Enrollment No.

NAVRACHANA UNIVERSITY
a UGC recognized University

School: School of Engineering and Technology
Program/s: B.Tech(CSE)
Year: 3rd **Semester:** 6th
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Course Code: CS402 **Course Name:** Compiler Design
Date: 16/05/2023
Time: 02:00 am to 04:00 am

Total Marks: 40
Total Pages: 06

Instructions:

a) Attempt All the Questions
b) No Calculator is allowed

Q. No.	Details	Marks	CO	BTLO
	Attempt **All the** Questions(**1 marks** each)	40		

Q.1	The following three address code is containing the loop.
	`t=E`
	`if t==1 goto L1`
	`if t==2 goto L2`
	`goto L3`
	`L1:a=b`
	`goto exit`
	`L2:a=c`
	`goto exit`
	`L3:a=d`
	`goto exit`
	`Exit:`
	A. True
	B. False
		1	CO2	BTLO2

Q.2	For the grammar (Terminals:{a, b} Non-terminals:{S, B}) S → a | SBbS B → bB | ε Follow(S) is_____ A. { a,$ } B. { a, b } C. { b, $ } D. { a, b, $}	1	CO3	BTLO3
Q.3	Which one of the following is FALSE?	1	CO4	BTLO4

	A. A basic block is a sequence of instructions where control enters the sequence the beginning and exits at the end B. Live variable analysis can be used for dead code elimination. C. Available expression analysis can be used for common sub expression elimination. D. X=4*5=>x=20 is an example of common sub expression elimination			
Q.4	Which of the following strings can definitely be said to be tokens without looking at the next input character while compiling a c program? I. for II. == III. result A. I B. II C. III D. all of the mentioned	1	CO5	BTLO5
Q.5	In a two-pass assembler, symbol-address table is A. Generated in first pass B. Generated in second pass C. Not generated at all D. In both the passes	1	CO2	BTLO1
Q.6	Consider the following SDT. $A \rightarrow BC$ (I) B.i = f(A.i) (II) B.i = f(C.S) (III) A.S = f(B.s) Which of the above is violating S – attributed definition? A. I only B. I, II C. II only D. I, II, III E. III only	1	CO3	BTLO2
Q.7	Consider the following Syntax Directed Translation Scheme (SDTS), with non-terminals {S, A} and terminals {a,b}. S→aA {print1} S→a {print2} A→Sb {print3} Using the above SDTS, the output printed by a bottom-up parser, for the input aab is: A. 1 3 2 B. 2 2 3 C. 2 3 1 D. syntax error	2	CO2	BTLO3

	Consider the grammar with the following translation rules and E as the start symbol. E → E1 @ T { E.value = E1.value * T.value } | T{ E.value = T.value } T → T1 & F { T.value = T1.value + F.value } | F{ T.value = F.value } F → num { F.value = num.value } Compute E.value for the root of the parse tree for the expression: 1 @ 2 & 3 & 4 @ 5.	2	CO2	BTLO4
Q.9	Predictive parsers – A. Always requires backtracking B. Backtracking is eliminated by making the grammar left-factored C. May require backtracking depending type of token D. None of the mentioned	1	CO1	BTLO5
Q.10	A language L allows declaration of arrays whose sizes are not known during compilation. It is required to make efficient use of memory. Which of the following is true? A. A compiler can use static memory allocation. B. Interpreter have to be used instead of a compiler as compiler cannot be written for L C. A compiler can use dynamic memory allocation. D. None of the mentioned.	1	CO1	BTLO5

Q.11	For the following, find out the final code –
	begin
	while x <= y do
	begin
	p = x - r
	q = x + r
	x = q + r
	end
	y = p + x
	end
	Final Code:
	1: if x <= y goto 2
	2: t1 = x - r
	3: p = t1
	4: t2 = x + r
	5: q = t2
	6: t3 = q + r
	7: x = t3
	8: go to 1
	9: t4 = p + x
	10: y = t4
	(a)
	Final Code:
	1: if x <= y goto 3
	2: goto end 10
	3: t1 = x - r
	4: p = t1
	5: t2 = x + r
	6: q = t2
	7: t3 = q + r
	8: x = t3
	9: go to 1
	10: t4 = p + x
	11: y = t4
	(b)
		2	CO4	BTLO5

	Final Code: 1: if x <= y goto 2 2: t1 = x - r 3: p = t1 4: t2 = x + r 5: q = t2 6: t3 = q + r 7: x = t3 8: t4 = p + x 9: y = t4 (c) (d) None of the mentioned.			
Q.12	Which of the following statement is true? A. Local variable cannot be retained once activation end in stack storage allocation. B. Recursion of function is not allowed in heap memory allocation. C. Binding of the name with the amount of storage allocated can be change at runtime in static storage allocation. D. None of the mentioned	1	CO4	BTLO3
Q.13	Which among the following is false. A. LL(1) Grammer can not be left recursive or ambiguous. B. LR method of parsing produced the Grammar which is a proper subset of the grammar produced by LL(1) method. C. LL(1) Method of parsing generate less language than LR method. D. CLR parser is most powerful parser	1	CO3	BTLO3
Q.14	The lexical analysis for a modern computer language such as Java needs the power of which one of the follo necessary and sufficient sense? A. Finite state automata B. Deterministic pushdown automata C. Non-Deterministic pushdown automata D. Turing Machine	1	CO3	BTLO3
Q.15	The minimum number of nodes and edges present in the DAG represent b + b + c + d A. 6 and 6 B. 8 and 10 C. 9 and 12 D. 4 and 4	1	CO2	BTLO2

	How many tokens will be generated by the scanner for the following statement? $X = X * (a + b)$	1	CO2	BTLO2
Q.17	Select the correct statement about operator precedence parser. A. If V has lower precedence over W, then V -> W B. $ has the highest precedence over any other symbol C. If two operators have equal precedence, then we check for the associativity of the particular operator D. id has the lowest precedence	1	CO1	BTLO1
	Theory Paper			
Q.1	Answer the following questions. (Attempt any four) (Each of five marks)	20		
	1. What's intermediate code's importance? Discuss various representations of address code for the following statement a=a-b*c		CO 2	BTLO5
	2. Construct the LR (1) item-sets for the following grammar S—aSB | d B->b		CO3	BTLO1
	3. Construct the CLR(1) parse table for the grammar mentioned in the question 1.2		CO4	BTLO1
	4. Parse the sting aaadbbb using the CLR(1) parser by considering the grammar mentioned in the question 1.2		CO2	BTLO4
	5. Explain the following code optimization techniques with example a) Strength reduction (1 mark) b) Common subexpression elimination (2 marks) c) Dead code elimination (2 marks)		CO4	BTLO5
	6. Is following grammar LR(0) or SLR(1)? **S->AB** **A->a / ϵ** **B->b**		CO3	BTLO3
	7. Explain the phases of compiler with an example		CO1	BTLO6

**********End of Question Paper**********