python using the Depth First Search (DFS) strategy. You have two jugs with capacities of 5 gallons and 3 gallons, respectively without any measurement markings. There is an endless supply of water available from a tap your task is to obtain exactly 4 gallons of water in the 5-gallon jug.	10	L3	CO2
	b.	Explain how Breadth-first search algorithm works. With a neat figure.	10	L2	CO2
Module – 3					
Q.5	a.	Explain the concept of machine learning in your own words. How does it differ from AI, Deep learning and Data science?	4	L2	CO3
	b.	Describe the components of the knowledge pyramid with neat sketch.	6	L2	CO3
	c.	With a neat figure, explain how do the five point summary contribute to understanding a datasets distribution with an example.	10	L2	CO3

OR

Q.6	a.	Describe the concept of reinforcement learning with an example and characteristics.	10	L2	CO3
	b.	With necessary equations, discuss the following: i) Mean ii) Geometric mean iii) Median iv) Standard deviation v) Mean absolute deviation	10	L2	CO3

Module – 4

Q.7	a.	Describe covariance and correlation of bivariate statistics.	10	L2	CO4
	b.	Solve the following set of equations using Gaussian elimination method: $2x_1 + 4x_2 = 6$ $4x_1 + 3x_2 = 7$	10	L3	CO4

OR

Q.8	a.	Consider a training dataset of 4 instances as shown in Table 1. It contains the details of the performance of students and likelihood of getting a job offer or not in their final semester. Apply find-s algorithm. <div>Table : 1</div> <table><tr><th>CGPA</th><th>Interact</th><th>Knowledge</th><th>Skills</th><th>Logical</th><th>Interest</th><th>Offer</th></tr><tr><td>≥ 9</td><td>Yes</td><td>Excellent</td><td>Good</td><td>Fast</td><td>Yes</td><td>Yes</td></tr><tr><td>≥ 9</td><td>Yes</td><td>Good</td><td>Good</td><td>Fast</td><td>Yes</td><td>Yes</td></tr><tr><td>≥ 8</td><td>No</td><td>Good</td><td>Good</td><td>Fast</td><td>No</td><td>No</td></tr><tr><td>≥ 9</td><td>Yes</td><td>Good</td><td>Good</td><td>Slow</td><td>No</td><td>Yes</td></tr></table>	CGPA	Interact	Knowledge	Skills	Logical	Interest	Offer	≥ 9	Yes	Excellent	Good	Fast	Yes	Yes	≥ 9	Yes	Good	Good	Fast	Yes	Yes	≥ 8	No	Good	Good	Fast	No	No	≥ 9	Yes	Good	Good	Slow	No	Yes	10	L3	CO4
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≥ 9	Yes	Good	Good	Slow	No	Yes																																		
	b.	Discuss singular value decomposition technique with equations.	10	L2	CO4																																			

Module – 5

Q.9	a.	With a neat diagram, describe Mcculloch Pitts Neuron Mathematical Model.	10	L2	CO5
	b.	Discuss the principle of perceptron model and explain the steps of perceptron algorithm.	10	L2	CO5

OR

Q.10	a.	Explain different types of artificial neural networks.	10	L2	CO5
	b.	Describe the architecture of radial basis function neural network and explain the algorithm.	10	L2	CO5
