16CS5A1

USN

RV COLLEGE OF ENGINEERING®

(An Autonomous Institution affiliated to VTU)

V Semester B. E. Fast Track Examinations July-19

Computer Science and Engineering

ARTIFICIAL NEURAL NETWORKS (ELECTIVE)

Time: 03 Hours ***Maximum Marks: 100***

Instructions to candidates:

1. Answer all questions from Part A. Part A questions should be answered in first three pages of the answer book only.
2. Answer FIVE full questions from Part B.In Part B question number 2, 7 and 8 are compulsory. Answer any one full question from 3 and 4 & one full question from 5 and 6

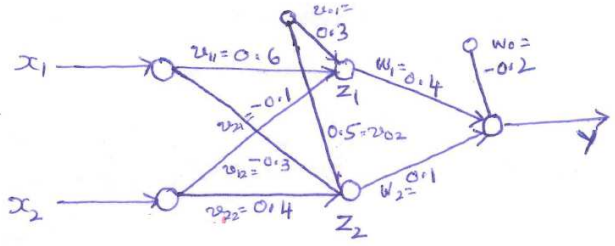
PART-A

1	1.1	Give the weight adjustment equation for competitive learning.	01
	1.2	During the learning phase of a BPN, give the direction of flow of error.	01
	1.3	Name the type of activation function suitable for BPN and why?	02
	1.4	Give the expression for 'enough' training pair (N) if 'w' will be the number of weights to be adjusted and 'e' the accuracy of classification for BPN.	01
	1.5	Give the equation for the empirical risk functional.	01
	1.6	What is the content addressable memory with respect to associative memory of ANN.	01
	1.7	Give the effect of learning rate (α) towards convergence in the design of Neural network.	02
	1.8	Give the meaning of the word Deep in Deep learning process.	01
	1.9	Which are the factors influences the generation.	02
	1.10	Illustrate the role of different subsets of training sets during cross-validation.	02
	1.11	What is sampling? What are the key points to be followed to take sampling data from graphical models?	02
	1.12	Give the differences between machine and deep learning.	02
	1.13	List some of the deep learning frameworks.	02

PART-B

2	a	There are two ways to interpret the role of the brain while considering the human body as a computational agent. One of them is to view the entire brain as a single unit act as CPU for the whole body. The other is to consider the brain as a huge network of billions of processing units called neurons. Compare and contrast these two views with respect to ANN from computational perspective.	04
	b	List and explain the various Neural Network Architectures proposed along with various activation function that maps the net input values to the output signal value.	06
	c	Explain the working principle of following learning techniques. i. Hebbian learning. ii. Boltzmann learning.	06

3	a	For a perception model to realize the logical AND function Bipolar input output pattern is provided with initial weights as (0.3, 0.3, 0.3) and learning rate as 0.2.Write the output after first epoch through LMS learning rule.	04
	b	Give the meaning for memory and adaption with respect to design of an ANN.	06
	c	Explain the role of Steepest Descent and Gauss Newton technique helps in the design of neural network with the help of an appropriate example.	06
		OR	
4	a	Give Delta and extended Delta rule in the neural network to realize logical OR function.	04
	b	What is the meaning of Learning? Explain how learning curves and Learning rate annealing techniques helps in the design of NN.	04
	c	Explain the following: i. VS dimension. ii. Convergence theorem. iii. Unconstrained optimization techniques.	08

5	a	With the help of a diagram, notational conventions and suitable activation function explain Backpropagation in a MLP network.	08
	b	Using BPN find the new weights for the network shown below. It is presented with i/p pattern [0,1] target is 1. Use $\alpha = 0.25$ and use binary sigmoidal activation function.  	04
	c	List and discuss the various stopping criteria's used in stopping the learning process of neural network.	04
		OR	
6	a	Explain the process of learning XOR problem using BPN and list the Heuristics for BPN algorithm to perform better and explain two Heuristics in detail.	08
	b	Explain the meaning of: i. Sequential and Batch Mode of training. ii. Universal approximation theorem. iii. Output representation and decision rule.	08

7	a	Explain the meaning of convolution operation with respect to convolution neural network and give full description of the convolution layer.	06
	b	With the help of a suitable example explain convolution algorithm.	06
	c	Explain the meaning of pooling and unsupervised features with respect to convolution network.	04

8	a	List and explain challenges of unstructured model and explain how graphs can be used to describe the model structure.	07
	b	Explain the following: i. Deep learning approach to structured probabilistic model. ii. Separation and D-separation. iii. Learning about dependencies.	09