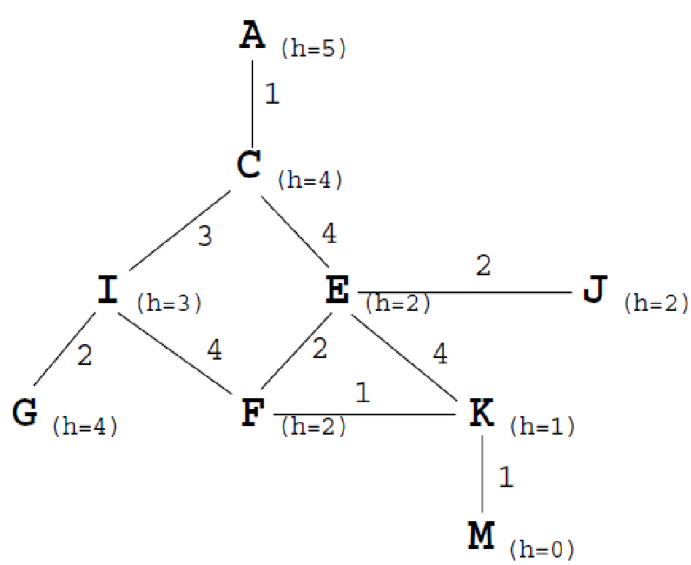
SETHU INSTITUTE OF TECHNOLOGY, KARIAPATTI (An Autonomous Institution Affiliated to Anna University, Chennai) Regulation 2019/2021/R2021 (Question Bank)	
Department:CSE	**Subject name : ARTIFICIAL INTELLLIGENCE AND MACHINE LEARNING**
Subject code : 21UCS603	**Question Pattern : Part A: ? Marks** **Part B: ? Marks** **Part C: ? Marks**
Course Coordinator :	**Time Duration :**

PART – B (2 Marks or 3 Marks)		
UNIT - I (Minimum 8 Questions)		
1.	Define the terms: Agent and Agent Function.	**CO1 U**
2.	Differentiate uninformed and informed search strategies .	**CO1 U**
3.	Compares Uninformed Search Strategies in terms of the four evaluation criteria	**CO1- U**
4.	Give a complete problem formulation for the following. Choose a formulation that is precise enough to be implemented. You have three jugs, measuring 12 gallons, 8 gallons, and 3 gallons, and a water faucet. You can fill the jugs up or empty them out from one to another or onto the ground. You need to measure out exactly one gallon.	**CO2- AP**
5.	Why problem formulation must follow the goal formulation?	**CO1 U**
6.	What is the difference between DFS and BFS?	**CO1 U**
7.	List the criteria to measure the performance of search strategies.	**CO1 U**
8.	Define Artificial Intelligence	**CO1 U**
UNIT - II (Minimum 8 Questions)		
1.	Convert into CNF B2,1<=> (P1,1 V P2,2 V P3,1)	**CO2 AP**
2.	Given the following statements represented by the variables A, B, and C, translate the following sentence into propositional logic. A – Alice is elected secretary. B – Bert is elected governor. C – Calvin is elected treasurer. If Alice is elected secretary, then either Bert is elected governor or Calvin is elected treasurer.	**CO2 AP**
3.	Give the components of the knowledge Based System?	**CO1 U**
4.	List Out Two Kinds Of Synchronic Rules That Allow Deductions?	**CO1 U**
5.	What is Skolemization.	**CO1 U**
6.	Define Universal And Existential Quantifiers.	**CO1 U**

