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Code No. : 14267 AS N/O

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD**

Accredited by NAAC with A++ Grade

**B.E. IV-Semester Advanced Suppl. Examinations, Aug./Sept.-2023****Machine Learning**

(Common to CSE &amp; AIML)

Time: 3 hours

Max. Marks: 60

*Note: Answer all questions from Part-A and any FIVE from Part-B***Part-A (10 × 2 = 20 Marks)**

Q. No.	Stem of the question	M	L	CO	PO																																			
1.	Write the various applications of Machine Learning.	2	1	1	1,2																																			
2.	Define concept learning.	2	2	1	1,2																																			
3.	Define & Compute Entropy for the following Dataset S Where Elevation, Roadtype, Speed limit are attribute and speed is the target.	2	3	2	1,2,3																																			
	<table border="1"> <thead> <tr> <th>Elevation</th> <th>RoadType</th> <th>Speed limit</th> <th>Speed</th> </tr> </thead> <tbody> <tr> <td>Steep</td> <td>Uneven</td> <td>Yes</td> <td>Slow</td> </tr> <tr> <td>Steep</td> <td>Smooth</td> <td>Yes</td> <td>Slow</td> </tr> <tr> <td>Flat</td> <td>Uneven</td> <td>No</td> <td>Fast</td> </tr> <tr> <td>Steep</td> <td>Smooth</td> <td>No</td> <td>Fast</td> </tr> </tbody> </table>	Elevation	RoadType	Speed limit	Speed	Steep	Uneven	Yes	Slow	Steep	Smooth	Yes	Slow	Flat	Uneven	No	Fast	Steep	Smooth	No	Fast																			
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4.	Draw single layer artificial neural network architecture.	2	2	2	1,2																																			
5.	Compute the conditional probability P(M/S) where Given P(S)=0.4, P(M)=0.3 and P(S/M)=0.9.	2	3	3	1,3																																			
6.	Why Bayesian learning methods are important?	2	2	3	1,2																																			
7.	What is the practical issue in applying k-Nearest neighbor algorithm?	2	1	4	1,2,4																																			
8.	Construct the Case based Reasoning for Designing the water faucet.	2	3	4	1,2																																			
9.	What are the factors that motivated the popularity of Genetic algorithms?	2	2	5	1,2,3																																			
10.	Find the output dimension of Conv layer 1 if the input image is 514*514 and kernel size is 7*7 with zero padding and stride is 2.	2	3	5	1,2																																			
<b>Part-B (5×8 = 40 Marks)</b>																																								
11. a)	Demonstrate find-S algorithm in detail considering the given dataset.	4	3	1	1,2,3																																			
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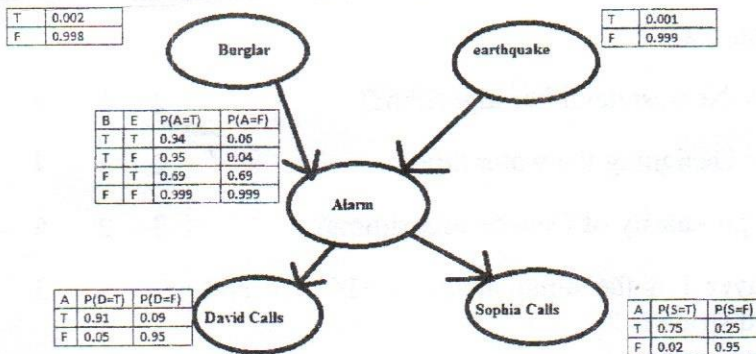
Contd... 2



- b) Write a short note on choosing the training experience in designing a learning system. 4 1 1 1,2
- 12. a) What is Artificial Neural Network? Explain hidden layer representations in back propagation. 4 2 2 1,2
- b) Present the ID3 algorithm for learning decision trees and illustrates its operations in detail by using the below given Dataset Patient\_record where which drug to suggest for patient P11. 4 3 2 1,2,3

Patient Id	Age	Gender	BP	Cholesterol	Drug
P1	Young	Female	High	Normal	Drug A
P2	Young	Female	High	High	Drug A
P3	Middle Age	Female	High	Normal	Drug B
P4	Senior	Female	Normal	Normal	Drug B
P5	Senior	Male	Low	Normal	Drug B
P6	Senior	Male	Low	High	Drug A
P7	Middle Age	Male	Low	High	Drug B
P8	Young	Female	Normal	Normal	Drug A
P9	Young	Male	Low	Normal	Drug B
P10	Senior	Male	Normal	Normal	Drug B
P11	Middle Age	Female	Low	Normal	?

- 13. a) Describe Bayesian belief networks. Compute the following:  
 $P(D, \bar{S}, A, B, E)$  4 3 3 1,2,3



- b) Discuss Expectation Maximization Clustering Algorithm 4 1 3 1,2
- 14. a) Illustrate k-Nearest neighbor algorithm for classification with an example. 4 3 4 1,2,3
- b) What is reinforcement learning? Explain in detail about Q Learning. 4 2 4 1,2
- 15. a) Explain genetic operators in genetic algorithm (GA) and give example for Uniform operator. 4 2 5 1,2
- b) What is Convolutional Neural Network (CNN)? Construct all the layers of CNN with a neat diagram. 4 3 5 1,2

16. a)	Discuss about list-then-eliminate algorithm.	4	3	1	1,2
b)	State about the information gain used to measure the reduction in entropy.	4	2	2	1,2
17.	Answer any <i>two</i> of the following:				
a)	State the Bayes Theorem. Illustrate the Naïve bayes classification algorithm with an example.	4	2	3	1,2
b)	Discuss the significance of locally weighted regression.	4	1	4	1,2
c)	Represent the program discovered by the Genetic Programming as a tree, Illustrate the operator by applying it using two copies of your tree as two parents.	4	3	5	1,2,3

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	35%
iii)	Blooms Taxonomy Level – 3 & 4	45%

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