



BRAINWARE UNIVERSITY
Term End Examination 2020 - 21
Programme – Master of Computer Applications
Course Name – Soft Computing
Course Code - MCA503

Semester / Year - Semester V

Time allotted : 85 Minutes

Full Marks : 70

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 70=70

1. *(Answer any Seventy)*

(i) Who initiated the idea of Soft Computing

- | | |
|-------------------|------------------|
| a) Charles Darwin | b) Lofti A Zadeh |
| c) Rechenberg | d) Mc_Culloch |

(ii) Machine learning is

- | | |
|---|---|
| a) The autonomous acquisition of knowledge through the use of computer programs | b) The autonomous acquisition of knowledge through the use of manual programs |
| c) The selective acquisition of knowledge through the use of computer programs | d) The selective acquisition of knowledge through the use of manual programs |

(iii) How many types of agents are there in artificial intelligence?

- | | |
|------|------|
| a) 1 | b) 2 |
| c) 3 | d) 4 |

(iv) The values of the set membership is represented by

- | | |
|------------------|---|
| a) Discrete Set | b) Degree of truth |
| c) Probabilities | d) Both Degree of truth & Probabilities |

(v) Let's assume that a fuzzy set A is defined as follows: $A = 0.1/50 + 0.3/60 + 0.5/70 + 0.8/80 + 1/90 + 1/100$. What will be the value of $|A|$?

- a) 3.7
- b) 6
- c) 1.7
- d) None of these

(vi) Every fuzzy complement has at most

- a) two equilibrium
- b) three equilibrium
- c) one equilibrium
- d) None of these.

(vii) A fuzzy number is a fuzzy set with the property of

- a) only normal
- b) only convex
- c) both normal and convex
- d) normal but not convex.

(viii) Let A and B are two fuzzy sets with membership function μ , then $\mu_{A \cap B}(x)$ is equal to

- a) $\mu_A(x) + \mu_B(x)$
- b) $\mu_A(x) - \mu_B(x)$
- c) $\text{MAX} \{ \mu_A(x), \mu_B(x) \}$
- d) $\text{MIN} \{ \mu_A(x), \mu_B(x) \}$

(ix) Consider the fuzzy set A given by, $A = \{ 0 / 0.4 + 1 / 0.6 + 3 / 0.9 \}$ then cardinality of A will be

- a) 0
- b) 4
- c) 1
- d) 1.9

(x) The membership functions are generally represented in

- a) Tabular Form
- b) Graphical Form
- c) Mathematical Form
- d) Logical Form

(xi) Which of the following is used for probability theory sentences;

- a) Conditional logic
- b) logic
- c) propositional logic
- d) None of these

(xii) What is meant by probability density function

- a) probability distributions
- b) Continuous variable

c) discrete variable

d) probability distributions for Continuous variables

(xiii) How many types of random variables are available

a) 1

b) 2

c) 3

d) 4

(xiv) The truth values of traditional set theory is

a) Either 0 or 1

b) 0

c) 1

d) None of these

(xv) Consider a fuzzy set A defined on the interval $X = [0, 10]$ of integers by the membership function $\mu_A(x) = x / (x+2)$, Then the α cut corresponding to $\alpha = 0.5$ will be

a) $\{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

b) $\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

c) $\{2, 3, 4, 5, 6, 7, 8, 9, 10\}$

d) None of these

(xvi) If A and B are two fuzzy sets with membership functions: $\mu_a(x)$

$= \{0.2, 0.5, 0.6, 0.1, 0.9\}$, $\mu_b(x) = \{0.1, 0.5, 0.2, 0.7, 0.8\}$ then the value of $\mu_a \cap \mu_b$ will be

a) $\{0.2, 0.5, 0.6, 0.7, 0.9\}$

b) $\{0.2, 0.5, 0.2, 0.1, 0.8\}$

c) $\{0.1, 0.5, 0.6, 0.1, 0.8\}$

d) $\{0.1, 0.5, 0.2, 0.1, 0.8\}$

(xvii) The height $h(A)$ of a fuzzy set A is defined as $h(A) = \sup A(x)$

a) $h(A) = 0$

b) $h(A) < 0$

c) $h(A) = 1$

d) $h(A) < 1$

(xviii) The region of the universe that is characterized by complete membership in the set is called?

a) Core

b) Support

c) Boundary

d) Fuzzy

(xix) In a Fuzzy set a prototypical element has a value

- a) 1
- b) 0
- c) infinite
- d) none of the mentioned

(xx) Perceptron is

- a) General class of approaches to a problem.
- b) Performing several computations simultaneously
- c) Structures in a database those are statistically relevant
- d) Simple forerunner of modern neural networks, without hidden layers.

