Total No. of Questions: 21

Enrollment No : _____

MEDICAPS UNIVERSITY

Faculty of Engineering

End Semester Examination May 2025

IT3CO37 Compiler Design

Programme	:	B.Tech.	**Branch/Specialisation**	:	IT
Duration	:	3 hours	**Maximum Marks**	:	60

Note: *All questions are compulsory. Internal choices, if any, are indicated. Assume suitable data if necessary. Notations and symbols have their usual meaning.*

Section 1 (Answer all question(s))

		Marks	CO	BL
Q1.	A compiler translates a program written in _____.	1	1	1
	(●) High-level language to machine language ( ) Assembly language to high-level language ( ) Machine language to assembly language ( ) Low-level language to high-level language			
Q2.	Which phase of the compiler removes whitespaces and comments?	1	2	1
	( ) Syntax analysis (●) Lexical analysis ( ) Code generation ( ) Semantic analysis			
Q3.	Top-down parsing is also known as:	1	2	1
	( ) Shift-reduce parsing (●) Predictive parsing ( ) Operator precedence parsing ( ) LR parsing			
Q4.	What is a limitation of recursive descent parsing?	1	2	2
	(●) Cannot handle left recursion ( ) Cannot parse arithmetic expressions ( ) Requires a parse table ( ) Cannot handle right recursion			
Q5.	Synthesized attributes are computed:	1	3	2
	( ) Before lexical analysis ( ) At runtime (●) Bottom-up ( ) Top-down			
Q6.	Which of the following is used to represent an abstract syntax tree?	1	3	1
	( ) Infix notation ( ) Postfix notation ( ) Prefix notation (●) Any of the above			
Q7.	Which data structure is used for dynamic storage allocation?	1	4	2
	(●) Stack ( ) Queue ( ) Linked List ( ) Hash Table			
Q8.	Which of the following is not a type of three-address code?	1	4	1
	( ) Quadruples ( ) Triples ( ) Indirect triples (●) Binary code			
Q9.	What is the purpose of code optimization?	1	5	2
	( ) Reduce execution time ( ) Minimize memory usage ( ) Improve program performance (●) All of the above			
Q10.	A basic block consists of:	1	5	1
	( ) A single line of code (●) A sequence of statements with no jumps except at the end ( ) Only variable declarations ( ) Recursive function calls			

Section 2 (Answer all question(s))

Marks CO BL

Q11. How does a Compiler, Assembler, and Interpreter differ from each other? 3 1 2

Rubric	Marks
Atleast 3 difference among them- 1 mark for each difference	3

Q12. (a) Illustrate the working of a compiler by detailing its phases with a suitable diagram and example. 7 1 1

Rubric	Marks
working of compiler with phases, diagram and example	7

(OR)

(b) Explain input buffering with its type and cross compiler in detail.

Rubric	Marks
explanation os input buffering and its type and cross compiler	7

Section 3 (Answer all question(s))

Marks CO BL

Q13. Write the production rules to eliminate the left recursion and left factoring problems. 4 2 3

Rubric	Marks
production rules to eliminate the left recursion and left factoring problems	4

Q14. (a) Consider the following grammar: 6 2 3

E-> E+T | T
T-> TF | F
F-> F* | a | b
Construct the SLR parsing table.

Rubric	Marks
Construct proper SLR parsing table.	6

(OR)

(b) Consider Grammar:

E-> E+T | T
T-> T*F | F
F-> (E) | id
Check whether the grammar is LL(1) or not.

Rubric	Marks
Check whether the grammar is LL(1) or not.	6

Section 4 (Answer all question(s))

Marks CO BL

Q15. Define syntax-directed definitions (SDD) and explain its types. 4 3 2

Rubric	Marks
definition-SDD with its explanation of its types	4

Q16. (a) Differentiate between S-attributed and L-attributed definitions. **6 3 1**

Rubric	Marks
atleast 6 difference- 1 marks for each.	6

(OR)

(b) Construct a syntax tree and postfix notation for the following expression:
(a + (b * c) ^ d - e / (f + g))

Rubric	Marks
construction of syntax tree and postfix notation	6

Section 5 (Answer all question(s))

Marks CO BL

Q17. What is activation record? Write the various fields of activation record. **4 4 2**

Rubric	Marks
Complete explanation of activation record	4

Q18. (a) Write quadruples, triples and indirect triples for the expression: **6 4 3**
- (a * b) + (c + d) - (a + b + c + d)

Rubric	Marks
2 marks for each expression	6

(OR)

(b) Illustrate various parameter passing techniques with an example.

Rubric	Marks
at least 3 parameter passing technique with example- 2 marks for each.	6

Section 6 (Answer any 2 question(s))

Marks CO BL

Q19. What is common sub-expression and how to eliminate it? Explain with example. **5 5 2**

Rubric	Marks
Complete explanation with example	5

Q20. Consider the following program code: **5 5 1**

```
Prod = 0;
i = 1;
Do {
Prod = Prod + a[i] * b[i];
i = i+1;
} while (i <=10);
```

a. Partition it into blocks
b. Construct the flow graph

Rubric	Marks
Partitioning and flow graph	5

Q21. Draw the DAG for the following expression: **5 5 3**
(a * b) + (c - d) * (a * b) + b

Rubric	Marks
Draw correct DAG graph	5

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