Registration No. : | | | | | | | | | | |

Total number of printed pages – 4

B. Tech

PCCS 4305

Sixth Semester Back Examination – 2015

COMPILER DESIGN

BRANCH : IT

QUESTION CODE : M 359

Full Marks – 70

Time : 3 Hours

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*Answer Question No. **1** which is compulsory and any **five** from the rest.*
The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2×10

   (a) What is the difference between NFA and DFA ? What is the necessity of both those automata ?

   (b) What is the difference between context-free grammar and context-sensitive grammar ? What is the necessity of both those grammar ?

   (c) Given expression A = B + C/D, what will be the output of the lexical analysis phase.

   (d) What is ambiguous grammar ? Explain using an example.

   (e) What is the difference between left recursion and left factoring ?

   (f) State whether the following grammar is LL (1) or not.

   $S \rightarrow aBa$

   $B \rightarrow bB \mid \varepsilon$

   (g) What is the difference between synthesized attribute and inherited attribute ?

   (h) What is the difference between register-descriptor and address-descriptor ? Explain.

   (i) What is the difference between triple and quadruple ? Explain using examples.

   (j) What is the difference between formal parameters and actual parameters ? Explain using examples.

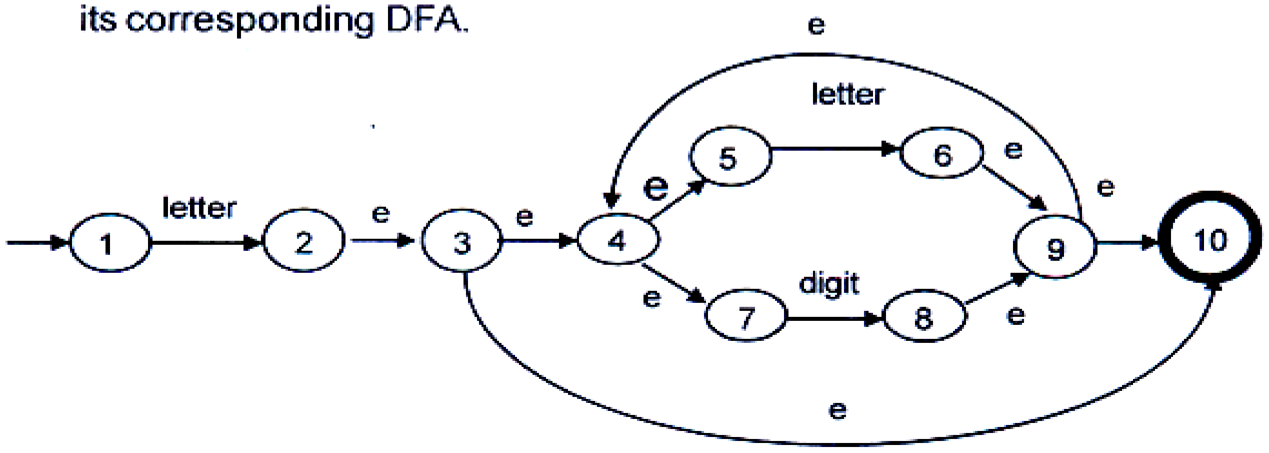
P.T.O.

2. (a) Write regular definitions for the following languages : 5

(i) all strings of letters that contain the five vowels in order.

(ii) all strings of letters in which the letters are in ascending lexicographic order.

(b) The NFA below represents the regular expression letter (letter | digit)*. Find its corresponding DFA. 5



3. (a) How error recovery is done in predictive parsing ? Explain using an example. 5

(b) What is SR parser ? How stack implementation of SR parsing is done ? Conduct the Shift reduce parsing of string (w) id + id * id using stack. 5

4. (a) What is SDD ? Why it is required ? Write down the SDD for the following set of production rules : 5

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S → E$

E → E1 + E2

E → E1 * E2

E → (E1)

E → I

I → I 1digit

I → digit

(b) Use the given production and its semantic rule and construct parse tree for expression 1 + 2 + 3 . 5

<u>Production</u>	<u>SemanticRule</u>
E → E1 + E2	E.val = E1.val + E2.val

5. (a) What are the various approaches of implementation of symbol table ? Explain using an example. 5

(b) Write down the algorithm to construct a DAG. Construct the DAG for the following expression : 5

a + a * (b – c) + (b – c) * d

6. (a) Give the activation code for the following piece of code : 5

```
----
printf("Enter Your Name: ");
scanf("%s", username);
show_data(username);
printf("Press any key to continue...");
. . .
intshow_data(char *user)
  {
printf("Your name is %s", username);
return 0;
----- .
```

(b) Give an account of static and dynamic storage allocations. 5

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7. (a) How do you define basic blocks ? Find out the basic blocks for the following three address code : 6

```
(1)   i : = m – 1
(2)   j : = n
(3)   t1 := 4 * n
(4)   v : = a [ t1 ]
(5)   i : = i + 1
(6)   t2: = 4 * i
(7)   t3: = a [t2]
(8)   if t3 < v goto (5)
(9)   j : = j – 1
(10)  t4 : = 4 * j
(11)  t5 : = a [t4 ]
(12)  if t5 > v goto (9)
(13)  if i >=j goto (23)
(14)  t6 : = 4 * i
(15)  x : = a [t6 ]
(16)  t7 : = 4 * i
```

(17) t8 : = 4 * j

(18) t9 : = a [t8]

(19) a[t7]: = t9

(20) t10 : = 4 * j

(21) a [t10] : = x

(22) goto (5)

(23) t11 : = 4 * i

(24) x := a [t11]

(25) t12 : = 4 * i

(26) t13 : = 4 *n

(27) t14: = a [t13]

(28) a[t12] : = t14

(29) t15 : = 4 * n

(30) a [t15] : = x

Also draw the flow graph for it.

(b) Explain redundant and un-reachable codes with examples. 4

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8. Write short notes on any **two** : 5 × 2

(a) LALR parsing table

(b) Syntax directed translation

(c) Back patching

(d) Peephole optimization.