

2125
B. E. (Information Technology)
Seventh Semester
PCIT-702: Compiler Design

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.

x-x-x

I. Attempt the following:-

- a) Explain bootstrapping with suitable example.
- b) Write regular expression for decimal numbers in C language.
- c) Differentiate between synthesized and inherited attributes.
- d) What are the problems of top down parsing with backtracking?
- e) What is code motion?

(5x2)

UNIT - I

II. Explain different phases of compiler in synthesizing the target program in detail? Also, discuss single and multi-pass compilers. (10)

III. Construct an NFA for the following language and convert it into DFA:

$$L = (aa + (bb^*)c^*)$$

'+' denotes the union operation

(10)

IV. Construct the sets of LR(0) items and the SLR parsing table for the following grammar

$F \rightarrow id(P);$

$P \rightarrow P \& id | id$

(10)

UNIT - II

V. a) Present a suitable format for the intermediate code that may be generated by a compiler. Using that format express the following source code segment in the intermediate code form.

$x = a + 30 * 6;$

$y = \text{square}(x);$

b) What is the role of symbol table in compilation process? Compare and contrast the data structures for symbol table. (2x5)

P.T.O.

(2)

VI. Consider the following code segment:

```
for (i=1 to n)
{
  j=1;
  while (j<=n)
  {
    A=B*C/D;
    j=j+1;
  }
}
```

- a) Transform the code into equivalent three address code.
- b) Partition the program into basic blocks, draw the flow graph and identify loop invariant statements. (2x5)

VII. Discuss various issues in machine code generation. Efficient Register allocation and assignment improves the performance of object code-Justify this statement with suitable examples. (10)

x-x-x