(xxi) ___ is composed of large number of highly interconnected processing elements (neurons) working in unison to solve problems.

- a) ANN
- b) Perceptron
- c) Both ANN and Perceptron
- d) None of these

(xxii) Ability to learn how to do tasks based on the data given for training or initial experience

- a) Self-Organization
- b) Adaptive Learning
- c) Fault tolerance
- d) Robustness

(xxiii) In artificial Neural Network interconnected processing elements are called

- a) nodes or neurons
- b) weights
- c) axons
- d) Soma

(xxiv) Each connection link in ANN is associated with _____ which has information about the input signal.

- a) neurons
- b) weights
- c) bias
- d) activation function

(xxv) Internal state of neuron is called _____, is the function of the inputs the neurons receives

- a) Weight
- b) activation or activity level of neuron
- c) Bias
- d) none of the mentioned

(xxvi) Quantitative attributes are

- a) A reference to the speed of an algorithm, which is quadratically dependent on the size of the data
- b) Attributes of a database table that can take only numerical values
- c) Tools designed to query a database
- d) All of the mentioned

(xxvii) Transparency

- a) The large set of candidate solutions possible for a problem
- b) The information stored in a database that can be retrieved with a single query
- c) Worth of the output of a machine learning program that makes it understandable for humans
- d) None of these

(xxviii) Factors which affect the performance of learner system does not include

- a) Representation scheme used
- b) Training scenario
- c) Type of feedback
- d) Good data structures

(xxix) In language understanding, the levels of knowledge that does not include

- a) Phonological
- b) Syntactic
- c) Empirical
- d) Logical

(xxx) What is a top-down parser?

- a) Begins by hypothesizing a sentence (the symbol S) and successively predicting lower level constituents until individual preterminal symbols are written
- b) Begins by hypothesizing a sentence (the symbol S) and successively predicting upper level constituents until individual preterminal symbols are written
- c) Begins by hypothesizing lower level constituents and successively predicting a
- d) Begins by hypothesizing upper level constituents and successively predicting a

sentence (the symbol S)

sentence (the symbol S)

(xxxix) Among the following which is not a horn clause?

- a) p
- b) $\exists p \vee q$
- c) $p \rightarrow q$
- d) $p \rightarrow \exists q$

(xxxix) What is meant by agent's percept sequence?

- a) Used to perceive the environment
- b) Complete history of actuator
- c) Complete history of perceived things
- d) None of the mentioned

(xxxix) Single layer perceptron is used for

- a) linear separability
- b) error minimization
- c) non-linear separability
- d) annealing.

(xxxix) X-OR problem can be solved by

- a) single layer perceptron
- b) Bayes theorem
- c) multi-layer perceptron
- d) both single layer perceptron and Bayes theorem

(xxxix) For a network with inputs $[x_1, x_2, x_3] = [0.3, 0.5, 0.6]$ and weights $[w_1, w_2, w_3] = [0.2, 0.1, -0.3]$, the net output to the output M-P neuron is

- a) 0.07
- b) -0.07
- c) 0.7
- d) -0.7.

(xxxix) For a 3-input neuron representing a perceptron, where $[x_1, x_2, x_3] = [0.8, 0.6, 0.4]$ and weights $[w_1, w_2, w_3] = [0.1, 0.3, 0.2]$ and bias $b = 0.35$, the output of the neuron using bipolar sigmoid activation function is

- a) 0.625
- b) 0.764
- c) 0.259
- d) 0.346.

(xxxix) Which one is unsupervised learning rule?

- a) Error-correction
- b) Delta
- c) Widrow-Hoff
- d) Hebbian.

(xxxviii) In simple perceptron learning rule change of synaptic weight is proportional to

- a) product of error and i/p signal
- b) product of i/p and o/p signals
- c) product of error and o/p signal
- d) Gradient of cost function.

(xxxix) What is the rule of simple reflex agent

- a) Simple-action rule
- b) Condition-action rule
- c) Simple & Condition-action rule
- d) None of the mentioned

(xl) Neuro software is:

- a) A software used to analyze neurons
- b) It is powerful and easy neural network
- c) Designed to aid experts in real world
- d) It is software used by Neurosurgeon

(xli) A 3-input neuron is trained to output a zero when the input is 110 and a one when the input is 111. After generalization, the output will be zero when and only when the input is:

- a) 000 or 110 or 011 or 101
- b) 010 or 100 or 110 or 101
- c) 000 or 010 or 110 or 100
- d) 100 or 111 or 101 or 001

(xlii) The competition in upper subnet of hamming network continues till?

- a) only one unit remains negative
- b) all units are destroyed
- c) output of only one unit remains positive
- d) None of the mentioned

(xliii) What are dendrites?

