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**Question Paper Code: 99813**

B.E./B.Tech. DEGREE EXAMINATION, MAY 2022

Elective

Information technology

19UIT913- SYSTEM SOFTWARE INTERNALS

(Regulations 2019)

Duration: Three hours

Maximum: 100 Marks

Answer All Questions

PART A - (10x 2 = 20 Marks)

1. Briefly describe the format of object program generated by SIC assembler CO1- U
2. How do you calculate the actual address in the case of register indirect with immediate index mode? CO1- U
3. Define a binary object program format for SIC and write an absolute loader to load programs in this format CO1- U
4. What is the purpose of relocation bit in object code of relocation loader? CO1- U
5. Discuss Regular expression and the Algebraic properties of Regular Expression. CO1- U
6. Express the main idea of NFA? And discuss with examples (a/b)\* CO1- U
7. Write an algorithm for finding FOLLOW. CO1- U
8. Differentiate Top Down parsing and Bottom Up parsing? CO2- App
9. List out the two rules for type checking. CO3- U
10. Illustrate the concepts of copy propagation. CO3- U

PART – B (5 x 16= 80Marks)

11. (a) Write any algorithm for one pass assembler and assign the memory for object code and symbol table entries for the program CO2-App (16)

Or

- (b) Describe the action taken by an assembler to deal with the program relocation and how to increase the flexibility. If the instruction in one control section need to refer instruction or data in another control section. CO2-App (16)
12. (a) Explain in detail about Basic Loader Functions CO2-U (16)  
Or
- (b) Explain how program linking is to resolve the problems with external references (EXTREF) and external definitions (EXTDEF) from different control sections CO2-U (16)
13. (a) Solve the given regular expression  $(a/b)^* abb (a/b)^*$  into NFA using Thompson construction. CO2-App (16)  
Or
- (b) Create DFA the following NFA. CO2-App (16)  
 $M = (\{q_0, q_1\}, \{0, 1\}, \delta, q_0, \{q_1\})$   
 Where  $\delta(q_0, 0) = \{q_0, q_1\}$   
 $\delta(q_0, 1) = \{q_1\}$   
 $\delta(q_1, 0) = \phi$   
 $\delta(q_1, 1) = \{q_0, q_1\}$
14. (a) Analyze the give grammar to construct predictive parser CO2-App (16)  
 $S \rightarrow +SS \mid *SS \mid a$  with the string “+\*aa.”  
Or
- (b) Evaluate predictive parsing table for the following grammar and CO2-App (16)  
 Parse the string  $id+id*id$   
 $E \rightarrow E+T \mid T$   
 $T \rightarrow T*F \mid F$   
 $F \rightarrow (E) \mid id$
15. (a) State the rules for type checking with example and Write an algorithm for type inference and polymorphic function. CO5- U (16)  
Or
- (b) Explain in detail about the various issues in code generation with CO5- U (16)  
 examples.