Reg. No.															

Question Paper Code	12816

M.E. / M.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2024

Second Semester

Industrial Safety Engineering

20PISPC205 – MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE FOR INDUSTRIAL SAFETY

Regulations - 2020

Duration: 3 Hours Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	Define machine learning.	2	K1	CO1
2.	On what basis inductive bias is important for machine learning performance?	2	K1	CO1
3.	Outline the architecture of artificial neural network (ANN).	2	K2	CO2
4.	Illustrate genetic algorithm with example.	2	K2	CO2
5.	Determine the medical diagnosis use case application of cognitive computing.	2	K2	CO3
6.	In what way does the visual system contribute to cognitive processes?	2	K2	CO3
7.	List the characteristics of knowledge engineering.	2	K2	CO4
8.	Which statement is the production rule in AI?	2	K1	CO4
9.	Define BPN model.	2	K1	CO5
10.	Mention the different parameters in neural networks.	2	K1	CO5

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

			Marks	K – Level	CO
11.	a)	Apply the candidate elimination algorithm to learn a concept of classifying fruits as either "apple" or "non-apple" based on their color and taste attributes.	13	K3	CO1
		OR			
	b)	Develop a decision tree algorithm for the following scenario, a candidate who has a job offer and wants to decide whether he should accept the offer or Not. So, to solve this problem, the decision tree starts with the root node (Salary attribute by ASM). The root node splits further into the next decision node (distance from the office) and one leaf node based on the corresponding labels. The next decision node further gets split into one decision node (Cab facility) and one leaf node. Finally, the decision node splits into two leaf nodes (Accepted offers and Declined offer).	13	K3	CO1

12.	a)	Assume that the neurons have the sigmoid activation function to perform forward and backward pass on the network. And also assume that the actual output of y is 0.5 and the learning rate is 1. Now perform the back propagation using back propagation algorithm.	*13*	*K4*	*CO2*
		OR			
	b) i)	Examine the focused learning (FOCL) algorithm in machine learning.	*6*	*K4*	*CO2*
	ii)	Distinguish reinforcement learning algorithm and supervised learning algorithm.	*7*	*K4*	*CO2*
13.	a) i)	Explain in detail about the application of artificial intelligence.	*7*	*K2*	*CO3*
	ii)	Compare LISP with prolog.	*6*	*K2*	*CO3*
		OR			
	b) i)	List the various components of thoughts in cognitive process.	*6*	*K2*	*CO3*
	ii)	A business man wants to know whether word count and country of origin impact the probability that an email is spam. To understand the relationship between these two predictor variables and the probability of an email being spam, researchers can perform logistic regression.	*6*	*K2*	*CO3*
14.	a)	Build the learning system for driverless Car, the training data is fed to algorithm like how to drive car in highway, busy and narrow street with factors like speed limit, parking, stop at signal etc. After that, a logical and mathematical model is created on the basis of that and after that, the car will work according to the logical model. Also, the more data the data is fed the more efficient output is produced.	*13*	*K4*	*CO4*
		OR			
	b)	Design architecture of expert system with neat sketch and explain the forward chaining and backward chaining.	*13*	*K4*	*CO4*
15.	a) i)	Brief about the recurrent neural network (RNN). Explain the types of recurrent neural network in detail.	*7*	*K1*	*CO5*
	ii)	Describe in detail about convolutional neural networks (CNN). Explain with the example.	*6*	*K1*	*CO5*
		OR			
	b)	Show the architecture of back propagation neural network with neat sketch and explain the each components.	*13*	*K1*	*CO5*

PART - C (1× 15 = 15 Marks)

16.	a)	Design the architecture of fuzzy logic system with neat diagram and explain the each components and characteristics.	*15*	*K4*	*CO6*
		OR			
	b)	To implement an L-layered deep neural network and train it on the MNIST dataset. The MNIST dataset contains scanned images of handwritten digits, along with their correct classification labels (between 0-9). MNIST's name comes from the fact that it is a modified subset of two data sets collected by NIST, the United States' National Institute of Standards and Technology.	*15*	*K4*	*CO6*