



# Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India  
(Autonomous College Affiliated to University of Mumbai)

<b>End Semester Examination</b> May 2022		
<b>Max. Marks: 60</b>	<b>Duration: 120 min.</b>	<b>Class: T.E.</b>
<b>Semester: VI</b>	<b>Course Code: CS 306</b>	<b>Branch: COMP</b>
<b>Name of the Course: Compiler Construction</b>		
<b>Instructions:</b> (1) All Questions are Compulsory (2) Draw neat diagrams (3) Assume suitable data if necessary		

Question No.	Question	Max. Marks	CO
Q. 1 A	<p>Solve following MCQs</p> <p>i) When is the symbol table, generated in a two-pass assembler?</p> <p>a. Generated in second pass</p> <p>b. Generated and used only in second pass</p> <p>c. Generated in first pass</p> <p>d. Not generated at all</p> <p>ii) Consider the grammar defined by the following production rules, with two operators * and + .</p> <p><math>S \rightarrow T * P</math></p> <p><math>T \rightarrow U \mid T * U</math></p> <p><math>P \rightarrow Q + P \mid Q</math></p> <p><math>Q \rightarrow id</math></p> <p><math>U \rightarrow id</math></p> <p>Which one of the following is TRUE?</p> <p>a). + is left associative, while * is right associative</p> <p>b) + is right associative, while * is left associative</p> <p>c) Both + and * are right associative</p> <p>d) Both + and * are left associative</p>	5	CO1, CO3, CO5 -CO5



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<b>Q1 B.</b>	<p>iii) Which derivation is generated by the bottom-up parser?</p> <ul style="list-style-type: none"><li>a. Right-most derivation in reverse</li><li>b. Leftmost derivation in reverse</li><li>c. Right-most derivation</li><li>d. Left-most derivation</li></ul> <p>iv) Which phenomenon happens when the non-terminal on the left side is repeated as the first symbol on the right side?</p> <ul style="list-style-type: none"><li>e. Left-most derivation</li><li>f. Left recursion</li><li>g. Left factoring</li><li>h. Left parsing</li></ul> <p>v) lexical analysis is used to generate sequences of _____.</p> <p>a. tokens   b. variables   c. constants   d. none of these</p> <p>Explain stack storage allocation.</p> <p>OR</p> <p>Draw and explain structure of general activation records and its usage with reference to run time environment</p>	<b>10</b>	<b>CO4</b>
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<p><b>Q. 2 A</b></p>	<p>Construct the LL(1) parsing table for the following grammar and parse the string: <b>a e b e b d</b></p> <p><math>S \rightarrow a A C \mid B b</math>  <math>A \rightarrow e D</math>  <math>B \rightarrow f \mid g</math>  <math>C \rightarrow h \mid i</math>  <math>D \rightarrow b E \mid \text{Epsilon}</math>  <math>E \rightarrow e D \mid d D</math></p> <p style="text-align: center;">OR</p> <p>Construct LR(0) parsing table for the grammar given below and draw DFA of LR(0) items and parse the following string : <b>a a a b b</b></p> <p><math>S \rightarrow A A</math>  <math>A \rightarrow a A \mid b</math></p>	<p><b>10</b></p>	<p><b>CO2</b></p>
<p><b>Q2 B</b></p>	<p>Explain with example synthesized and inherited attributes used in syntax directed definitions.</p>	<p><b>5</b></p>	<p><b>CO2</b></p>
<p><b>Q.3. A</b></p>	<p>Using the translation scheme for Boolean expression, draw an annotated parse tree and Show the true and false lists for each subexpression. You may assume the address of the first instruction generated is 100.</p> <p style="text-align: center;"><math>x &lt; 100 \parallel x &gt; 200 \ \&amp;\&amp; \ x \neq y.</math></p> <p style="text-align: center;">also write 3 address codes for it.</p>	<p><b>8</b></p>	<p><b>CO3</b></p>
<p><b>Q3. B</b></p>	<p>Discuss the different issues in the design of code generator</p>	<p><b>7</b></p>	<p><b>CO3</b></p>
<p><b>Q.4.a</b></p>	<p>Consider the basic block given below</p> <p><math>t_1 = a + b</math>  <math>t_2 = c * d</math>  <math>t_3 = t_1 - t_2</math>  <math>t_4 = e / f</math>  <math>t_5 = t_3 * e</math>  <math>t_6 = t_5 * f</math>  <math>t_7 = t_1 * t_4</math>  <math>t_8 = t_7 + t_6</math></p> <p>Construct DAG.          Apply heuristic ordering (optimal) to it.          Apply code generation algorithm to generate the code.</p>	<p><b>9</b></p>	<p><b>CO3</b></p>



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<b>Q4 B.</b>	State various assembler directives and explain with example OR With reference to SIC MACROPROCESSOR , explain the use of NAMTAB , DEFTAB and ARG TAB with the example of NESTED MACRO.	<b>6</b>	<b>CO5</b>
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