

Total No. of Questions : 10]

SEAT No. :

P1767

[Total No. of Pages : 4

[5460] - 597

T.E. (IT)

**SYSTEMS PROGRAMMING
(2015 Pattern) (Semester - II)**

Time : 2½ Hours]

[Max. Marks :70

Instructions to the candidates:

- 1) *Answer Q1 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 side indicate full marks.*
- 4) *Assume suitable data if necessary.*

Q1) Perform Pass I and Pass II of assembler for the given assembly language program. Assume instruction length of 1 byte. **[10]**

```
START 1500
READ LAB
LOOP MOVER AREG, A
MOVER BREG, = '1'
A EQU LOOP+5
LOAD B
ORIGIN A +10
LTORG
B MOVER CREG, = '2'
STORE D
MOVEM AREG, = '1'
LAB DS 10
STOP
END
```

OR

P.T.O.

- Q2)** a) Explain overlay structure and subroutine linkage w.r.t. loaders. [6]
b) Define the following : [4]
i) Forward referenced symbol
ii) Pattern and Lexeme
iii) Macroprocessor

- Q3)** a) For the given 'C' code, generate the output of lexical analysis. [6]

```
// My first C Program
Void main ()
{
    int i,j;
    clrscr();
    scanf("%d %d",&i,&j);
    while (i <= j)
    {
        i++;
        j--;
    }
}
```

printf("C Programming!");

getch();}

- b) Define loader and explain its functions. [4]

OR

- Q4)** a) Explain different parameter passing methods used in macroprocessors. [5]

- b) Convert the given RE to its equivalent DFA : [5]

$(a + b)^*.a$

- Q5)** a) For the given grammar, construct the SLR parser and parse the string (a,(a,a)) [8]

$S \rightarrow (L) / a$

$L \rightarrow L, S / S$

- b) Explain with example the problem of left factoring of grammar in parsers. [4]

- c) With neat diagram explain classification of parsers. [6]

OR

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

$S \rightarrow Aa / bAc / Bc/bBa$

$A \rightarrow d$

$B \rightarrow d$

Construct CLR parser and parse for the string "bdc" and "bc".

b) Define handle. Where is the concept of handle pruning used? For the given grammar, generate the string +*aaa
And identify the handles at each stage. [4]

$S \rightarrow +SS/*SS/a$

c) Differentiate between SLR and LALR parsers. [4]

Q7) a) Define the following : [4]

i) Syntax Directed Definition

ii) Syntax Directed Translation

iii) Synthesized Attributes

iv) Inherited Attributes

b) For the given grammar. [6]

$D \rightarrow TL$

$T \rightarrow \text{int} / \text{real}$

$L \rightarrow L, \text{id}/\text{id}$

Show the annotated parse tree for the statement $\text{real } x_1, x_2;$

c) Define dependency graph and for the annotated tree generated in Q7b) draw the dependency graph. [6]

OR

Q8) a) Explain dynamic allocation strategies. [6]

b) Show DAG, quadruple and triple for the given expression : [6]

$a + a*(b-c) + (b-c)*d$

c) Generate three address code for [4]

If $(a > b)$ then $x = y + z$

else $p = q - r$

- Q9)** a) i) $\text{prod} = 0$
 ii) $i = 1$
 iii) $t_1 = 4 * i$
 iv) $t_2 = a[t_1]$
 v) $t_3 = 4 * i$
 vi) $t_4 = b[t_3]$
 vii) $t_5 = t_2 * t_4$
 viii) $t_6 = \text{prod} + t_5$
 ix) $\text{prod} = t_6$
 x) $t_7 = i + 1$
 xi) $i = t_7$
 xii) $\text{if } i \leq 20 \text{ goto}(3)$

Show the basic flow graph for the given code. Explain the rules for forming the blocks. **[4]**

- b) Explain machine dependent and independent optimization techniques. **[8]**
 c) Discuss machine dependent issues for code generation. **[4]**

OR

- Q10)** a)

| | | |
|----------------|----------------|--------------|
| $i = 4$ | $i = 4$ | $i = 4$ |
| $t_1 = i + 1$ | $t_1 = 5$ | $t_1 = 5$ |
| $t_2 = b[t_1]$ | $t_2 = b[t_1]$ | $t_2 = b[5]$ |
| $a[t_1] = t_2$ | $a[t_1] = t_2$ | $a[5] = t_2$ |

Perform machine independent code optimization techniques on the given code. **[8]**

- b) Discuss code generation issues. **[4]**
 c) Write a note on activation record. **[4]**

