

**B.TECH. SEM -VII ( COMPUTER) 2014 COURSE (CBCS) : WINTER  
- 2017  
SUBJECT: COMPILER DESIGN**

Day: **Friday**  
Date: **19/01/2018**

**W-2017-2279**

Time: **02.30 PM TO 05.30 PM**  
Max Marks : **60**

**N.B:**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Assume suitable data, if necessary.
- 4) Draw neat and labeled diagram **WHEREVER** necessary.

**Q.1** Explain compiler construction tools. **(10)**  
Construct NFA for regular expression  $aa^* | bb^*$  with alphabet  $\{a,b\}$  using Thomson's construction algorithm.

**OR**

Convert the following regular expression  $(a|b)^*abb$  into DFA using subset construction algorithm **(10)**

**Q.2 a)** Explain the need of Bottom up parser. **(04)**  
**b)** Consider the grammar: **(06)**

$E \rightarrow E+E$

$E \rightarrow E * E$

$E \rightarrow id$

Perform shift reduce parsing of the input string  $id1+id2*id3$

**OR**

Consider the following grammar: **(10)**

$E \rightarrow E + T | T$

$T \rightarrow T * F | F$

$F \rightarrow (E) | id$

Compute First and Follow for each non-terminal symbol with the help of Predictive parsing table algorithm.

**Q.3** Describe various representations of Intermediate codes. **(10)**

Translate the expression:

$A = - B * (C + D)$

into Quadruples and Triples.

**OR**

Explain postfix notation, DAG, three address code, syntax directed translation scheme with suitable example. **(10)**

**Q.4** Explain common sub-expression elimination, copy propagation, dead code elimination with suitable example. **(10)**

**OR**

Explain the principle sources of optimization and represent the following basic block using DAG. **(10)**

$a := b + c$

$b := a - d$

$c := b + c$

$d := a - d$

**P.T.O**

**Q.5** Discuss the major issues of code generation and explain the different output forms of code generation. **(10)**

**OR**

**a)** Explain algebraic simplification and reduction in strength with suitable example. **(04)**

**b)** Apply the algorithm of code generation on following code - **(06)**

$$t_1 = p + q$$

$$t_2 = r + s$$

$$t_3 = t_2 - t$$

$$a = t_1 - t_3$$

**Q.6** Explain the architecture of gcc compiler with neat block diagram and discuss cross compiler with example. **(10)**

**OR**

Explain atleast 5 different command line options for gcc compiler. **(10)**