B.E. (Information Technology) Seventh Semester (CBS)

Elective-I : Compiler Design

P. Pages : 2 **AHK/KW/19/2352**

Time : Three Hours * 1698 * Max. Marks : 80

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Assume suitable data whenever necessary.
9. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Explain the structure of realistic compiler with block diagram. **7**

b) Explain different types of compiler. **6**

OR

2. a) Explain Bootstrapping & cross-compiler. **7**

b) What are the different types of compiler writing tools? Explain each. **6**

3. a) Construct LALR parsing table for the given grammar **7**
$S \rightarrow AA;\ A \rightarrow aA / b$

b) Is the following grammar LR(10) or not? **7**
$S \rightarrow wAz / xBz / wBy / zAy;\ A \rightarrow r;\ B \rightarrow r$

OR

4. a) Compare SLR, CLR & LALR parser. **7**

b) Check whether the given grammar is LR (0) or not? **7**
$S \rightarrow Aa / bAc / Bc / bBa;\ A \rightarrow d;\ B \rightarrow d$

5. Draw parse tree, generate TAC and write translation scheme for : **13**
if (A > B and not B > C) or (C > D))
then
    while (C > D) do
    D = D + 1
else
    D = D – 1

OR

6. Draw labeled parse tree & translate the following statement to intermediate code using array reference. Array a & b have size 30 x 40 while array c & d have size 20. BPW = 4. **13**
c[a[i, j] = b[i, j] + c[a[i, j]] + d[i+ j]

7. a) What is symbol table? Explain data structure for symbol table management. 7

b) Explain different storage allocation strategies. 6

OR

8. a) Explain with block diagram, the basic structure of activation record. 6

b) Explain different types of errors in compilation process. Also explain error detection & recovery for LL & LR parser. 7

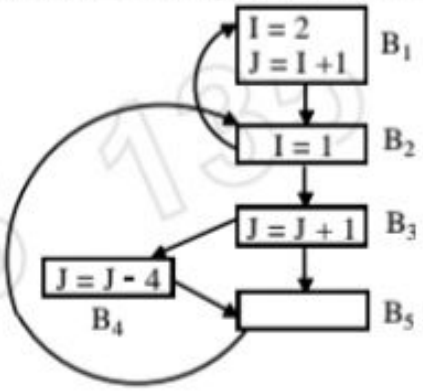
9. a) Draw program flow graph for following code. 7

```
fact (x)
{
    int f = 1 ;
    for (i = 2 ; i < x ; i++)
    f = f * i ;
    return (f) ;
}
```

b) Explain the procedure to eliminate induction variable with suitable example. 7

OR

10. Compute IN and OUT computations & u-d chain for following data flow graph. 14



11. Consider the following code : 13

$t_1 = a + b$; $t_2 = c + d$; $t_3 = e - t_2$; $t_4 = t_1 - t_3$

i) Generate DAG and implement labeling algorithm.

ii) Write gencode algorithm & generate code using gencode( ) function.

OR

12. a) Explain peephole optimization. 7

b) Explain machine model for code generation. Also explain the problems that hinder good code generation. 6

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