

University Institute of Engineering & Technology

(Recognised Under Section 2(f) and 12B of UGC)

Kurukshetra University, Kurukshetra

THEORY EXAMINATION – JULY 2021	
B.TECH - CSE	SEMESTER - VI

TIME : 4 HRS

M.M. - 75

PAPER- PC-CS-302

SUBJECT – COMPILER DESIGN

INSTRUCTIONS TO BE FOLLOWED

- The candidates will be required to attempt All questions in Part-A and Part-B (Compulsory Sections). Attempt any four questions from Part-C selecting at least one from each unit.
- Allotted time for examination is 4 hours that includes time for downloading the question paper, writing answers, scanning of answer sheets and uploading the sheets on the Attendance Sheet Cum Answer Sheet Uploading google form.
- The PDF files should be saved as Roll No. and Subject Code.
- Maximum Page Limit should be 36 (Thirty Six) for attempting the question paper on A4 sheets which could be downloaded and printed from the sample sheets given in the UIET Website.
- Over-attemptation should be avoided.
- Handwriting should be neat and clean and diagrams should be clear and contrasted.
- The candidate should not write their Mobile No. otherwise Unfair Means Case will be made.
- While attempting the paper, the candidate will use blue/black pen only.
- Before attempting the paper, the candidate will ensure that he/she has downloaded the correct question paper. No complaint for attempting wrong question paper by the candidate will be entertained.
- Candidate must ensure that he/she has put his/her signature on each page of the answer sheet used by him/her. Answer sheet without the signature of the candidate will not be evaluated.
- Attempt parts A, B & C separately. Do not inter-mix them. Write neatly & mention the question number clearly.

PART-A (15 Marks)

Q. No. – 1 Answer the following questions.

(i)	Compiler should report the presence of _____ in the source program, in translation process. a) Classes b) Objects c) Errors d) Text (1 mark)
(ii)	Compiler can check _____ error. a) syntax b) logical c) Content d) both a & b (1 mark)
(iii)	A bottom-up parser generates a) Leftmost derivation in reverse b) Leftmost derivation c) Rightmost derivation in reverse d) Rightmost derivation (1 mark)
(iv)	Which of the following techniques is used to replace run-time computations by compile time computations? a) Constant folding b) Peephole optimization c) Code hoisting d) Invariant computation (1 mark)
(v)	Which of the following actions an operator precedence parser may take to recover from an error? a) delete symbols from stack b) insert symbols onto stack c) inserting & deleting symbols from input d) all of the above (1 mark)
(vi)	The graph that shows basic blocks and their successor relationship is called a) Flow graph b) Hamilton graph c) Control graph d) DAG (1 mark)
(vii)	It is less complex to prove the closure properties over regular languages using a) NFA b) DFA c) PDA d) Can't be said (1 mark)
(viii)	Which of the following is an application of Finite Automaton? a) Compiler Design b) Grammar Parsers c) Text Search d) All of the mentioned (1 mark)
(ix)	List the issues in the design of the code generator. (2 marks)
(x)	Define DAG. (2 marks)
(xi)	Differentiate between Synthesized and Inherited attributes. (3 marks)

PART-B (20 Marks)

UNIT-I		
2	What is LEX? Discuss its role in compiler design.	5
UNIT-II		
3	Differentiate between parse tree and syntax tree along with example.	5
UNIT-III		
4	Give the SDT for Boolean Expressions.	5
UNIT-IV		
5	Explain the Peephole Optimization.	5

PART-C (40 Marks)

UNIT-I		
6	Explain the different phases of the compiler along with single pass and multi-pass compiler	10
7	Design the NFA and convert into equivalent minimized DFA for the following regular expression: (aa*)(bb*)	10

UNIT-II		
8	<p>Let G be the formal grammar for following production rules:</p> <p>S -> E\$ E -> T + E E -> T T -> x</p> <p>(a) Explain the role of terminal symbol \$. (b) Construct the LR(0) parsing table for the grammar. (c) What kind of conflict does the resulting parsing table contain? (d) Explain strategies to resolve this conflict.</p>	10
9	<p>Show that following grammar:</p> <p>S -> Aa bAc Bc bBa A -> d B -> d is LR(1) but not LALR(1).</p>	10
UNIT-III		
10	<p>Generate the target code for the following three address statements, using the code generation algorithm $t = a - b$, $u = a - c$, $v = t + u$, $d = v + u$ with d live at the end using only three registers.</p>	10
11	<p>Consider the following program, in which a and b are integer arrays of size 20:</p> <p>Begin: prod=0 i=0 do Begin: prod = prod + a[i] *b[i] i = i + 1 End while i <= 20</p> <p>(a) Construct flow graph with three address code. (b) optimize this code reduce for common sub- expression, loop invariants, induction variables and reduction in strength.</p>	10
UNIT-IV		
12	<p>What is a Symbol table? Explain in detail about its contents and data structure.</p>	10
13	<p>Explain the various types of errors generated during the various phases of the compiler. How do we recover from these errors?</p>	10