7.	Define Unification	**CO1 U**
8.	Decide whether each of the following sentences is valid , unsatisfiable or neither. Verify your decisions using truth tables or the equivalence rules. Smoke→Smoke, Smoke→Fire, Smoke V Fire V¬Fire	**CO2 AP**
	UNIT - III (Minimum 8 Questions)	**CO- U/App/Ana**
1.	List out the applications of Bayesian N/W?	**CO1 U**
2.	Define Bayes theorem	**CO1 U**
3.	What are the other approaches to uncertain reasoning?	**CO1 U**
4.	What are the properties of Atomic event?	**CO1 U**
5.	Define Markov Blanket with example	**CO1 U**
6.	Define Join tree and poly tree	**CO1 U**
7.	What do you mean hybrid Bayesian networks	**CO1 U**
8.	Let P(h)=0.01(one in 100 women tested have it) P(e/h)=0.8 and P(e/-h)=0.1(true and false positive rates). What is P(h/e)?	**CO2 AP**
	UNIT - IV (Minimum 8 Questions)	
1.	Mention the different forms of learning	**CO1 U**
2.	What is over fitting	**CO1 U**
3.	What is a training set and how is it used to train neural networks?	**CO1 U**
4.	Give the major issues that affect the design of a learning element	**CO1 U**
5.	Define inductive learning	**CO1 U**
6.	What are the characteristics of SVM	**CO1 U**
7.	How to assess the performance of the learning algorithm	**CO1 U**
8.	State the significance of statistical learning	**CO1 U**
	UNIT - V (Minimum 8 Questions)	**CO- U/App/Ana**
1.	Differentiate supervised and unsupervised learning.	**CO1 U**
2.	List out some applications of unsupervised learning.	**CO1 U**
3.	Define Clustering	**CO1 U**
4.	Describe the different types of clustering techniques.	**CO1 U**
5.	State the strengths and weaknesses of k-means clustering algorithm.	**CO1 U**
6.	Differentiate k-means and k-medoids algorithm with a neat diagram.	**CO1 U**
7.	Describe the concept of single link and complete link in the context of hierarchical	**CO1 U**
8.	What is dendrogram? Explain its uses.	**CO1 U**

	PART – C		
	UNIT - I (Minimum 12 Questions **without** choice) **Font size : Times new roman :12 Line spacing: 1.15**		
1. a.	Provide the PEAS description of the task environment for Internet book-shopping agent, Vaccum Cleaner Agent, Medical Diagnosis System and Autonomous Mars rover. Compare and contrast the properties of task environment	**CO - APP**	(8)
b.	(i) Provide the PEAS description of the task environment for the following activities and Compare with properties of task environment. ● Playing Soccer	**CO -App**	(8)

	• Knitting a sweater		
2.	Explain with neat diagram the four different types of agent programs	**CO1 - U**	(16)
3.	Explain in detail the uninformed search strategies and compare the analysis of various searches.	**CO1 - U**	(16)
4.	Explain with neat diagram the four different types of agent programs	**CO1 - U**	(16)
5.	Provide the PEAS description of the task environment for Internet book-shopping agent, Vaccum Cleaner Agent, Medical Diagnosis System and Autonomous Mars rover. Compare and contrast the properties of task environment	**CO1 - U**	(16)
6..	Consider the tree shown below. The numbers on the arcs are the arc lengths. Assume that the nodes are expanded in alphabetical order when no other order is specified by the search, and that the start state is A and goal is state M. No visited or expanded lists are used. What order would the states be expanded by each type of search? Stop when you expand G. Write only the sequence of states expanded by each search. Write only the sequence of states expanded by the following search i) Breadth-first search ii) Depth-first search iii) Iterative deepening search 	**CO 2 - App**	(16)
7.	Illustrate the various steps associated with the knowledge engineering Process for one bit full adder.	**CO 1 - U**	(16)
8.	Consider the tree shown below. The numbers on the arcs are the arc lengths. Assume that the nodes are expanded in alphabetical order when no other order is specified by the search, and that the goal is state L. No visited or expanded lists are used. What order would the states be expanded by each type of search?	**CO 2 - App**	(16)

