3rd Internal Test of MSc CS/IT
Paper: Compiler Design
Semester: 3rd

Marks: 30 **Time: 1hr**

Answer any three questions from the following questions-

2. Construct (including construction steps) a syntax tree for the expression a – 4 + c by using the following Syntax Directed Definition 10

	PRODUCTION	SEMANTIC RULES
1)	$E \rightarrow E_1 + T$	$E.node =$ **new** $Node('+', E_1.node, T.node)$
2)	$E \rightarrow E_1 - T$	$E.node =$ **new** $Node('-', E_1.node, T.node)$
3)	$E \rightarrow T$	$E.node = T.node$
4)	$T \rightarrow (\ E\ )$	$T.node = E.node$
5)	$T \rightarrow$ **id**	$T.node =$ **new** $Leaf($**id**, **id**$.entry)$
6)	$T \rightarrow$ **num**	$T.node =$ **new** $Leaf($**num**, **num**$.val)$

3. Draw (including construction steps) a DAG (Directed acyclic graph) for the expression a + a*(b-c) + (b-c)*d by using the Syntax Directed Definition given in Q2. 10

4. Covert the expression a=b*-c + b*-c into three address codes. Also show how can we store these three address codes in different data structure like- Quadruples, Triples and Indirect Triples 4+6=10

5. Partition the following code segments into basic blocks. Also shows the flows between the basic blocks. 10

```
1)  i = 1
2)  j = 1
3)  t1 = 10 * i
4)  t2 = t1 + j
5)  t3 = 8 * t2
6)  t4 = t3 - 88
7)  a[t4] = 0.0
8)  j = j + 1
9)  if j <= 10 goto (3)
10) i = i + 1
11) if i <= 10 goto (2)
12) i = 1
13) t5 = i - 1
14) t6 = 88 * t5
15) a[t6] = 1.0
16) i = i + 1
17) if i <= 10 goto (13)
```

6. Give the Syntax directed definition for the following Flow of Control statements- 10

$S \rightarrow$ **if** $(\ B\ )\ S_1$
$S \rightarrow$ **if** $(\ B\ )\ S_1$ **else** S_2
$S \rightarrow$ **while** $(\ B\ )\ S_1$