Total No. of Questions : 10]

SEAT No. :

P2621

[Total No. of Pages : 4

[5153]-597
T.E. (I.T.)
SYSTEMS PROGRAMMING
(2012 Course) (Semester - II) (314450)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

Q1) a) Give the various data structures in the design of pass-1 of a Two-pass direct linking loader. **[4]**

b) What are the assembler directives? Explain how assembler directives LTORG, ORIGIN and EQU are processed in first pass. **[6]**

OR

Q2) a) For the 'C' code given below, give the different tables that would be generated as output of lexical analysis. **[8]**

```
main ( )
{    Float average ;
     int i, sum , n = 10;
     sum = 0;
     clrscr();
     printf("Average of 10 nos. : %f",avg);
     for (i = 1; i < = 10; i++)
          Sum = sum +i;
     avg = sum / (float) n;
}
```

b) Define macroprocessor and assembler. **[2]**

P.T.O.

Q3) a) For the following piece of assembly language code, show the contents of MDT, MNT, IC and EC, **[5]**

```
        MACRO
        INCR & ARG
        LOAD 1,&ARG
        ADD 1, = F'1'
        STORE 1,&ARG
        MEND
        MACRO
        DECR & NUM
        LOAD 2, &NUM
        SUB 2, = F'1'
        STORE 2, & NUM
        MEND
        START
        DECR D1
        STORE AREG, D1
        INCR D2
D1      DC '50'
D2      DC '100'
        END
```

b) Define loader and enlist the basic functions of loader. **[5]**

OR

Q4) a) Using the algorithm convert the following regular expressions to DFA: (a.b)*.a.# **[6]**

b) Explain different parameter passing mechanisms in macro-processor. **[4]**

Q5) a) Consider the grammar **[6]**

$$E \rightarrow E\text{-}E$$
$$E \rightarrow E/E$$
$$E \rightarrow id$$

Perform shift Reduce parsing of i/p string "id – id/id"

b) Explain recursive descent parser for the given grammar to derive the string cad

$$S \rightarrow cAd$$
$$A \rightarrow ab/a$$

[6]

c) Compare bottom UP and top down parser. **[6]**

OR

Q6) a) Consider the following grammar **[10]**

$$S \rightarrow S(S)S/\varepsilon$$

Construct SLR parser and parse for the string (a,(a,a))

b) Explain YACC file structure. **[4]**

c) Compare SLR, CLR and LALR parsers. **[4]**

Q7) a) Write down Syntax Directed Translation for assignment statement. **[6]**

b) For the grammar **[6]**

$$D \rightarrow TL$$
$$T \rightarrow int/real$$
$$L \rightarrow L,id/id$$

Draw an annotated parse tree for the statement real x_1, x_2;

c) Write the method of generating intermediate code for the expression

If (condition) then p = q Else x = y + z **[4]**

OR

Q8) a) Define Syntax directed definition and syntax directed translation. **[4]**

b) Design dependency graph for the following grammar **[6]**

$E \rightarrow E+T/T$

$T \rightarrow T*F/F$

$F \rightarrow id$

The expression given is : 5*8-10

c) For the following expression write its postfix expression, draw DAG and write three address code: **[6]**

$$\left((x+y)-\left((x+y)*(x-y)\right)\right)+\left((x+y)*(x-y)\right)$$

Q9) a) Compare between static, stack & heap allocation. **[4]**

b) With examples explain code generation issues. **[6]**

c) What are the different techniques of storage allocation. **[6]**

OR

Q10)a) With examples explain at least four machine independent code optimization techniques. **[8]**

b) Which are the machine dependent code optimization issues. **[8]**