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**R. V. COLLEGE OF ENGINEERING**

Autonomous Institution affiliated to VTU

V Semester B. E. Examinations Nov/Dec-18

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	What are the useful properties and capabilities of Neural Networks?	02
	1.2	Define a Hebbian Synapse.	02
	1.3	Draw the block diagram of learning with a teacher.	02
	1.4	Draw the signal flow graph of the perception.	02
	1.5	Define Adaptive process.	02
	1.6	What are the three distinctive characteristics of multilayer perception?	02
	1.7	Define sequential and batch modes of training.	02
	1.8	Define Conventional Neural Networks and its application.	02
	1.9	Define Energy Based Models.	02
	1.10	Define Deep learning.	02

**PART-B**

2	a	What is a Neural Network? With a neat diagram explain a model of a neuron.	08
	b	Define learning. With neat diagram explain error correction learning.	08
3	a	What are the different types of activation functions? Explain in detail.	08
	b	Explain the following: i) Competitive learning ii) Boltzmann learning.	08
		<b>OR</b>	
4	a	What are the different learning tasks? Explain any two methods.	08
	b	Derive an expression for perception convergence theorem.	08
5	a	Explain the method of steepest descent unconstrained optimization technique.	06
	b	With a neat diagram explain model of the supervised learning process.	04
	c	Derive an expression for least mean square algorithm.	04
		<b>OR</b>	

6	a	Derive an expression for back propagation algorithm for both output and hidden neuron cases.	10
	b	Write a note on cross validation.	06
7	a	Define sparse interactions in Convolutional Networks. Graphically illustrate direct connections in a convolutional net are very sparse, units in the deeper layers can be indirectly connected to all or most of the input image.	08
	b	Discuss in detail the process of solving any one of the following problems using <i>CNNS</i> . i) Make use of health data to predict any disease ii) Detecting the cracks on concrete or steel surfaces iii) Detecting plant diseases using leaf images	08
8	a	Explain the challenge of unstructured modeling.	08
	b	Explain the following with suitable examples: i) Separation and De-separation ii) Deep learning approach to structured probabilistic models.	08