INDIAN INSTITUTE OF TECHNOLOGY, KHARAGPUR

Date 16.11.2006 15.00 *Time:* 30 min. *Full Marks* **20** *No. of Students:* **56**
Autumn Semester:, 2006 Department: Computer Science and Engineering Sub. No: CS 43001
3^{rd} Yr. B. Tech.(Hons.) Sub. Name: Compiler Construction

Name : – Roll No:– – – – – – – – – – – – – – – –

Instructions : Answer **all** the questions. Answer only what is asked. Do rough work in separate sheet of paper.

1. Given the intermediate code
   1. location = -1
   2. i = 0
   3. if i < 100 goto 5
   4. goto 14
   5. $t_1 = 4 \times$ i
   6. goto 3
   7. $t_2 =$ A[t_1]
   8. if $t_2 =$ x goto 10
   9. goto 11
   10. location = i
   11. $t_3 =$ i + 1
   12. i = t_3
   13. goto 3
   14.

   Determine the Basic Blocks and draw the block flow diagram. (6)

   Block Flow Diagram :

Block No.	Statements

2. Minimize the number of temporary variables for the following piece of code. The temporary variables are indicated as t_x

t_1 = a * a
t_2 = a * b
t_3 = 2 * t_2
t_4 = t_1 + t_3
t_5 = b * b
t_6 = t_4 * t_5 (4)

3. Generate short-circuit (intermediate) code for the following input (a $<$ b or c $<$ d and e $<$ f) (3)

4. Given the grammar

```
S − > if B then S
    | if B then S else S
    | while B do S
    | begin L end
    | A /*assignment*/
L − > L S
    | S
B − > id relop id
A − > id = E
E − > E + E | E - E
```

Gerenate the parse tree for the following input

```
begin
    while a > b do
     begin
          x = y + z
          a = a - b
     end
     x = y - z
end
```

(7)