Course Code : CST 221 **ITSJ/RW – 17 / 1308**

Fourth Semester B. E. (Computer Science and Engineering) Examination

SYSTEMS PROGRAMMING

Time : 3 Hours] [Max. Marks : 60

Instructions to Candidates :—

(1) Questions **One** and **Six** have internal choices.
(2) Due credit will be given to neatness.
(3) Assume suitable data wherever required.

1. Solve any **Two** :—

(a) Construct a possible solution for the design of single pass assembler with the help of flowchart. 5 (CO 2)

(b) Illustrate following assembler directives with examples.

(i) DC

(ii) BALR

(iii) EQU 5 (CO 2)

(c) What are different instruction formats used in IBM 360 assembly language programming ? 5 (CO 1)

2. (a) Construct macro definitions INCR and DECR for implement and Decrement operations respectively. Write a macro definition SAMPLE using AIF for the following such that it must call

- Macro INCR when count > 20 else

- Macro DECR when count > 10 5 (CO 1, CO 2)

(b) Exemplify macro definition within macro. Is it feasible to have two pass macro processor that can handle macro definition within macro ? Why ? 5 (CO 2)

3. (a) Assume that following programs are loaded at location 400 in order PROG and then SEGMT. Obtain ESD, TXT, RLD tables.

```
SEGMT    START
         ENTRY    SEGMT2
         EXTRN    PROG2,PROG3
SEGMT1   DC       A(SEGMT1), A(PROG2+12)
SEGMT2   DC       A(SEGMT1 – SEGMT), A(PROG3 –
                  SEGMT1)
         END

PROG     START
         ENTRY    PROG2, PROG3
         EXTRN    SEGMT2, SEGMT

PROG1    DC       A(PROG2 + 4), A(SEGMT)
PROG2    DC       A(SEGMT2 + * ), A(PROG3 – SEGMT2)
PROG3    DC       A(PROG2 – PROG + SEGMT)
         END
```

5 (CO 2, CO 3)

(b) Outline following terms :

(i) Binder and Module loader

(ii) Overlay structure. 5 (CO 3)

4. (a) Given the files exp.c and main.c, write a "Makefile" for the same. Also give command to :

(i) Compile this Makefile

(ii) Execute final executable

exp.c

```
#include<stdio.h>
 void  myprog(void);
/*function  definition*/
 void  myprog(void)
  {
    printf("Body  of
 myunc\n");}
```

main.c

```
 #include<stdio.h>
  void  myprog(void);
  int  main()
   {
    printf("Hello,  World.\n");
     myprog();
    fflush(stdout);
   }
```

5 (CO 4)

(b) How Source Code Control Systems are helpful while building a project? 5 (CO 4)

5. (a) Explain different types of UNIX device drivers. 5 (CO 1)

(b) Answer the following questions for a LINUX device driver :

(1) What is Major number and it's usage ?

(2) Can we have same major number for more than one device file ?

(3) What is minor number and it's usage ?

(4) What is range of major and minor numbers ?

5 (CO 2, CO 4)

6. Solve any **Two** :—

(a) Draw a block diagram explaining syntax analysis and semantic analysis phases of a compiler. Explain each phase with examples. Also give some tools used by these phases while compiler construction. 5 (CO 4)

(b) How a simple calculator can be implemented using LEX and YACC scripts ? 5 (CO 4)

(c) Optimize matrix after elimination of common sub expression.

$Q = B + C – (P – A) – D * (C + B) / (P – A)$ 5 (CO 2)