University of Mumbai

Examination 2020 under cluster __(Lead College: _____)

Program: Computer Engineering

Curriculum Scheme: Rev 2016

Examination: BE Semester: VII

Course Code: CSC703 and Course Name: Artificial Intelligence & Soft Computing

Time: 2 hour Max. Marks: 80

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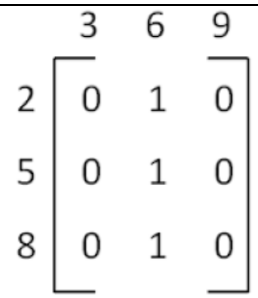
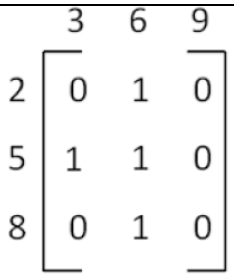
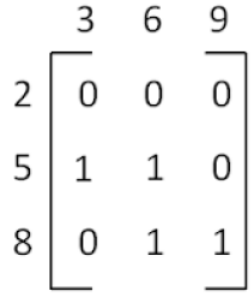
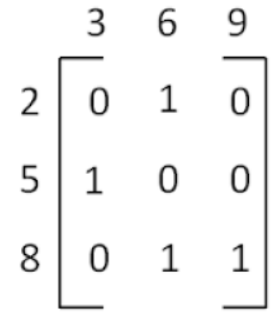
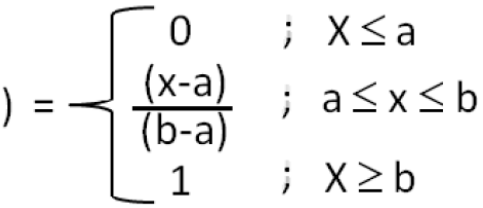
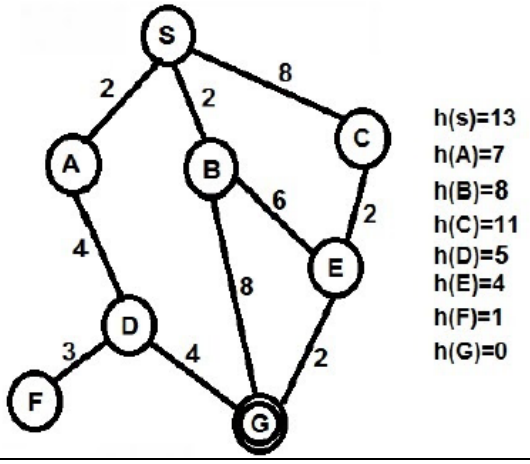
Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	What is rational at any given time does not depends on?
Option A:	Performance Measure
Option B:	Program
Option C:	Environment
Option D:	Action
2.	Which of the following agent does not contain previous history, but works on condition-action rules?
Option A:	Simple Reflex agent
Option B:	Goal base agent
Option C:	Learning agent
Option D:	Model based agent
3.	Which of the following is incorrect statement about soft computing?
Option A:	Soft computing can perform parallel computations
Option B:	Soft Computing relies on formal logic and probabilistic reasoning
Option C:	Soft computing works on exact data.
Option D:	Soft computing is stochastic in nature.
4.	Heuristic value H(n) is _____
Option A:	Distance from root node to current node
Option B:	Distance from only root node to goal node
Option C:	Distance from current node to goal node
Option D:	Distance from any node to root node
5.	Which of the following is example of modus Ponen?
Option A:	{Rule: If [x is power driven] Then [x requires a power source]} {Fact: A Lathe is a machine tool} {New Rule: Lathe requires power source}
Option B:	{Rule: If [x is a machine tool] Then [x has tool holder]} {Fact: A Lathe is a machine tool} {New rule: A Lathe has tool holder}
Option C:	{Rule: X barks and wags tail} {Fact: Tommy is a dog} {New Fact: Tommy barks and wags tail}
Option D:	{Rule : x is icecream} {Rule: x is cold} {New Rule: icecream is cold}
6.	Which of the following is a correct predicate logic statement for given fact "Anything anyone eats and not killed by is food"
Option A:	∀a: ∀b: eats(a) ∧ killed(a) → food(b)
Option B:	∀a: ∃b: eats(a, b) ∧ ¬killed(a) ∧ food(b)

