National Institute of Technology
Tiruchirappalli, Tamil Nadu – 620 015

CSPC31 - Principles of Programming Languages **Date: 11.09.2023**

Cycle Test I

Duration: 1 Hour **Time:** 03:00 – 04:00 PM

Total Marks: 20

1. The situation where two pointers are set to point to the same memory location or variable is called _____. The situation where one of the pointers is deleted (along with the allocated memory space) and the other is left undisturbed is called___ ***(2 M → CO1)***

2. Pictorially represent the various steps that are involved in the compilation process. ***(4 M → CO1)***

3. What output will be generated by lexical analyzer, while parsing the following two statements? ***[Hint:*** *Consider e, f and g are all Float Datatypes; _ represents Space character]*. ***(2.5 M → CO1)***
   (a) **float d = e + f * _ _ _ g ;**
   (b) **// printf_(_"HelloHowAreYou"_) ;**

4. Using the following grammar, generate the sentence **begin A = B + C ; B = C end.**
   [Hint: *Use leftmost derivation and also draw the corresponding parse tree.]*
   (4 M → CO2)

<program> → begin <stmt_list> end
<stmt_list> → <stmt>
| <stmt> ; <stmt_list>
<stmt> → <var> = <expression>
<var> → A | B | C
<expression> → <var> + <var>
| <var> - <var>
| <var>

5. Write the following grammar in extended BNF form. ***(2 M → CO2)***
   <term> → <term> * <factor> | <term> / <factor> | <term> % <factor>

6. Assume that the free space manager maintains all the empty slot list in the first few bytes of its heap memory. The current list is noticed to be 1, 3, 5, 7, 9, 100, 11, 15, 25, 26 (all are in Bytes). Now, consider that the programmer requests a heap memory size of 10 Bytes. What will be the size allocated, if the programming language follows: (i) First Fit; (ii) Best Fit; (iii) Worst Fit; policy. ***(1.5 M → CO2)***

7. Using the following grammar and table, check whether the string **id + (id)** will be accepted by the grammar or not: ***(4 M → CO1)***

   E → E + T | T

   T → (E) | id

State	Action					Goto	
	id	+	(	)	$	E	T
0	S4		S3			1	2
1		S5			Accept		
2	R2	R2	R2	R2	R2		
3	S4		S3			6	2
4	R4	R4	R4	R4	R4		
5	S4		S3				8
6		S5		S7			
7	R3	R3	R3	R3	R3		
8	R1	R1	R1	R1	R1		

---------- **END** ----------