National University of Computer and Emerging Sciences, Lahore Campus

Course Name:	Compiler Construction	Course Code:	
Program:	BS (CS)	Semester:	Fall 2021
Duration:	One hour	Total Marks:	30
Paper Date:	20-Oct-2021	Weight:	
Section:	7A	Page(s):	3
Exam Type:	Mid-1		

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Instruction/Notes: Solve all questions on this question paper. Do not attach any additional sheets.

Question 1 (5+5 marks)

α) Match the entries in the first column with the corresponding description in the second:

a) Lexical analyzer		i.	Convert words into sentences (b)
b) Parser		ii.	Type checking (c)
c) Semantic analyzer		iii.	Translator (d)
d) Intermediate code generator		iv.	Execute program (e)
e) Interpreter		v.	Identify words (a)

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β) Fill in the blanks, using the following words: compiler, interpreter or hybrid system.

i. Compiler provides the fastest execution

ii. Interpreter does not hide source code

iii. Hybrid System provides platform independence while protecting source code

iv. Compiler is not good for debugging

v. Hybrid System uses both a compiler and an interpreter

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Question 2 (5+5 marks)

a) Give regular definition for a time string. Following are two examples: "09:10:40 am", and "11:05:09 pm" should be valid; invalid strings should not be generated.

b) Give a DFA for the odd-even language i.e. odd no of a's and even no of b's.

(a)

4

Time → H:M:M F

H → 0Ha | 1Hb

Ha → 1|2|3|4|5|6|7|8|9

Hb → 0|1|2

Ma → Ma Mb

Ma → Hb|3|4|5

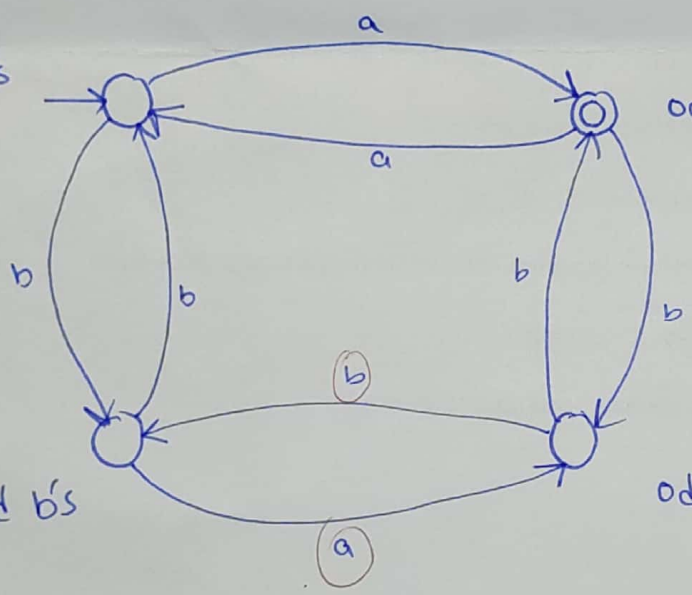
Mb → 0|Ha

F → am|pm

Complex

(b)

4



even a's even b's

odd a's even b's

even a's odd b's

odd a's odd b's

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stion 3 (5+5 marks)

Give a left-recursive CFG for C++ structures. Assume only two data types: int and char; do not worry about arrays or pointers. You may use the id token (no need to define it).

b) Remove left recursion from the following grammar: S -> S (S) | #

(a)

S → struct id { Y } ;

Y → Y DT id ; | ε

DT → int | char

(b)

S → S (S) | #

Removing left recursion

S → S' x

S' → (S) S' | #