2nd Semester Regular/Back Examination – 2016
THEORY OF COMPUTATION
QUESTION CODE: W 433
BRANCH: MCA

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Time: 3 Hours
Max marks: 70

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1		Answer the following questions: bputonline.com	(2 x 10)
	a)	Define alphabet and language?	
	b)	State the difference between NFA and DFA?	
	c)	Construct a DFA for all the strings containing exactly 4 zeros.	
	d)	The language 0^n where n is prime is regular or not?	
	e)	When do you say a grammar is ambiguous?	
	f)	Remove the unit production and useless symbols from the following grammar	

$$S \rightarrow ABA, A \rightarrow aAA|aBC|bB, B \rightarrow A|bB|Cb, C \rightarrow CC|cC$$

	g)	Dedifferentiate between single tape and multiple tape usage in TM?	
	h)	State the CNF and give an example of it?	
	i)	How do you say that a post correspondence problem is undecidable?	
	j)	The context sensitive languages are not accepted by PDA,why?	
Q2		Construct a minimized DFA from the regular expression $(x|y)x(x|y)^*$ Trace the string w=xxyx.	(10)
Q3		What are the closure properties of regular language? What is the use of pumping lemma?	(10)
Q4	a)	What are the languages accepted by a PDA. Give an example of it?	(5)
	b)	Proof that NPDA is not equivalent to DPDA?	(5)
Q5	a)	Determine the type of language accepted by this grammar and deduce it	(5)

$$S \rightarrow aSb|ab|\varepsilon$$

	b)	What are the closure properties of CFL? Proof any one of them?	(5)
Q6	a)	State the techniques for turing machine construction?	(5)
	b)	Prove that the halting problem of turing machine over {0,1}* is unsolvable.	(5)
Q7	a)	How to convert a regular expression to a ε-NFA? explain with an example.	(5)
	b)	There exist a DFA for every NFA. Justify.	(5)

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Q8		Write Short Notes (Any Two)
	a)	Regular expression bputonline.com
	b)	Pumping Lemma
	c)	Church-Turing Thesis
	d)	Decidabilty

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