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Total Number of Pages: 2

MCA/ MCC 204

2nd Semester Regular/Back Examination – 2016

THEORY OF COMPUTATION

QUESTION CODE: W 433

BRANCH: MCA

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: (2 x 10)
- Define alphabet and language?
 - State the difference between NFA and DFA?
 - Construct a DFA for all the strings containing exactly 4 zeros.
 - The language 0^n where n is prime is regular or not?
 - When do you say a grammar is ambiguous?
 - Remove the unit production and useless symbols from the following grammar
 $S \rightarrow ABA, A \rightarrow aAA|aBC|bB, B \rightarrow A|bB|Cb, C \rightarrow CC|cC$
 - Dedifferentiate between single tape and multiple tape usage in TM?
 - State the CNF and give an example of it?
 - How do you say that a post correspondence problem is undecidable?
 - 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 $w=xyyx$. (10)
- Q3 What are the closure properties of regular language? What is the use of pumping lemma? (10)
- Q4
- What are the languages accepted by a PDA. Give an example of it? (5)
 - Proof that NPDA is not equivalent to DPDA? (5)
- Q5
- Determine the type of language accepted by this grammar and deduce it. (5)
 $S \rightarrow aSb|ab|\epsilon$
 - What are the closure properties of CFL? Proof any one of them? (5)
- Q6
- State the techniques for turing machine construction? (5)
 - Prove that the halting problem of turing machine over $\{0,1\}^*$ is unsolvable. (5)
- Q7
- How to convert a regular expression to a ϵ -NFA? explain with an example. (5)
 - There exist a DFA for every NFA, Justify. (5)

Q8 Write Short Notes (Any Two)

(5 x 2)

- a) Regular expression
- b) Pumping Lemma
- c) Church-Turing Thesis
- d) Decidability

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