Option C:	∃a: ∃b: eats(a, b) ∧ ¬killed(a) ∧ food(b
Option D:	∀a: ∀b: eats(a, b) ∧ ¬killed(a) → food(b)
7.	Which of the following is a correct CNF statement for given logical statement "∀x:[∃y:Animal(y) ∧ killed(x, y)] →{∀z: ¬ loves(z,x)] "?
Option A:	[∃y:Animal(y) ∧ killed(x
Option B:	¬Animal(y) ∨ ¬ killed(x
Option C:	Animal(y) ∧ killed(x
Option D:	Animal(y) ∨ killed(x
8.	Artificial Network contain highly interconnected processing elements called as,
Option A:	Impulses
Option B:	Neurons
Option C:	Weights
Option D:	Data
9.	Which of the following is not true statement for activation function?
Option A:	Activation function also called as transfer function
Option B:	All activation function types use in single layer are non-linear
Option C:	The sum of the weighted input (net input) is applied with an activation to obtain the neuron response.
Option D:	Output response of a neuron is calculated using activation function.
10.	Which of the following is not a Fuzzy logic terminology?
Option A:	Support
Option B:	Core
Option C:	Equality
Option D:	Fuzzy singleton
11.	A is a fuzzy set, A = {(2, 0.4), (3, 0.7), (4, 0.3), (5, 0.5), (7, 0.6), (8, 0.1), (9, 0.4), (1,0.9)}, And Alpha α = 0.6. What will be the Strong-α cut?
Option A:	a) A = {0.7, 0.6, 0.9}
Option B:	A = {3, 7, 1}
Option C:	A = {3, 1}
Option D:	A = {2, 4, 5, 7, 8, 9}
12.	R & S are crisp relations, and T is a Max-Min composition. T= RoS = T(a,c) =max{min{R(a, b), S(b, c) and ∀b ∈ B}}. If relation R and S given as follows then what will be the T= RoS?

$$R = \begin{array}{c} \\ 2 \\ 5 \\ 8 \end{array} \begin{array}{c} \begin{array}{ccc} 1 & 4 & 7 \end{array} \\ \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \end{array} \qquad S = \begin{array}{c} \\ 1 \\ 4 \\ 7 \end{array} \begin{array}{c} \begin{array}{ccc} 3 & 6 & 9 \end{array} \\ \begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 1 & 1 \end{bmatrix} \end{array}$$

Option A:	RoS = 
Option B:	RoS = 
Option C:	RoS = 
Option D:	RoS = 
13.	For a given membership representation, Which of the following is a correct type of membership function? 
Option A:	Increasing Membership Function
Option B:	Decreasing Membership Function
Option C:	Triangular Membership Function
Option D:	Gaussian Membership Function
14.	Which of the following is incorrect statement about perceptron?
Option A:	The Perceptron network consists of three units, namely, sensory unit (input unit), associator unit (hidden unit), response unit (output unit).
Option B:	The output of the Perceptron network is given by y = f(yin) where f(yin) is an Activation function.

Option C:	The Perceptron learning rule is used in the inputs updation between the sensory unit and the associator unit.
Option D:	The error calculation is based on the comparison of values of targets with those of the calculated outputs.
15.	A neuron with 4 inputs has the weight vector w =[1 2 3 4]T. The activation function is non-linear, the activation function given below. If the input vector is X =[5 6 7 8]T, then what will be the output of the neuron. $f(\text{net}) = \frac{1}{1 + e^{-\text{net}}}$
Option A:	1.0
Option B:	0.1
Option C:	0.8
Option D:	0.7
16.	What is back propagation?
Option A:	It is unsupervised algorithm
Option B:	single layer feed forward network only
Option C:	It is the transmission of error back through the network to adjust the inputs
Option D:	It is the transmission of error back through the network to allow weights to be adjusted so that the network can learn.
17.	Self-Organizing Map (SOM) is a technique which_____
Option A:	Supervised neural network
Option B:	Classifies similar data
Option C:	Reduce the dimensions of data through the use of self-organizing neural networks.
Option D:	Based on inductive learning
18.	How many total layers consist by neuro-fuzzy system?
Option A:	3
Option B:	5
Option C:	4
Option D:	2
19.	A neuro-fuzzy system is a neural network which is functionally equivalent to___
Option A:	Fuzzy inference model
Option B:	Neural network
Option C:	Genetic algorithm
Option D:	Evolutionary algorithm
20.	Hybrid system is not combination of _____
Option A:	probabilistic reasoning
Option B:	fuzzy logic
Option C:	neural networks
Option D:	Search techniques

Q2. **(20 Marks Each)**	**Solve any Four out of Six 5 marks each**
A	Apply A* algorithm on given graph, Find min cost between S-G. 
B	Consider following set of facts, **1.** If A is on top of B then B supports A. **2.** If A is above B and they are touching each other then A is on top of B **3.** The cup is above the book **4.** The cup is touching the book. Prove "book supports cup" using resolution.
C	Define agent and Explain goal based and model based agent with diagram and example.
D	Define Planning agent and explain partial order planning.
E	Define support, core, crossover with suitable diagram.
F	What are the Stages in the development of expert system?

Q3. **(20 Marks Each)**	**Solve any Four out of Six.** **5 marks each**
A	Give State space representation for 8-puzzle Problem. What are possible Heuristic functions for it?
B	What is the use of activation function? Explain types of activation functions.
C	Explain Delta Learning rule with example.
D	Implement AND function using perceptron networks for binary inputs and targets.
E	Explain types of activation functions use in ANN.
F	Define hybrid system. And what are the layers of ANFIS system?