DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
B.TECH. SEMESTER VI [INFORMATION TECHNOLOGY]
SUBJECT: (IT 608) LANGUAGE TRANSLATOR

Examination	**: Second Sessional**	**Seat No.**	**:**
Date	**: 16/02/2018**	**Day**	**: Friday**
Time	**: 12.00 to 1.15**	**Max. Marks**	**: 36**

INSTRUCTIONS:
1. Figures to the right indicate maximum marks for that question.
2. "^" indicates null , "|" is a rule separator , other symbols used carry their usual meanings
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

Q.1 Do as directed.

(a) Assume that the SLR parser for a grammar G has n1 states and the LALR parser for G has n2 states. The relationship between nl and n2 is _____. Justify your answer. [note: no marks without justification] **[2]**
(a) n1 is necessarily greater than n2
(b) n1 is necessarily less than n2
(c) n1 is necessarily equal to n2
(d) none of the above

(b) A shift reduces parser carries out the actions specified within braces immediately after reducing with the corresponding rule of grammar G1. **[2]**
Grammar G1 : S→xxW {print "7"}
S→y {print "8"}
S→Sz {print "9"}
What is the translation of string "**xxxxyzz**" using the syntax directed translation scheme described by above rule.

(c) What is symbol table? Which phases interact with symbol table in one pass and two pass compiler? Which are the attributes of this data structure? Which command is used to show symbol table entry in GNU Linux? **[2]**

(d) Which kind of conflict(s) can be generated in classical "dangling-else problem"? Give a grammar, and show behavior of YACC parser. **[3]**

(e) What is attribute grammar? Define and explain attributes in syntax directed translation. Also write advantages of attribute grammar. **[3]**

Q.2 Do as directed. **[12]**

(a) Consider the **Grammar G2**: **S→ (L) | a, L→L, S | S.** [4]
(i) Is grammar valid operator grammar or not? Why? If it is valid then show operator precedence relation table. 2
(ii)Evaluate operator function table using operator precedence relation. 2

(b) Consider following grammar G3. [8]
Grammar G3: S→id:X X→a+b | YZ Y→Z|ab* Z→XY|a-b
(i) Construct canonical LR(0) item set 3
(ii) Find first and follow set 2
(iii) Construct SLR(1) Parsing table 3

OR

(b) Consider following grammar G4. [8]
Grammar G4: E→E sub R | E sup E | {E} | c R→E sup E| E
(i) Construct canonical LR(0) item set 3
(ii) Find first and follow set 2
(iii) Construct SLR(1) Parsing table 3

Q.3 (a) Show functions of set and reset operations for block structured language. Draw memory layout for stack structured symbol table & stack implemented tree structured (individual approach) symbol table organization technique for a given pseudo code up to …point 1. **[6]**

```
begin
  real v1, V2;
  string temp, ans;
  proc A =

     begin
       real v3, ptr;
       proc B =
          begin
            real v4, ptr1;
            ...
          end{B};
       B          ----call B
     end{A}; -------point 1

end -----------end of Main
```

(b) Write Syntax directed Definition which governs the motion of Robot in particular four directions. Define attributes for this and classify them in either S or L. Take sample string and draw the parse tree. Evaluate attributes on parse tree by showing dependency graph. Assume and mention all necessary details clearly. **[6]**

OR

Q.3 (a) Explain symbol table organization techniques for non-block structured languages using example. **[6]**

(b) Write Context Free Grammar for Type Declaration of Variables in Higher Level Language like C. Also write Syntax Directed Definition for inserting type information in Symbol table maintained by Compiler. Explain its inherited and synthesized attributes. **[6]**