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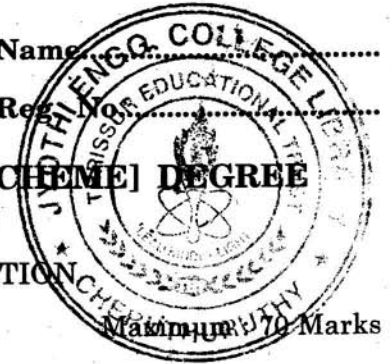
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FIFTH SEMESTER B.TECH. (ENGINEERING) [09 SCHEME] DEGREE EXAMINATION, NOVEMBER 2014

CS/IT/PTCS 09 506—THEORY OF COMPUTATION

Time : Three Hours　　　　　　　　　　　　　　　　　　　Maximum : 70 Marks

Part A

Answer all questions.
Each question carries 2 marks.

1. Describe the following sets by regular expression :

    (a) L1 = the set of all strings of 0's and 1's ending in 00.

    (b) L2 = the set of all strings of 0's and 1's beginning with '0' and ending with '1'.

2. What is the principle of mathematical induction ?

3. What is meant by empty production removal in PDA ?

4. Design a Turning machine to compute n mod 2.

5. When a problem is said to be decidable and give an example of an undecidable problem ?

(5 × 2 = 10 marks)

Part B

Answer any four questions.
Each question carries 5 marks.

1. Define Deterministic automata and Non-deterministic automata with example.

2. Consider G whose productions are S → aAS/a, A→SbA/SS/ba. Show that S→aabbaa and construct a derivation tree whose yield is aabbaa.

3. What are the different types of language acceptances by a PDA and define them ?

4. Define total recursive and partial recursive functions. When a language is said to be recursively enumerable ?

5. What are post correspondence problem ? Give example.

6. Explain the Halting problem. Is it decidable *or* undecidable problem ?

(4 × 5 = 20 marks)

Part C

Answer all questions.
Each question carries 10 marks.

1. Construct an NDFA equivalent to (0 + 1) * (00 + 11).

Or

Turn over

2. Construct the deterministic finite automata for accepting the set of all strings with three consecutive 0's.

3. Explain in detail the ambiguity in Grammar and Languages.

Or

4. Convert the grammar S→ABb | a, A→aaA | B, B→bAb into Greibach normal form.

5. Discuss in detail about Universal Turing machine.

Or

6. Prove that the union and intersection of two recursive languages are also recursive.

7. Explain any *four* NP-Complete problems.

Or

8. Explain the difference between tractable and intractable problems with examples.

(4 × 10 = 40 marks)