

CBCS SCHEME

USN

--	--	--	--	--	--	--	--	--	--

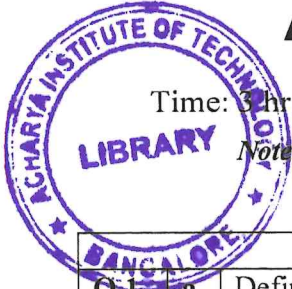
BDS602

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2026 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. Explain in detail the foundations of AI.	10	L2	CO1
	b.	Describe the concept of Simple Reflex Agent and Goal based agent with a neat diagram.	10	L2	CO1
OR					
Q.2	a.	Describe the various properties of Task environment with relevant examples.	10	L2	CO1
	b.	Describe the concept of Model-based Reflex agents and Utility based agents with a neat diagram.	10	L2	CO1
Module – 2					
Q.3	a.	Explain 5 components for a well-defined problem by considering an 8-puzzle problem as an example.	10	L2	CO2
	b.	Explain uniform-cost search strategy algorithm by considering a suitable example to find the path from C to Z. [Refer Fig.Q3(b)]	10	L2	CO2
Fig.Q3(b)					
OR					
Q.4	a.	Define Heuristic Function. Explain Greedy best first search and solve for the following graph to find path from the initial state 'A' to the goal state 'G'. [Refer Fig.Q4(a)]	10	L2	CO2
Fig.Q4(a) [NOTE: number associated with each node is heuristic value]					
	b.	Explain A* search algorithm for minimizing the total estimated solution cost.	10	L2	CO2
Module – 3					
Q.5	a.	Define Machine Learning. List and explain the types of machine learning.	10	L2	CO3
	b.	Explain atleast 5 charts in detail that help in univariate data visualization.	10	L2	CO3

OR

Q.6	a.	Explain in detail the Machine Learning process model with relevant diagram.	08	L2	CO3
	b.	For the given univariate dataset $S = \{10, 15, 5, 20, 25, 30\}$ of marks. Calculate the following: i) Mean, Median ii) Variance and Standard deviation iii) Five-point summary with boxplot iv) Geometric mean	12	L3	CO3

Module – 4

Q.7	a.	Solve the following numerical: i) Find the correlation coefficient of the data hours studied $(x) = \{2, 4, 6, 8, 10\}$ and Test scores $(y) = \{45, 50, 65, 70, 85\}$ ii) Solve the following set of equations using Gaussian elimination method $2x_1 + 4x_2 = 6$ and $4x_1 + 3x_2 = 7$.	10	L3	CO4
	b.	Explain the following : i) Feature Engineering ii) Singular Value Decomposition	10	L2	CO4

OR

Q.8	a.	Write Fins-S Algorithm. Apply the same on the following data set for the target “Job Offer” :					12	L3	CO4		
		CGPA	Interactive-ness	Practical Knowledge	Communi- cation Skills	Logical Thinking				Interest	Job 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
	b.	Write the algorithm for the following : i) K-nearest Neighbour Algorithm ii) Weighted K-Nearest Neighbour Algorithm					08	L2	CO4		

Module – 5

Q.9	a.	Explain with neat diagram McCulloch and Pitts Model of an artificial neuron along with any 5 activation functions.	10	L2	CO5
	b.	Describe with neat diagram the Perception Learning Model. Write the relevant algorithm.	10	L2	CO5

OR

Q.10	a.	Explain the different types of Artificial Neural Networks with a neat diagram.	08	L2	CO5
	b.	Consider the network architecture with 4 input units and 2 output units. Train the Self-Organizing Feature Map (SOFM) networks by determining class memberships of the input data. $x_1 : (1, 0, 1, 0)$ $x_2 : (1, 0, 0, 0)$ $x_3 : (1, 1, 1, 1)$ $x_4 : (0, 1, 1, 0)$ Output Units : Unit 1, Unit 2 Learning rate $\eta = 0.6$ Initial weight matrix $\begin{bmatrix} \text{Unit 1} \\ \text{Unit 2} \end{bmatrix} : \begin{bmatrix} 0.3 & 0.5 & 0.7 & 0.2 \\ 0.6 & 0.5 & 0.4 & 0.2 \end{bmatrix}$	12	L3	CO5