- a) fibers of nerves
- b) nuclear projections
- c) other name for nucleus
- d) none of the mentioned

(xliv) Signal transmission at synapse is a?

- a) physical process
- b) chemical process
- c) physical & chemical both
- d) none of the mentioned

(xlv) Where does the chemical reaction take place in neuron?

- a) dendrites
- b) axon
- c) synapses
- d) nucleus

(xlvi) Prolog is

- a) A programming language based on logic
- b) A computer where each processor has its own operating system, its own memory, and its own hard disk
- c) Describes the structure of the contents of a database
- d) None of these

(xlvii) Back propagation is a learning technique that adjusts weights in the neural network by propagating weight changes.

- a) Forward from source to sink
- b) Backward from sink to source
- c) Forward from source to hidden nodes
- d) Backward from sink to hidden node

(xlviii) An artificial neuron receives n inputs $x_1, x_2, x_3, \dots, x_n$ with weights w_1, w_2, \dots, w_n attached to the input links. The weighted sum _____ is computed to be passed on to a non-linear filter ? called activation function to release the output.

- a) $\sum w_i$
- b) $\sum x_i$
- c) $\sum w_i \cdot x_i$
- d) None of these

(xlix) Slots and facets are used in

- a) Semantic Networks
- b) Frames
- c) Rules
- d) All of these

(l) What is charge at protoplasm in state of inactivity

- a) positive
- b) negative

c) neutral

d) may be positive or negative

(li) What is the main constituent of neural liquid?

a) sodium

b) potassium

c) Iron

d) none of the mentioned

(lii) What is average potential of neural liquid in inactive state

a) +70mv

b) +35mv

c) -35mv

d) -70mv

(liii) What is the function of neurotransmitter?

a) they transmit data directly at synapse to other neuron

b) they modify conductance of post synaptic membrane for certain ions

c) cause polarisation or depolarization

d) both polarisation & modify conductance of membrane

(liv) The cell body of neuron can be analogous to what mathematical operation?

a) Summing

b) Differentiator

c) integrator

d) none of the mentioned

(lv) Operations in the neural networks can perform what kind of operations?

a) serial

b) parallel

c) serial or parallel

d) none of the mentioned

(lvi) Which action is faster pattern classification or adjustment of weights in neural nets?

a) pattern classification

b) adjustment of weights

c) equal

d) either of them can be fast, depending on conditions

(lvii) Who developed the first learning machine in which connection strengths could be adapted automatically?

- a) McCulloch-pitts
- b) Marvin Minsky
- c) Hopfield
- d) none of the mentioned

(lviii) What is ART in neural networks

- a) automatic resonance theory
- b) artificial resonance theory
- c) adaptive resonance theory
- d) none of the mentioned

(lix) What is an activation value?

- a) weighted sum of inputs
- b) threshold value
- c) main input to neuron
- d) none of the mentioned

(lx) Positive sign of weight indicates?

- a) excitatory input
- b) inhibitory input
- c) can be either excitatory or inhibitory as such
- d) none of the mentioned

(lxi) The process of adjusting the weight is known as?

- a) activation
- b) synchronisation
- c) learning
- d) none of the mentioned

(lxii) What is asynchronous update in neural networks?

- a) output units are updated sequentially
- b) output units are updated in parallel fashion
- c) can be either sequentially or in parallel fashion
- d) none of the mentioned

(lxiii) A particular set of genes in genome is called

- a) alleles
- b) chromosome
- c) locus
- d) genotype.

(lxiv) How many successors are generated in backtracking search?

- a) 1
- b) 2
- c) 3
- d) 4

(lxv) What is the space complexity of Depth-first search

- a) $O(b)$
- b) $O(bl)$
- c) $O(m)$
- d) $O(bm)$

(lxvi) The size of each chromosome for the problem maximizing a function $f(x) = x^2$ in the interval $0 \leq x \leq 31$ is

- a) 8
- b) 5
- c) 4
- d) None of these.

(lxvii) Zero sum game has to be a _____ game.

- a) Single player
- b) Two player
- c) Multiplayer
- d) all of the mentioned

(lxviii) uniform-cost search expands the node n with the _____

- a) Lowest path cost
- b) Heuristic cost
- c) Highest path cost
- d) Average path cost

(lxix) Depth-first search always expands the _____ node in the current fringe of the search tree.

- a) Shallowest
- b) Child node
- c) Deepest
- d) Minimum cost

(lxx) For general graph, how one can get rid of repeated states?

- a) By maintaining a list of visited vertices
- b) By maintaining a list of traversed edges
- c) By maintaining a list of non-visited vertices
- d) By maintaining a list of non-traversed edges

