B.E. Computer Technology / Computer Science & Engineering Eighth Semester

CSE802 - Compiler Construction

P. Pages : 2 **GUG/W/18/1997**

Time : Three Hours * 1 5 2 9 * Max. Marks : 80

Notes : 1. All questions are compulsory.
2. All questions carry equal marks.
3. Assume suitable data wherever necessary.
4. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Explain with neat diagram various stages of phases of compiler. Also explain analysis and synthesis tasks performed by compiler. **8**

b) Explain the following with appropriate example : **8**
i) Boot Strapping. ii) Cross compiler

OR

2. a) Explain the following compiler writing tools **8**
i) LEX tool ii) YACC tool

b) Comment on the following statements : A multipass compiler can be made less space then a single pass compiler. **8**

3. a) Construct LL(1) parsing table for the following grammar. **8**

$S \rightarrow aAB \mid bA \mid \in$

$A \rightarrow aAb \mid \in$

$B \rightarrow bB \mid C$

b) Comment on the following statements : **8**
i) No left recursive grammar can be LL(1)
ii) $\in$-free LL(1) grammar can parser a sentence without FOLLOW( ) set.

OR

4. a) Describe implementation of CLR parsing table. **6**

b) Frame the transition table (transition diagram), Action table and Goto table for the grammar **10**

$S \rightarrow AaAb$

$S \rightarrow BbBa$

$A \rightarrow \in$

$B \rightarrow \in$

5. a) Give the syntax directed definition with the synthesized attribute val Draw the annotated parse tree for the expression $2+3*5$ **8**

$E \rightarrow E+T \quad E \cdot val = E \cdot val + T \cdot val$

$E \rightarrow T \quad E \cdot val = T \cdot val$

$T \rightarrow T*F \quad T \cdot val = T \cdot val + F \cdot val$

$T \rightarrow F \quad T \cdot val = F \cdot val$

$F \rightarrow id \quad F \cdot val = num \cdot lexval$

b) Generate three-address code for the following switch statement. **8**

```
switch (i + j)
{
      case 1 : x = y + z
      case 2 : u = v + w
      default : p = q + r
}
```

OR

6. a) Write the translation scheme for the given array reference and write TAC for the given multidimensional array, arrays are statically allocated and size of B is 10 x 10 x 20, size of C is 20, size of D is 20 x 10 and BPW is 8 **8**
B[i, j, k] = C[i] + D[i, j]

b) Generate three address code using SDTS for following statement **8**

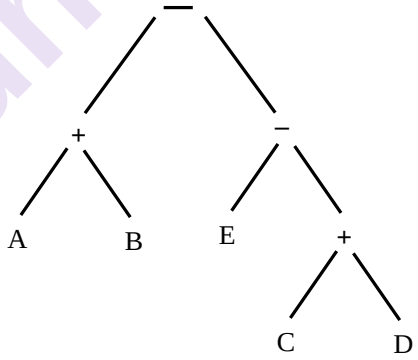
```
while (A < B and C > D or E = F)
do
      if (G = 0)
          X = X + 1
      else
          X = Y + Z
```

7. a) Describe phrase level error recovery in LR parser. **8**

b) Write labelling algorithm to determine the minimum number of register required to evaluate the tree. Use labelling algorithm to evaluate following expression **8**
$Z = X - Y + X * Y * V$

OR

8. Generate object code for the following DAG using labelling algorithm. **16**



9. a) For the given program fragment, generate TAC bpw = 4 **8**
PROD = PROD + A[I] * B[J]
I = I + 1
If I ≤ 20 goto (1)
Eliminate local common subexpression.

b) Explain the method to eliminate global common subexpression. **8**

OR

10. a) Write and explain syntax directed translation scheme for array reference. **8**

b) Explain phrase level error recovery for LR parser with suitable example. **8**

****