BACHELOR OF COMPUTER SCIENCE AND ENGINEERING
THIRD YEAR
FIRST SEMESTER EXAM 2023

System Programming

Time: 3 hours Full Marks : 100

Answer any *five* questions. 5 X 20 = 100

1. What are fundamental differences between SIC and SIC/XE? List the registers of 8086 and their utilities during returning values from a function. What are different addressing modes of 8086? 5+10+5=20 [CO1]
2. Discuss different machine dependent and machine independent features of an assembler. Draw a flowchart for 2-pass assembler mentioning all data structures and steps clearly. 10+10=20 [CO1]
3. Build a simple macro processor without nested definition and calls. Explain all data structures and steps clearly using a flow diagram. Write the instructions to concatenate two strings with a macro. 15+5=20 [CO2]
4. What are the advantages and disadvantages of Overlay. What is a bootstrap loader? What is dynamic linking? 10+5+5=20 [CO3]
5. Write an assembly language program to compute Fibonacci numbers upto 100. What are the components of text editor? 15+5=20 [CO4]
6. Distinguish between single pass assembler and cross assembler. Why cross assembler becomes indispensable for system development. Summarize edit control features available for text editor. 5+5+10=20[CO4]
7. What are the differences between line editor and screen editor? Explain the differences in user mode and kernel mode in device driver architecture. How UART device driver works in EXINU. 5+8+7=20 [CO6]
8. Consider the following two modules written in SIC/XE assembly language.

```
ONE     CSECT
        EXTREF B1,B2
        EXTDEF A1,A2
        LDA STORE
        STA VAL
        +STA B1
        LDA A1
        STA A2
        +STA B2
VAL     RESW 1
A1      RESW 1
A2      RESW 1
STORE   RESW 1
        END ONE
```

```
TWO     CSECT
        EXTREF A1,A2
        EXTDEF B1,B2
        +LDA A1
        +LDB A2
        STA B1
        STB B2
B1      RESW 1
B2      RESW 1
        END TWO
```

(i) Show the M-records produced by the assembler for the modules ONE and TWO. Each M-record should have an address (in decimal), the number of bytes, the flag (`+' or `-') and an appropriate symbol.

(ii) Assume that the starting addresses of modules ONE and TWO are 400 (decimal) and 600 (decimal) respectively. Show the External Symbol Table (EST). All the addresses specified in EST must be in decimal. 5+15=20

[CO5]