

LD R0, i
MUL R0, R0, 8
LD R1, a(R0)
ST b, R1

4

4/12/19 (Morning)

This question paper contains 6 printed pages.

Your Roll No.

Sl. No. of Ques. Paper : 7877 J
Unique Paper Code : 32347501
Name of Paper : Systems Programming
Name of Course : B.Sc. (Hons.) Computer Science :
: DSE - 2
Semester : V
Duration : 3 hours
Maximum Marks : 75

38

(Write your Roll No. on the top immediately
on receipt of this question paper.)

The question paper consists of two Sections.

Section A is compulsory.

Attempt any four questions from Section B.

SECTION A

1. (a) Explain forward reference in assembler with the help of an example. 2
- (b) Draw the activation tree for the function calls :
- ```
main () { p1 (); }
p1 () { p2 (); p3 (); }
p2 () { }
p3 () { } 2
```
- (c) Define inherited attribute with the help of a suitable example. 2

P.T.O.

(d) Define type synthesis and type inference in the context of type checking. 2

(e) Write the structure of a Yacc Program. 2

(f) Translate the expression  $a = (-c) * b + (-c)$  to quadruples. 2

(g) Draw the structures of Machine Opcode Table (MO), Pseudo Opcode Table (POT) and Symbol Table (SYMTAB) used in the assembler. 3

(h) Find the FOLLOW() for every non-terminal in the following grammar : 3

$S \rightarrow Bb \mid Cd$

$B \rightarrow aB \mid \epsilon$

$C \rightarrow cC \mid \epsilon$

(i) What is the difference between shared library and static library? 3

(j) What are the functions performed by lexical analyser? 3

(k) How is the symbol table used by lexical and syntax analyzers of the compiler? 2

(l) Write token name, lexeme and attribute value for the following statement : 4

`int * a;`

(m) Generate the assembly code for the following sequence of statements. Assume  $x$ ,  $y$  and  $z$  are in memory.

`if x < y goto L1`

`z = 0`

`goto L2`

(c) Compare and contrast single-pass and two-pass assemblers. 3

7. (a) What is the output of the following code?

```
int f(int x, int *y, int **z)
```

```
{
```

```
 **z+= 1;
```

```
 *y+= 2;
```

```
 x+= 3;
```

```
 return x + *y + **z;
```

```
}
```

```
int main()
```

```
{
```

```
 int x, c, *b, **a;
```

```
 c = 4, b = &c, a = &b;
```

```
 x = f(c, b, a);
```

```
 printf("%d", x);
```

```
 return 0;
```

```
}
```

(b) "Values communicated between caller and callee are placed in the beginning of callee's activation record." Why? 2

(c) Determine the cost of each instruction in the following assembly code. Assume that each memory access (including the machine instruction) has cost 1.