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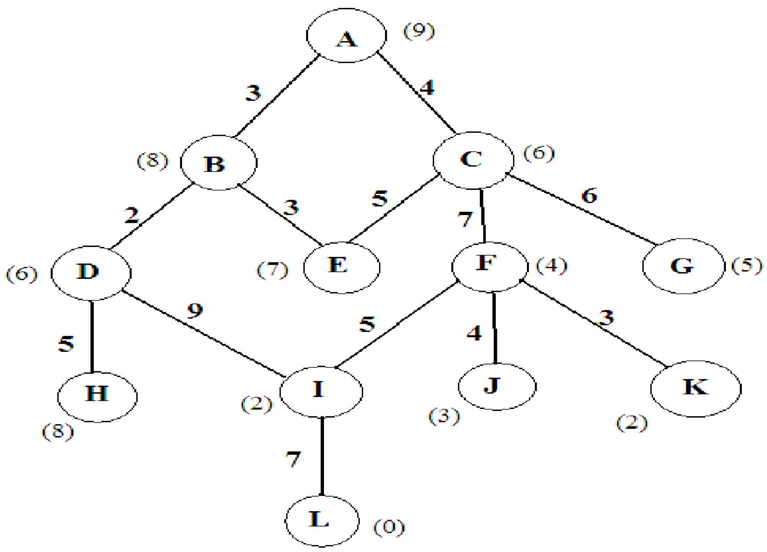
Stop when you expand G. Write only the sequence of states expanded by the following search.

a) Breadth-first search
b) Depth-first search
c) Uniform-Cost Search



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<td>9.</td>
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(i)What are the four basic types of agent program in any intelligent system? Explain any one type using vacuum cleaner agent?
(ii) Consider the tree shown below Fig.1. The numbers on the arcs are the arc lengths. Assume that the nodes are expanded in alphabetical order when no other order is specified by the search, and that the start state is A and goal is state W. No visited or expanded lists are used. What order would the states be expanded by each type of search? Stop when you expand W. Write only the sequence of states expanded by the following search. Breadth-first search
(4)
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<td>CO 2 - App</td>
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<td>10.</td>
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Consider the following facts
1. John likes all kinds of food
2. Apples are food
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<td>CO2-APP</td>
<td>(16)</td>
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	3. Chicken is food 4. Anything anyone eats and isn't killed by its food 5. Bill eats peanuts and is still alive 6. Sue eats everything Bill eats (a) Translate these sentences into formulas in predicate logic (b) Prove that John likes peanuts using backward chaining (c) Convert the formulas of part (a) into clause form (d) Prove that John likes peanut using resolution.		
11.	(i)Determine the Syntax and Semantics of First order logic.	CO1-U	8
	(ii) What are the steps to convert FOL to CNF? Explain Each step with an example	CO1-U	8
12.	Given the following CNF knowledge base. A. Determined (Mario) B. ¬ Determined(x) v Marry(x, Princess) C. ¬ Practice(x) v Defeat(x, y) D. ¬ Defeat(x, Bowser) v ¬ Marry(x, Princess) v Joyful(x) E. ¬ Determined(x) v Defeat(x, y) F. ¬ Practice (Mario) • Please demonstrate how one can prove Joyful(Mario) using Forward Chaining and Resolution as the inference. Show all details of unification needed for each step of the inference process. (You may assume that Mario, Princess, and Bowser are constants, and x and y are variables).	CO2-APP	16
	UNIT - II (Minimum 12 Questions **without** choice) **Font size : Times new roman :12 Line spacing: 1.15**		
1.	Consider the following facts: 1. Ravi likes all kind of food. 2. Apples and chicken are food 3. Anything anyone eats and is not killed is food 4. Ajay eats peanuts and is still alive 5. Rita eats everything that Ajay eats (a) Translate these sentences into formulas in predicate logic. (b) Convert the formulas of a part into clause form. I Prove by Resolution that "Ravi likes peanuts" using resolution. (d) Use Forward Chaining to prove that "what food Rita eats"	**CO 2- APP**	(16)
2.	(i)Determine the Syntax and Semantics of First order logic.	**CO2 - APP**	(10)
	(ii) List the inference rules along with suitable examples for FOL.	**CO2 - APP**	(6)
3	Transform the following facts into FOL and those convert into CNF. •Everyone who loves all animals is loved by someone. •Jack loves all animals. •Either Jack or Curiosity killed the cat, which is named Tuna. •Did Curiosity kill the cat?	**CO2 - APP**	(16)
4.	Consider the following facts. John likes all kinds of food	**CO2 - APP**	(16)

