2nd Semester Back Paper Examination 2016-17
PATTERN RECOGNITION
BRANCH(S): COMPUTER SCIENCE, COMPUTER SCIENCE AND ENGG, COMPUTER SCIENCE AND TECH.
Time: 3 Hours
Max Marks: 70
Q.CODE: Z1084
Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1		**Answer all questions**	**(2 x 10)**
	a)	What does the design of a generic pattern recognition system involve?	
	b)	With an example, explain what is meant by feature extraction?	
	c)	Why is it preferred to extract features instead of working with raw data?	
	d)	What is meant by 'training' a classifier?	
	e)	How can classifiers be evaluated?	
	f)	What are linear discriminant functions? What do they look like in higher dimensions?	
	g)	How does the basic gradient decent procedure work?	
	h)	What is the perceptron criterion function? How can it be minimized?	
	i)	What are relaxation procedures? Discuss any one of them.	
	j)	What is meant by a pseudo inverse? How is it used in MSE?	
Q2	**(a)**	Describe the basic modules in designing a pattern recognition system.	**(5)**
	(b)	Briefly explain what is generalization in the context of pattern recognition problems?	**(5)**
Q3	**a)**	Draw the diagram single layer two input – one output perceptron. State its weight update equation.	**(5)**
	b)	Show the design of a two layer perceptron to solve the XOR problem in a 2-D input feature space.	**(5)**
Q4		Show that a three layered perceptron can perform any logical combination of convex regions.	**(10)**
Q5	**a)**	Why is back propagation algorithm so called? What is the significance of its activation function in relation to its cost function?	**(5)**
	b)	Discuss the solution of XOR problem using a polynomial classifier.	**(5)**
Q6	**a)**	Describe the basic steps that must be followed in order to develop a clustering task.	**(5)**
	b)	Which are the two schemes of Hierarchical clustering algorithm? Give brief descriptions.	**(5)**
Q7	**a)**	With a diagram explain the Minimum Spanning tree algorithm.	**(5)**
	b)	Describe the basic competitive learning algorithm with relevant equations.	**(5)**
Q8		**Write short notes (Any TWO) of the following**	**(5 x 2)**
	a)	decision trees	
	b)	supervised and unsupervised learning	
	c)	simulated annealing	
	d)	first-order hidden markov models	