Faculty of Engineering & Technology
Seventh Semester B.E. (C.S.E.) (C.B.S.) Examination
**LANGUAGE PROCESSOR**

Time—Three Hours]   [Maximum Marks—80

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.

(2) Solve Question No. **1 OR** Question No. **2**.

(3) Solve Question No. **3 OR** Question No. **4**.

(4) Solve Question No. **5 OR** Question No. **6**.

(5) Solve Question No. **7 OR** Question No. **8**.

(6) Solve Question No. **9 OR** Question No. **10**.

(7) Solve Question No. **11 OR** Question No. **12**.

(8) Due credit will be given to neatness and adequate dimensions.

(9) Assume suitable data wherever necessary.

(10) Illustrate your answers wherever necessary with the help of neat sketches.

10. (a) What is dominator ? Construct dominator tree for the following graph. Also detect Back edges from the given graph. 7
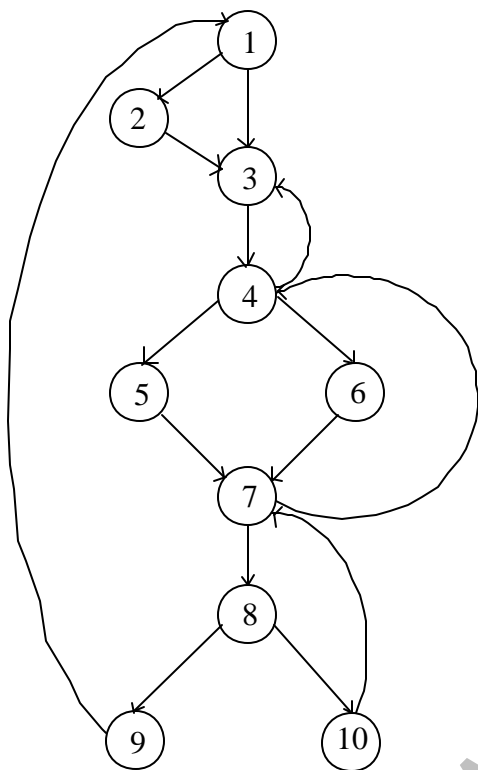
(b) Write short note on Loop Unrolling and Loop Jamming. 6

4. (a) What is Augmented grammar ? Why there is a need to have Augmented Grammar while constructing LR parsers ? Explain with suitable example. 4

(b) Construct LR(1) Parsing Table for the given grammar.

S → AaAb

S → BbBa

A → ∈

B → ∈. 9

5. (a) Write SDTS to generate TAC for the given Boolean Expression :

NOT (T > U AND A < B OR C > D). 8

(b) Consider the SDTS :

E → E + E {Print "+"}

E → E * E {Print "*"}

E → id [Print id.name}

Convert infix id + id * id into postfix. 5

OR

6. Generate three address code using SDTS for following :

$$A[I, J, K] = B[I, J] + C [I + J + K]$$

where

A is 3D array of size $10 \times 10 \times 10$

B is 2D array of size 10×10

C is 1D array of size 30

bpw = 2

Draw Annoted Parse tree for the same.   13

7. (a) What is Symbol Table ? Explain various data structures required to implement symbol table.   9

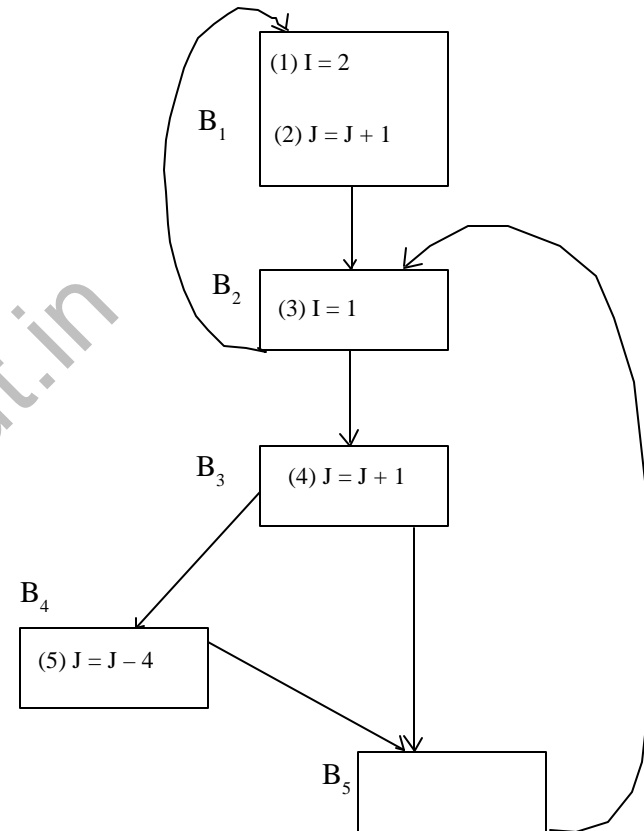   (b) Explain Activation record for procedure calls.   5

OR

8. (a) What are the different types of errors ? Explain various error recovery strategies used by compiler.   9

   (b) Write short note on Run-Time support as provided by compiler.   5

9. Compute IN and OUT equations for following graph.

13

B_1 | (1) I = 2
(2) J = J + 1

B_2 | (3) I = 1

B_3 | (4) J = J + 1

B_4 | (5) J = J – 4

B_5

OR

1. (a) Explain various phases of compiler in detail. 8

   (b) Write short note on implementation of Lexical Analysis. Also explain structure of LEX. 6

   OR

2. (a) Write a LEX program to recognize keyword if/then else; identifier; constant. 6

   (b) State the difference between pass and phase of compiler. 4

   (c) What is cross compiler ? Explain how boot-strapping is used in design of a compiler. 4

3. (a) Explain why we remove left recursion and perform left factorization for the given CFG while constructing LL(1) parser. 4

   (b) Construct LL(1) parsing table for the given grammar.

   $A \rightarrow aCDq \mid aBg \mid \in$

   $C \rightarrow p \mid \in \mid Ct \mid BD \mid rAB$

   $D \rightarrow d \mid \in$

   $B \rightarrow e \mid \in .$ 9

   OR

11. (a) Apply Heuristic ordering algorithm to detect optimal sequence and then generate optimal code for that sequence using two registers R_0 and R_1 for the following code :

   $T_1 = a + b$

   $T_2 = c + d$

   $T_3 = e - T_2$

   $T_4 = T_1 - T_3 .$ 9

   (b) Explain different design issues for a good code generator. 4

   OR

12. (a) Give labelling algorithm and determine number of registers required to evaluate following instruction set:

   $T_1 = a + b$

   $T_2 = c + d$

   $T_3 = e + f$

   $T_4 = T_2 + T_3$

   $T_5 = T_4 + T_1 .$ 6

   (b) Write a short note on Peephole Optimization. 7