End Sem(IV) —
IT (CC – 8)

2022

Time : 3 hours

Full Marks : 60

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Answer from both the Groups as directed.

Group – A

(Compulsory)

1. Answer the multiple choice questions : 10

   (a) Which of the following does not represents the given language ? Language : { 0, 01 }

   (i) 0+01 (ii) {0} U {01}

   (iii) {0} U {0} {1} (iv) {0} ∧ {01}

   (b) Which of the following statement is false ?

   (i) Context free language is the subset of context sensitive language

(ii) Regular language is the subset of context sensitive language

(iii) Recursively enumerable language is the super set of regular language

(iv) Context sensitive language is a subset of context free language

(c) The ability for a system of instructions to simulate a Turing Machine is called _____.

(i) Turing Completeness

(ii) Simulation

(iii) Turing Halting

(iv) None of the mentioned

(d) Push down automata accepts _____ languages.

(i) Type 3 (ii) Type 2

(iii) Type 1 (iv) Type 0

(e) If L1, L2 are regular and op(L1, L2) is also regular, then L1 and L2 are said to be _____ under an operation op.

(i) Open

(ii) Closed

(iii) Decidable

(iv) None of the mentioned

(f) If A and B are regular languages, ! (A' U B') is :

(i) Regular

(ii) Non regular

(iii) May be regular

(iv) None of the mentioned

(g) Assume the R is a relation on a set A, aRb is partially ordered such that a and b are _____.

(i) Reflexive

(ii) Transitive

(iii) Symmetric

(iv) Reflexive and transitive

(h) The minimum number of states required to recognize an octal number divisible by 3 are/is :

(i) 1 (ii) 3

(iii) 5 (iv) 7

(i) Relate the following statement :

Statement : All sufficiently long words in a regular language can have a middle section of words repeated a number of times to

produce a new word which also lies within the same language :

(i) Turing Machine

(ii) Pumping Lemma

(iii) Arden's Theorem

• (iv) None of the mentioned

2. Define pumping lemma. 5

Group – B

Anwer any **three** of the following questions : 15×3 = 45

3. What do you mean by Relation ? Discuss Equivalence relation.

4. What is qualifiers ? Discuss Universal and Existential qualifiers.

5. What is context free language ? Explain with example.

6. (a) Write the regular expression for the language of odd length string.

(b) Design a T. M of the one's compliment. Write down the state transformation diagram ?

7. (a) Difference between NFA and DFA

(b) Explain kleene closure and '+' (plus) closure

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