	Apples are food Chicken is food Anything anyone eats and isn't killed by is food Bill eats peanuts and is still alive Sue eats everything bill eats. (i)Transform these sentences into FOL (ii)Arrange those into clause form. (iii)Justify John likes peanuts by resolution. (iv) Justify John likes peanuts by Backward Chaining.		
5.	Consider the following 5 facts that are added to a knowledge base in turn. Hobbit, Hero, Hafling are predicates, FinalBattle is a function, Frodo and Mount Doom are constants, and x and y are variables that are universally quantified. 1. Journey(Frodo, Mount Doom) 2. Hafling(x) → Hobbit(x) 3. Journey(x, y) → FinalBattle(x, y) 4. Hafling(Frodo) 5. Hobbit(x) ^ FinalBattle(x, Mount Doom)→ Hero(x) i) Show how forward chaining can be used to infer whether Frodo is a Hero (i.e.Hero(Frodo)) . ii) Show how backward chaining can be used to infer whether Frodo is a Hero (i.e. Hero(Frodo)). iii) Justify "Frodo is Hero" by resolution.	**CO2 - APP**	(16)
6.	Consider the following facts: 1. Ravi likes all kind of food. 2. Apples and chicken are food 3. Anything anyone eats and is not killed is food 4. Ajay eats peanuts and is still alive 5. Rita eats everything that Ajay eats (a) Translate these sentences into formulas in predicate logic. (b) Convert the formulas of a part into clause form. I Prove by Resolution that "Ravi likes peanuts" using resolution. (d) Use Forward Chaining to prove that "what food Rita eats"	**CO2 - APP**	(16)
7	(i) Write short note on Unification	**CO1 - U**	(6)
	(ii)Explain the forward chaining process with an example and what is the need of incremental forward chaining.	**CO1 - U**	(10)
8.	(i) Differentiate propositional logic with FOL. List the inference rules along with suitable examples for FOL.	**CO1 - U**	(8)
	(ii)What are the steps to convert FOL to CNF? Explain Each step with an example.	**CO1 - U**	(8)
9.	Explain resolution in predicate logic with suitable example.	**CO1 - U**	(16)
	UNIT - III (Minimum 12 Questions **without** choice) **Font size : Times new roman :12 Line spacing: 1.15**		

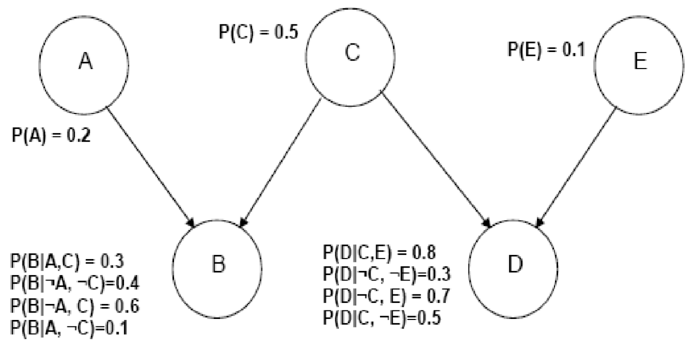
1. (i) Consider the following joint probability table:

	SeeingCheetah		¬ SeeingCheetah	
	Rain	¬ Rain	Rain	¬ Rain
HaveBinoculars	0.01	0.2	0.5	0.1
¬ HaveBinoculars	0.01	0.1	0.04	0.04

1. What is the probability P(¬ SeeingCheetah)?
2. What is the probability P(¬Rain, SeeingCheetah)?
3. What is the probability P(¬ HaveBinoculars | ¬ Rain)?

