



- 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. Due credit will be given to neatness and adequate dimensions.
  9. Assume suitable data whenever necessary.
  10. Illustrate your answers whenever necessary with the help of neat sketches.
  11. Use of non programmable calculator is permitted.

1. a) What is cross compiler? Explain bootstrapping compiler. 6  
 b) Describe different phase of compiler with suitable. 7
- OR**
2. a) Construct DFA for following regular expression  $a^*(aa/bb)^*b$ . 5  
 b) What is meant by ambiguity of grammar? Check the given grammar is ambiguous or not. 4  

$$S \rightarrow iCts / iCtSeS$$

$$C \rightarrow b$$

$$S \rightarrow a$$
  
 c) State the difference between a pass and phase. 4
3. a) Compare SLR, CLR and LALR parser. 4  
 b) Construct LR(1) parsing table for the following grammar. 9  

$$S \rightarrow xAy | xBy | xAz$$

$$A \rightarrow q | qS$$

$$B \rightarrow q$$
- OR**
4. a) Explain recursive descent parser in details. 6  
 b) Construct LL (1) parsing table for the following grammar. 7  

$$S \rightarrow Aa Ab | Ba Bb$$

$$A \rightarrow \epsilon$$

$$B \rightarrow \epsilon$$
5. Translate following statement into intermediate code 14  

$$A[I, J, K] := B [I, J] + C[I + J + K]$$
 where A is 3 – D array of size 10 x 10 x 10  
 B is 2 – D array of size 10 x 10

C is 1 – D array of size 30  
 bpw = 2  
 Draw annotated parse tree for the same.

**OR**

6. Write SDTS for the following code : Write TAC and annotated tree diagram 14  
 { while (B > D and A < C) do  
   if (A > Z) then  
     C = C+1;  
   else  
     while (A < D) do  
       A = A + 2;

7. a) Explain the error recovery in LR parsing. 6  
 b) Explain the symbol table management for block structured language. 7

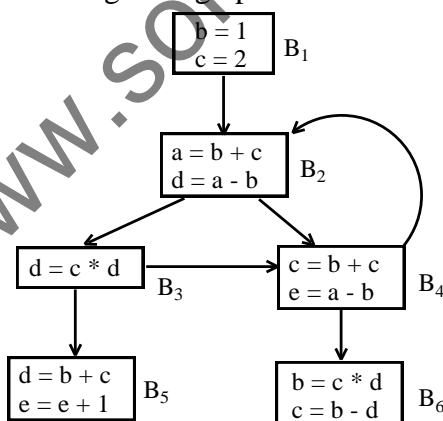
**OR**

8. a) Explain the error recovery in LL parsing. 6  
 b) What are the various attributes that should be stored in symbol table and discuss various data structures for implementation of symbol table. 7

9. a) Write short note on: 13  
 1) Common subexpression elimination      2) Dominator node  
 3) Loop Jamming                                4) Loop Unrolling  
 5) Reducible flow graph.

**OR**

10. Compute IN and OUT for following flow graph. 13



11. a) Write an algorithm for heuristic ordering for evaluation order. 5  
 b) Generate the code for following expression using simple code generation algorithm 9  
 $x = (a + b) - ((c + d) - e)$ .

**OR**

12. a) Explain the algorithm for Register allocation & assignment using suitable example. 7  
 b) Write short notes on: 7  
 1) Problems in code generation.

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