Program: **Computer Engineering** Curriculum
Scheme: Rev 2016
Examination: ME Semester: I
Course Code: CSDLO1014 Course Name: Computational Intelligence
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.	In supervised learning_____.
Option A:	classes are not predefined
Option B:	classes are predefined
Option C:	classes are not required
Option D:	classification is not done
2.	How is perceptron different from Mc Culloch pitts model of neuron?
Option A:	Perceptron introduced the concept of only binary weights for input.
Option B:	Perceptron has the mechanism to learn.
Option C:	In perceptron inputs are limited to Boolean values
Option D:	Perceptron uses only linear activation functions
3.	Which of the following kinds of classification problems can be solved by a perceptron ?
Option A:	Non-linearly separable
Option B:	Linearly separable
Option C:	Fully solvable
Option D:	Partially solvable
4.	In Delta Rule for error minimization_____.
Option A:	weights are adjusted with respect to change in the output
Option B:	weights are adjusted with respect to difference between desired output and actual output
Option C:	weights are adjusted with respect to difference between input and output
Option D:	weights are adjusted with respect to only output
5.	If C and D are two fuzzy sets with membership functions: $\mu c(\chi)=\{0.8,0.5,0.9,0.1,0.1\}$ $\mu d(\chi)=\{0.1,0.8,0.2,0.3,0.8\}$ then the value of $\mu c \cap \mu d$ will be
Option A:	{0.1,0.5,0.2,0.1,0.1}
Option B:	{0.8,0.8,0.9,0.3,0.8}
Option C:	{0.1,0.8,0.2,0.1,0.1}
Option D:	{0.8,0.8,0.2,0.3,0.8}
6.	For Neuron, if w1=2, w2= -1 and input vector X=[0.8 1.2] and desired output d= 1, Determine value of T .

Option A:	T= 1
Option B:	T= 0
Option C:	T= 0.4
Option D:	T= -0.3
7.	The coffee is warm. Here linguist variable warm can be represented by:
Option A:	Crisp Logic
Option B:	Boolean set theory
Option C:	Fuzzy logic
Option D:	Real Number
8.	Which of the following phenomena is not modeled by fuzzy set theory?
Option A:	Randomness
Option B:	Vagueness
Option C:	Uncertainty
Option D:	Certainty
9.	Which of the following transformations on membership functions of fuzzy sets enhances the membership values ?
Option A:	Dilation
Option B:	Concentration
Option C:	Intensification
Option D:	Fuzzification
10.	Characteristic features of membership functions are:
Option A:	Intuition, Inference, Rank Ordering
Option B:	Fuzzy Algorithm, Neural network, Genetic Algorithm
Option C:	Core, Support , Boundary
Option D:	Weighted Average, center of Sums, Median
11.	Genetic Algorithms are inspired by____.
Option A:	Statistical mechanics
Option B:	Big bang theory
Option C:	Natural evolution
Option D:	Deployment theory
12.	What is a way of representing individual genes in genetic algorithm?
Option A:	Conversion
Option B:	Encoding
Option C:	Coding
Option D:	Decoding
13.	Which operator in genetic algorithm performs exploration of search space and also preserves diversity?
Option A:	Crossover
Option B:	Mutation
Option C:	selection
Option D:	encoding
14.	In Particle Swarm Optimization ,each particle is made up of

Option A:	Gbest and lbest values
Option B:	X-vector,P-vector,V-vector
Option C:	Only its location information
Option D:	Only V-Vector
15.	In Particle Swarm optimization ,particle represents____.
Option A:	Initial position values
Option B:	Local best values
Option C:	A solution in search space
Option D:	Global best values.
16.	Which will be correct statements describing antigens in NIS?
Option A:	Antigens are created by human body.
Option B:	Antigens destroys foreign particles like viruses, bacterias etc.
Option C:	Antigens are nothing but bacteria, viruses etc.
Option D:	Antigens are type of Lymphocyte.
17.	Identify correct statement for Lymphocyte theory
Option A:	T-cells are matured in bone marrow.
Option B:	Plasma cell is B type Lymphocyte.
Option C:	T cells are meant to find antigens.
Option D:	
18.	Antibodies are created by _____ type of Lymphocyte.
Option A:	T- cell
Option B:	B- cell
Option C:	Plasma Cell
Option D:	Memory cell
19.	In CLONALG algorithm, which of the following is true
Option A:	Only self-affinity is tested
Option B:	Only Non-self-affinity is tested
Option C:	Both self and Non- self- affinity are tested
Option D:	Clone affinity is tested.
20.	pheromone is produced by _____ and is _____
Option A:	Lymphocyte, evaporates with time
Option B:	Queen Ant, evaporates with time
Option C:	T-Cell, increases with time
Option D:	Ants, evaporates with time

<table>
<tr><td>Q2</td><td>Solve any Four out of Six (5 marks each)</td></tr>
<tr><td>A</td><td>Explain various membership functions used in fuzzy systems. Draw suitable diagram and equations.</td></tr>
<tr><td>B</td><td>Explain Genetic algorithms with a flow chart.</td></tr>
<tr><td>C</td><td>Explain Particle Swarm Optimization with a flow chart.</td></tr>
<tr><td>D</td><td><table><tr><td>X1</td><td>X2</td><td>D</td></tr><tr><td>0</td><td>-1.2</td><td>-1</td></tr><tr><td>-0.5</td><td>1.2</td><td>1</td></tr><tr><td>1</td><td>0</td><td>1</td></tr><tr><td>1.5</td><td>2</td><td>1</td></tr></table>Identify W1, W2 and T for given data</td></tr>
<tr><td>E</td><td>State and explain function of Lymphocyte with its types.</td></tr>
<tr><td>F</td><td>How Ants finds optimal path?</td></tr>
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<tr><td>Q3.</td><td>Solve any Two Questions out of Three. (10 marks each)</td></tr>
<tr><td>A</td><td>Explain Max-Min and Max-Product Composition with an example.</td></tr>
<tr><td>B</td><td>Describe Error Back Propagation Algorithm in detail with emphasis on weight update mechanism at hidden layer.</td></tr>
<tr><td>C</td><td><table><tr><td>X1</td><td>X2</td></tr><tr><td>0</td><td>-1.2</td></tr><tr><td>-0.5</td><td>1.2</td></tr><tr><td>1</td><td>0</td></tr></table>For a given network Show one Iteration of Hebbian learning Initial weight vector W0 = [1 1 -1], Data is as Shown in the table. Note that Hebbian is unsupervised learning so no Desired output is given.</td></tr>
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