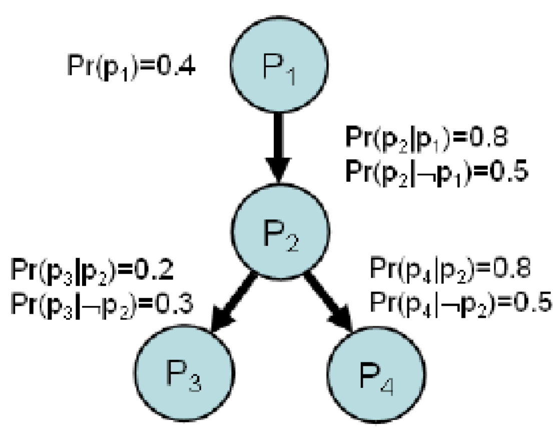
CO2 - APP (8)

2. (ii) Consider the following Bayesian Network. What is the probability **P(¬A, B, C, D, ¬E) ?**



CO2 - APP (8)

3. Given the network below, calculate Pr (¬p3), Pr (p2|¬p3) using Variable elimination algorithm



CO2 - APP (16)

4. Create a Bayesian Networks

You have a new burglar alarm installed.It is reliable about detecting burglary, but responds to minor earthquakes.Two neighbors (John, Mary) promise to call you at work when they hear the alarm.John always calls when hears alarm, but confuses alarm with phone ringing (and calls then also).Mary likes loud music and sometimes misses alarm!.Given evidence about who has and hasn’t called, estimate the probability of a burglary P(Burglary = true | JohnCalls = true,MaryCalls = true).

Give reasonable conditional probability tables for all the nodes.

CO2 - APP (16)

i)How many independent values are contained in the joint probability distribution for eight Boolean nodes, assuming that no conditional independence relations are known to hold among them?
ii)How many independent probability values do your network tables contain?

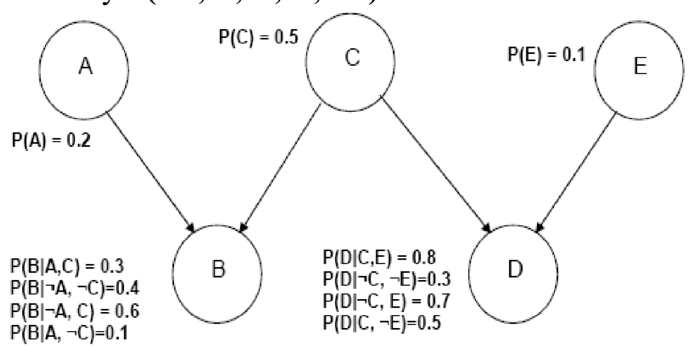
5. i) Consider the following joint probability table:

	SeeingCheetah		¬ SeeingCheetah	
	Rain	¬ Rain	Rain	¬ Rain
HaveBinoculars	0.01	0.2	0.5	0.1
¬ HaveBinoculars	0.01	0.1	0.04	0.04

1. What is the probability P(¬ SeeingCheetah)?
2. What is the probability P(¬Rain, SeeingCheetah)?
3. What is the probability P(¬ HaveBinoculars | ¬ Rain)?

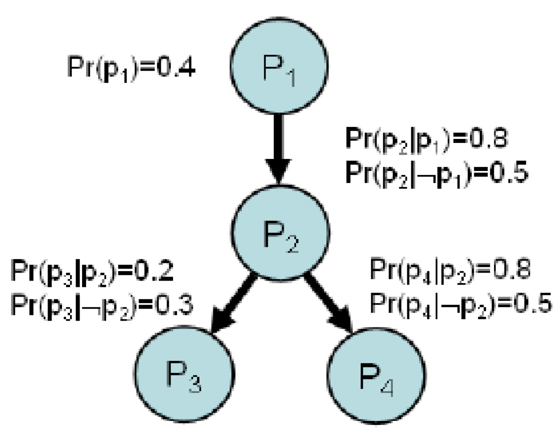
CO2 - APP (16)

6. (ii) Consider the following Bayesian Network. What is the probability **P(¬A, B, C, D, ¬E) ?**



CO2 - APP (16)

7. Given the network below, calculate marginal and conditional probabilities: Pr (¬p3), Pr (p2|¬p3), Pr (p1|p2, ¬p3) using inference by enumeration



CO2 - APP (16)

8. (i) Explain Exact Inference in Bayesian Network with an Example.

CO1 - U (16)

(ii) Explain the process of Inference using full joint distribution with example.

