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**Reg. No. : .....**

**Name : .....**

**Fifth Semester B.Tech. Degree Examination, December 2016**
**(2013 Scheme)**
**13.504 : SYSTEM PROGRAMMING (FR)**

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks :

1. What are the different instruction formats in SIC/XE assembler ?
2. What is a forward reference ? How it can be solved using back-patching ?
3. Explain the use of following assembler directives.
   i) BYTE
   ii) EQU
   iii) RESW
   iv) ORG.
4. Write an algorithm for an absolute loader.
5. What are the different tasks involved in a document editing process ? **(5×4=20 Marks)**



PART – B

Answer **one full** question from **each** Module :

**Module – I**

6. i) Describe the characteristics of Pentium PRO architecture. 8
   ii) Write a subroutine for SIC that will read a record into a buffer. The record may be any length from 1 to 100 bytes. The end of the record is marked with a "null" character (ASCII 00). The subroutine should place the length of the record read into a variable LENGTH. 8

**P.T.O.**

iii) Write a sequence of instructions for SIC/XE to find the sum and difference of two variables A and B, each of one word and store the result in variables C and D. 4

OR

7. i) Describe the characteristics of Power PC architecture. 8

ii) Describe the instruction formats and addressing modes of SIC/XE architecture. 7

iii) Write a program for SIC/XE machine to copy a 11 byte string from one location to another. 5

## Module – II

8. i) How literals are handled by the SIC assembler ? 6

ii) Explain the use of assembler directives 'EXTDEF' and EXTREF' with example. 4

iii) Consider the following assembly program.

```
STRPGM    START   1000
FIRST     LDX     ZERO
MOVECH    LDCH    STR1, X
          STCH    STR2, X
          TIX     ELEVEN
          JLT     MOVECH
STR1      BYTE    C'TEST STRING'
STR2      RESB    11
ZERO      WORD    0
ELEVEN    WORD    11
          END     FIRST
```

a) Identify task performed by the above program.

b) Generate symbol table.

c) Generate the complete object program, with the format containing Header record, Text record. End record, for above program. Assume Opcode for instruction. 10

OR

9. i) What are the various data structures needed in pass – I of the two-pass assembler ? Explain. 5

ii) Translate (by hand) the following assembly program to SIC/XE object code. Also assume Opcode for instruction. The output format will contains Header record, Text record, End record.

```
RECTOBUF    START    3000
RDREC       LDX      ZERO
            LDA      ZERO
RLOOP       TD       INPUT
            JEQ      RLOOP
            RD       INPUT
            COMP     ZERO
            JEQ      EXIT
            STCH     BUFFER, X
            TIX      MAXLEN
            JLT      RLOOP
EXIT        STX      LENGTH
INPUT       BYTE     X'F1'
ZERO        WORD     0
MAXLEN      WORD     4096
BUFFER      RESB     4096
LENGTH      RESW     1
            END      RDREC
```

10



iii) What is a control Section ? How it differs from program blocks ? 5

## Module – III

10. i) What is program relocation ? Explain the structure of modification record used for program relocation. 6

ii) Write the algorithm for pass I of an linking loader. Explain. 8

iii) Suggest a design for a one-pass linking loader. What restrictions (if any) would be required ? What would be the advantages and disadvantages of such a one-pass loader ? 6

OR

11. i) Explain various data structures of a macro processor with example. 8

ii) Explain various macro processor design options. 12

## Module – IV

12. i) Describe the structure of a typical editor. 10

ii) Explain how breakpoint mechanism helps in debugging process. 5

iii) Differentiate between same-process debugger and separate-process debugger. 5

OR

13. i) Explain the features of UNIX operating system. 5

ii) Describe the UNIX architecture. 8

iii) Explain the kernel data structures of UNIX operating system. 7

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