This question paper contains **4+1** printed pages]

(Write your Roll No. on the top immediately on receipt of this question paper.)

The question paper consists of *two* Sections.

Section A is compulsory.

Attempt any *four* questions from Section B.

Section A

1. Differentiate between the following :   6

    (*a*) System Software and Application Software

    (*b*) Absolute and Relative Expression.

2. List the format of 3 byte and 4 byte instructions available in SIC/XE machine.   3

3. What typical options are available in a loader ?   4

4. Explain LOCCTR maintenance during generation of object code.   3

5. Give the format of the following :   4

    (*a*) Define Record

    (*b*) Refer Record.

6. Explain Finite Automata (FA) with the help of an example.   4

7. Write short notes on the following :   6

   (*a*) Storage allocation

   (*b*) Semantic analysis.

8. Define Ambiguous Grammar. Consider the following grammar :
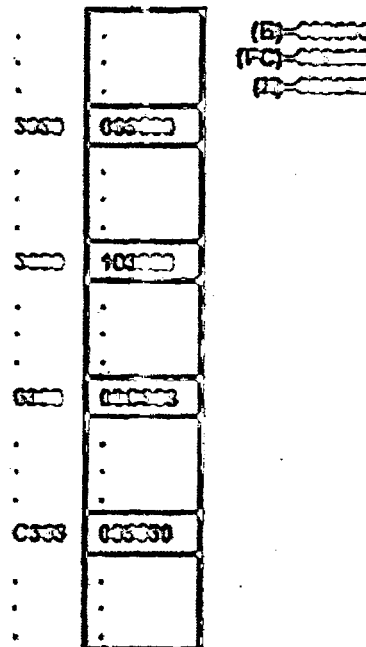
   $$S \rightarrow \text{if } E \text{ then } S \mid \text{if } E \text{ then } S \text{ else } S \mid \text{OTHER}$$

   Check for ambiguity of the following :

   If E1 then if E2 then S3 else S4.   5

Section B

9. (*a*) Consider the memory contents shown in the following figure. What would be loaded to register A with the object code 022030 (Hex) ? Justify your answer.   3

(b) How relocation is done by Modification Record ? Explain the following Modification Record : M00000705.   3

(c) What do you mean by Recursive Descent Parsing ?   4

10. (a) Assemble the following SIC/XE object code and show object code as would appear in object file :   4+2

STRCP2	START	1000
FIRST	LDT	#11
	LDX	#0
MOVECH	LDCH	STR1,X
	STCH	STR2,X
	TIXR	T
	JLT	MOVECH
STR1	BYTE	C'TEST STRING'
STR2	RESB	11
	END	FIRST

Opcode for the Mnemonics are :

LDT	74
LDX	04
LDCH	50
STCH	54
TIXR	B8
JLT	38

(b) Explain with an example how concatenation operator is helpful to concatenate macro-instruction parameter with character strings.   4

11. (a) What is the advantage of rearranging a program in the form of program blocks ? 3

(b) Describe the data structure used in macro processor algorithm.   3

(c) What is Lexical Analysis ?   4

12. (a) What is the disadvantage of an absolute loader and how can it be overcome by relocating loader ?   3

(b) Explain recursive macro expansion with suitable example.   3

(c) Give a comparison of context-free and context-sensitive grammar.   4

13. (*a*) Explain the difference between linking loader and linkage editor. 4

(*b*) How compilers for most high level language store arrays ? 2

(*c*) What do you mean by Prologue and Epilogue with respect to an activation record ?

4

14. (*a*) How BNF Grammar is used to describe syntax ?

3

(*b*) What is a program translation ? Give its characteristics. 3

(*c*) What is a LPDT ? Write a brief description of YACC. 4

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