(i) Describe a method for constructing Bayesian
(ii) Networks

(iii) Explain Variable elimination algorithm for
(iv) answering queries on Bayesian networks

9. Apply Naive Bayes classifier for making a decision to PlayTennis using the following attribute:
< Outlook: sunny, Temperature: cool, Humidity: high, Wind: strong >

CO2-APP (16)

Day	Outlook	Temperature	Humidity	Wind	PlayTennis
D1	Sunny	Hot	High	Weak	No
D2	Sunny	Hot	High	Strong	No
D3	Overcast	Hot	High	Weak	Yes
D4	Rain	Mild	High	Weak	Yes
D5	Rain	Cool	Normal	Weak	Yes
D6	Rain	Cool	Normal	Strong	No
D7	Overcast	Cool	Normal	Strong	Yes
D8	Sunny	Mild	High	Weak	No
D9	Sunny	Cool	Normal	Weak	Yes
D10	Rain	Mild	Normal	Weak	Yes
D11	Sunny	Mild	Normal	Strong	Yes
D12	Overcast	Mild	High	Strong	Yes
D13	Overcast	Hot	Normal	Weak	Yes
D14	Rain	Mild	High	Strong	No

Table: Training examples for the target concept *PlayTennis*

10. You are a robot in a lumber yard, and must learn to discriminate Oak wood from Pine wood. Apply Navie Bayes algorithm to classify the sample data. You are given the following (noisy) examples:

CO2-APP (16)

Example	Density	Grain	Hardness	Class
Example #1	Light	Small	Hard	Oak
Example #2	Heavy	Large	Hard	Oak
Example #3	Heavy	Small	Soft	Oak
Example #4	Heavy	Small	Soft	Oak
Example #5	Light	Large	Hard	Pine
Example #6	Light	Small	Soft	Pine
Example #7	Heavy	Large	Soft	Pine
Example #8	Light	Large	Hard	Pine

Consider a new example :
(Density=Heavy ^ Grain=Small ^ Hardness=Hard). Write these class probabilities as the product of α and common fractions from above.

11. Apply Naive Bayes classifier for making a decision to PlayTennis using the following attribute:
< Outlook: sunny, Temperature: cool, Humidity: high, Wind: strong >

CO2 - APP (16)

Day	Outlook	Temperature	Humidity	Wind	PlayTennis
D1	Sunny	Hot	High	Weak	No
D2	Sunny	Hot	High	Strong	No
D3	Overcast	Hot	High	Weak	Yes
D4	Rain	Mild	High	Weak	Yes
D5	Rain	Cool	Normal	Weak	Yes
D6	Rain	Cool	Normal	Strong	No
D7	Overcast	Cool	Normal	Strong	Yes
D8	Sunny	Mild	High	Weak	No
D9	Sunny	Cool	Normal	Weak	Yes
D10	Rain	Mild	Normal	Weak	Yes
D11	Sunny	Mild	Normal	Strong	Yes
D12	Overcast	Mild	High	Strong	Yes
D13	Overcast	Hot	Normal	Weak	Yes
D14	Rain	Mild	High	Strong	No

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Example #2	Heavy	Large	Hard	Oak
Example #3	Heavy	Small	Soft	Oak
Example #4	Heavy	Small	Soft	Oak
Example #5	Light	Large	Hard	Pine
Example #6	Light	Small	Soft	Pine
Example #7	Heavy	Large	Soft	Pine
Example #8	Light	Large	Hard	Pine

Consider a new example :
(Density=Heavy ^ Grain=Small ^ Hardness=Hard). Write these class probabilities as the product of α and common fractions from above.

UNIT - IV (Minimum 12 Questions **without** choice)

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1. Explain about Decision tree learning with an example **CO - U** (16)

2. NASA wants to discriminate Martians (M) from Humans (H) based on these features (attributes): Green $\in\{N,Y\}$, Legs $\in\{2,3\}$, Height $\in\{S,T\}$, Smelly $\in\{N,Y\}$. Your available training data is as follows (N = No, Y = Yes, S = Small, T = Tall): **CO - APP** (16)

Example Number	Height	Green	Legs	Smelly		Target: Species
1	S	Y	3	Y		M
2	T	Y	3	N		M
3	S	Y	3	N		M
4	T	Y	3	N		M
5	T	N	2	Y		M
6	T	Y	2	Y		H
7	S	N	2	N		H
8	T	N	3	N		H
9	S	N	3	N		H
10	T	N	3	N		H

Please note: A human might be green or have three legs for many possible reasons, e.g., if they were an actor playing a Martian as a role in a film or play. Anyway, it's a made-up problem for the test.

