(Ex./CSE/T/313/2016)

Bachelor of Computer Science & Engineering
System Programming
3rd Year 1st Semester Examination 2016

Time: Three hours **Full marks: 100**

Part – A (All)

1. Write down the restrictions and disadvantages of a two pass macro processor.
2. What do you mean by Shared Library linking?
3. Write down the relations exist between Control Section and Location Counter in case of an assembly language programming?
4. What do you mean by Forward Reference and Cross References in case of assembling a code?
5. What are the differences between Early and Lazy Bindings?

(5X2)=10

Part – B (Any Two)

Q1. a) What are the advantages and disadvantages of Overlay? Why an absolute loader is called as a self-destroyed loader? What do you mean by Deferred linking?

b) Consider a Macro as described in Table-I. What will be the contents of Argument List Arrays, Macro Definition Table, Macro Name Table and Intermediate output file, if a macro call is made as follows? Assume the available index numbers of Definition and Name Tables are 56 and 6, respectively.

"L0 FUNC D2, D1, DATA"

```
        MACRO
&L      FUNC    &P1, &P2, &P3
&L      LOAD    4, &P1
        ADD     4, &P2
        STORE   4, &P3
        MEND
```

Table – I

(4+2+4)+10=20

Q2. a) What do you mean by conditional macro expansion? What are the relations present between Nested Macro definitions and Recursive Macros? What is/are the role(s) of *Expanding Switch* in case of a single-pass macro processor?

b) Write down the Algorithm of a simple Two pass Macro Processor.

(3+3+4)+10=20

Q3. a) What are the differences between exported and imported functions in case of linking? What do you mean by *relocatability* of a program code? Write down an algorithm to relocate the relative addresses of a Module M_i with base address equals to B.

b) Suppose, we have a program code containing three modules, P1, P2 and P3 as described in Table -II. A linker performed relocation activities on the modules during linking. What will be the values of the "*base addresses*", "*relocation factors*" and "*relative addresses*" of these three modules if the base address of the link module, B=0.

Module Name (length)	**Base Address during Translation**	**Relative Address**
P1 (256)	0	40, 64
P2 (32)	1000	1010, 1056
P3 (512)	48	60

(4+4+4)+8=20

Q4. a) Why one-pass macro processor does not permit macro calls within a macro definition? What are the differences between Relocating linking loader and Linkage editor? Suppose a program has nine subprograms and their subroutine calls within the program are given in Table III. Construct an overlay structure and calculate the maximum storage requirement to optimize memory usage.

Subprograms	**Size**	**Calling Subprograms**	**Remark**
S1	400K	S2, S3	root
S2	350K		
S3	200K	S4, S6, S9	not root
S4	500K		
S5	400K	S7, S8	root
S6	400K		
S7	300K		
S8	450K		
S9	300K		

Table –III

b) Assume an assembly program segment of a SIC machine is described in Table -IV. Write down the contents of the symbol table after processing each of the instructions done by a simple load-and-go assembler.

LC value	**SIC statements**		
340		LOAD	N1
364.....		STORE	N1
394.....	LAB	LDCH	STRP
430.....		STCH	STRP
454.....		JUMP	LAB
634.....	N1		RESW 1
640.....	STRP	BYTE	C'ABC'

Table –IV

(2+2+6)+10=20

EX/ CSE/T/313/2016

Bachelor of Computer Science and Engineering Examination- 2015

(3^{rd} year 1^{st} Semester)

System Programming

Part-B

Full marks: 50

Question no 1 is compulsory. Answer any 4 questions from the rest

1. a. A given mass storage device such as a hard disk can store 2 giga bytes of information. Assuming that each page of text has 25 rows and each row has 80 columns of ASCII character, approximately how many information can this disk store? 3

   b. Which register(s) of CPU holds the address of the instructions to be fetched? 2

   c. Can the Physical address 346E0 be the starting address for a segment? Why or Why not? 3

   d. Find the errors in the following 2

```
        .model  Enormous
        .stack
        .code
        .data
main proc far
        mov ax,data
        mov ds,@data
        mov al,34h
        mov al,4fh
        mov data1,al
        start endp
        end
```

2. a. Write a set of instruction which gets a string response from the keyboard and displays it at row 17 and column 20. 4

   b. How ctrl and shift keys of a standard keyboard are handled by computer? 3

   c. What does it mean when the address of the head and trail in the keyboard buffer are the same? 3

3.	a.	What are the characteristics of mouse programming?	2
	b.	Write a program to display different messages depending on whether the mouse is clicked inside or outside of a predefined box.	8
4.	a	When and why debug mode is preferred over the MASM?	3
	b.	Write a program using a look-up-table to retrieve the y value in the equation $y = x^2 + 2x + 5\ for\ x$ values of 0 to 9. (use separate procedure for look up table searching)	7
5	a.	What is the significance of Terminate and Stay Resident programming?	2
	b.	Write a Terminate and Stay Resident program in assembly language so that whenever a vowel is pressed the cursor move to the position of the previous typed character?	8
6.	a.	What is the memory location of the entry point to BIOS? On power-up, how does the system direct itself to this address?	3
	b.	Write the set of instructions to determine the size of the file?	3
	c.	What do you mean by disk system area?	2
	d.	Identify the differences between the body of macro definition and macro expansion.	2