Which attribute would information gain choose as the root of the tree? and Draw the decision tree that would be constructed by recursively applying information gain to select roots of sub-trees, as in the Decision-Tree-Learning algorithm

3.	Use a simple perceptron with weights w0,w1 and w2 as -1,2,1 respectively, to classify data points (3,4);(5,2);(1,-3);(-8,-3),(-3,0).	**CO - APP**	(16)
4.	) Explain the basic concept of Support vector machine	**CO 1 - U**	(6)
	ii)Discuss Back Propagation algorithm for learning in multilayer neural network	**CO 1- U**	(10)
5.	A pharmacodynamic study was conducted at Yale in the 1960's to determine the relationship between LSD concentration and math scores in a group of volunteers. The independent (predictor) variable was the mean tissue concentration of LSD in a group of 5 volunteers, and the dependent (response) variable was the mean math score among the volunteers. There were *n*=7 observations, collected at different time points throughout the experiment using Regression model and Find the prediction equation.	**CO2 – APP**	(16)

Time (i)	Score (*Y*)	Conc (*X*)
1	78.93	1.17
2	58.20	2.97
3	67.47	3.26
4	37.47	4.69
5	45.65	5.83
6	32.92	6.00
7	29.97	6.41

6.	Explain about Decision tree learning with an example	**CO - U**	(16)
7	Explain about Artificial Neural network with an example	**CO - U**	(16)
8.	The relation between internal examination marks and external examination marks of the student was taken to develop a regression model.	**CO2 – APP**	(16)

Int	15	23	18	23	24	22	22	19	19	16	24	11	24	16	23
Ext	49	63	58	60	58	61	60	63	60	52	62	30	59	49	68

9.	You are an agricultural robot given the following set of plant examples. Each is assigned a class label of + or — depending on whether or not it is a member of the target class:	CO2 – APP	(16)

Example	Vine?	Fruit?	Leaf?	Class
Watermelon	Yes	Yes	Curly	+
Ivy	Yes	No	Curly	—
Bougainvillea	Yes	No	Flat	—
Kudzu	Yes	No	Flat	—
Maple	No	No	Curly	+
Oak	No	No	Flat	+
Sycamore	No	No	Flat	+
Apple	No	Yes	Curly	—

Draw the decision tree that would be constructed by recursively applying information gain to select roots of sub-trees, as in the Decision-Tree-Learning algorithm
What class is Grape? (Vine=Yes, Fruit=Yes, Leaf=Curly) ?
What class is Orange? (Vine=No, Fruit=Yes, Leaf=Curly)?

10.	Consider a fictional dataset that describes the weather conditions for playing a game of golf. Given the weather conditions, each tuple classifies the conditions as fit("Yes") or unfit("No") for playing golf. **Design a Decision Tree** for the dataset and test the chance of playing golf if the weather condition today = (Sunny, Hot, Normal, False)	CO2 – APP	(16)

	Outlook	Temperature	Humidity	Windy	Play Golf
0	Rainy	Hot	High	False	No
1	Rainy	Hot	High	True	No
2	Overcast	Hot	High	False	Yes
3	Sunny	Mild	High	False	Yes
4	Sunny	Cool	Normal	False	Yes
5	Sunny	Cool	Normal	True	No
6	Overcast	Cool	Normal	True	Yes
7	Rainy	Mild	High	False	No
8	Rainy	Cool	Normal	False	Yes
9	Sunny	Mild	Normal	False	Yes
10	Rainy	Mild	Normal	True	Yes
11	Overcast	Mild	High	True	Yes
12	Overcast	Hot	Normal	False	Yes
13	Sunny	Mild	High	True	No

11.	Explain naiveBayes algorithm with an Example.	CO1 - U	(16)
12.	Second Half of the portion	CO - U /App/Ana/Eva/Cre	(16)
	UNIT - V (Minimum 12 Questions **without** choice)		

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<tr><td></td><td colspan="3">Font size : Times new roman :12 Line spacing: 1.15</td></tr>
<tr><td>1.</td><td>Apply K-means clustering to the following 8 examples to convert into them into 3 clusters: A1=(2,10), A2=(2,5), A3=(8,4), A4=(5,8), A5=(7,5), A6=(6,4), A7=(1,2), A8=(4,9). Assume the initial seeds are A1,A4,A7.</td><td>CO2 – APP</td><td>(16)</td></tr>
<tr><td>2.</td><td>Apply hierarchical clustering to the following 8 examples to convert into them into cluster: A1=(2,10), A2=(2,5), A3=(8,4), A4=(5,8), A5=(7,5), A6=(6,4), A7=(1,2), A8=(4,9).</td><td>CO2 – APP</td><td>(16)</td></tr>
<tr><td>3.</td><td><table>
<tr><td>Int</td><td>15</td><td>23</td><td>18</td><td>23</td><td>24</td><td>22</td><td>22</td><td>19</td><td>19</td><td>16</td><td>24</td><td>11</td><td>24</td><td>16</td><td>23</td></tr>
<tr><td>Ext</td><td>49</td><td>63</td><td>58</td><td>60</td><td>58</td><td>61</td><td>60</td><td>63</td><td>60</td><td>52</td><td>62</td><td>30</td><td>59</td><td>49</td><td>68</td></tr>
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Apply k means clustering to the above data set</td><td>CO2-AP</td><td>AP</td></tr>
<tr><td>4.</td><td>Apply K-means clustering to the following 8 examples to convert into them into 3 clusters: A1=(2,10), A2=(2,5), A3=(8,4), A4=(5,8), A5=(7,5), A6=(6,4), A7=(1,2), A8=(4,9). Assume the initial seeds are A1,A4,A7.</td><td>CO2 – APP</td><td>(16)</td></tr>
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<tr><td>Int</td><td>15</td><td>23</td><td>18</td><td>23</td><td>24</td><td>22</td><td>22</td><td>19</td><td>19</td><td>16</td><td>24</td><td>11</td><td>24</td><td>16</td><td>23</td></tr>
<tr><td>Ext</td><td>49</td><td>63</td><td>58</td><td>60</td><td>58</td><td>61</td><td>60</td><td>63</td><td>60</td><td>52</td><td>62</td><td>30</td><td>59</td><td>49</td><td>68</td></tr>
</table>
Apply k means clustering to the above data set</td><td>CO2 – APP</td><td>(16)</td></tr>
<tr><td>6.</td><td>Apply hierarchical clustering to the following 8 examples to convert into them into cluster: A1=(2,10), A2=(2,5), A3=(8,4), A4=(5,8), A5=(7,5), A6=(6,4), A7=(1,2), A8=(4,9).</td><td>CO2 – APP</td><td>(16)</td></tr>
<tr><td>7.</td><td>Apply Fuzzy clustering for identifying the cloth size using your own dataset</td><td>CO2 – APP</td><td>(16)</td></tr>
<tr><td>8.</td><td>Apply Agglomerative hierarchical clustering for identifying the foods using your own dataset</td><td>CO2 – APP</td><td>(16)</td></tr>
<tr><td>9.</td><td>Apply Fuzzy clustering for identifying the cloth size using your own dataset</td><td>CO2 – APP</td><td>(16)</td></tr>
<tr><td>10.</td><td>Apply fuzzy-means clustering to the following data points
{(1, 3), (2, 5), (6, 8), (7, 9)}</td><td>CO2 – APP</td><td>(16)</td></tr>
<tr><td>11.</td><td>Apply Agglomerative hierarchical clustering for identifying the foods using your own dataset</td><td>CO2 – APP</td><td>(16)</td></tr>
<tr><td>12.</td><td>Apply Fuzzy clustering for identifying the cloth size using your own dataset</td><td>CO2 – APP</td><td>(16)</td></tr>
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