Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering

End Sem (Even) Examination May-2022

CS3CO27 Compiler Design

Programme: B.Tech. Branch/Specialisation: CSE / All

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i. What is the use of a symbol table in compiler design? **1**

(a) Finding name's scope
(b) Type checking
(c) Keeping all of the names of all entities in one place
(d) All of these

ii. The lexical analyzer takes _____ as input and produces a stream of _____ as output. **1**

(a) Source program, tokens (b) Token, source program
(c) Either of the two (d) None of these

iii. What is the grammar for the below equations? **1**

$S \rightarrow C\ C$
$C \rightarrow c\ C \mid d$

(a) LL(1) (b) SLR(1) but not LL(1)
(c) LALR(1) but not SLR(1) (d) LR(1) but not LALR(1)

iv. The grammar $A \rightarrow AA \mid (A) \mid e$ is not suitable for predictive parsing because the grammar is: **1**

(a) Ambiguous (b) Left recursive
(c) Right recursive (d) An operator grammar

v. Which of the following grammar rules violate the requirements of an operator grammar? **1**

I. P -> QR II. P -> QsR III. P -> ε IV. P -> QtRr
(a) I only (b) I and III only
(c) II and III only (d) III and IV only

P.T.O.

vi. If a state does not know whether it will make a shift operation or reduction for a terminal is called _____. **1**
(a) Shift/reduce conflict (b) Reduce /shift conflict
(c) Shift conflict (d) Reduce conflict

vii. Which is not true about syntax and semantic parts of a computer language? **1**
(a) Semantics is checked mechanically by a computer
(b) Semantics is the responsibility of the programmer
(c) Both (a) and (b)
(d) None of these

viii. The graph that shows basic blocks and their successor relationship is called _____. **1**
(a) Dag (b) Flow Graph
(c) Control Graph (d) Hamilton Graph

ix. _____tree is used to depict the way control enters and leaves activations. **1**
(a) Activation (b) Parse (c) Syntax (d) None of these

x. In which allocation, names are bound to storage as program is compiled _____. **1**
(a) Static (b) Heap (c) Stack (d) None of these

Q.2 i. Define pass structure of compiler. **2**
ii. What is the role of lexical analyser? **3**
iii. Explain different phases of compiler with the help of diagram. **5**
OR iv. Explain any two of the following terms- **5**
(a) Translators (b) Interpreter
(c) Assembler

Q.3 i. What is ambiguous grammar? **2**
ii. Find First and Follow set for the given CFG grammar- **8**
S->ACB | CbB | Ba
A-> da | BC
B-> g | ε
C-> h | ε
Note- Symbol ε represent epsilon

OR iii. Construct the LL(1) parsing table for the following grammar and also check whether this grammar is LL(1) grammar or not and also verify whether it is ambiguous or not. **8**
S-> AB
A->a
B->b

Q.4 i. Define operator grammar with the help of example. **3**
ii. Construct the SLR(1) parsing table for the following grammar and also check whether this grammar is SLR(1) grammar or not and also verify whether it is ambiguous or not? **7**
E-> T+E
E-> T
T-> i
OR iii. Construct operator precedence parsing table for the following grammar. **7**
A-> B + A | B
B-> B * C | C
C-> D ↑ C | D

Q.5 i. Explain syntax directed definition with example. **4**
ii. Differentiate S-attributed and L-attributed syntax directed definition. **6**
OR iii. Define three address codes? Also find the quadruples, triples and indirect triples for the following expression- **6**
a= b +c * d

Q.6 Attempt any two:
i. What is an activation record? **5**
ii. Explain basic blocks and flow graphs with the help of example? **5**
iii. Find loop invariant computation for the following code- **5**
For(i=1;i<=10;i++)
{
X=I + a/b;
}

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Marking Scheme
CS3CO27 Compiler Design

Q.1	i.	What is the use of a symbol table in compiler design? (d) All of these		**1**
	ii.	The lexical analyzer takes _____ as input and produces a stream of _____ as output. (a) Source program, tokens		**1**
	iii.	What is the grammar for the below equations? S → C C C → c C | d (a) LL(1)		**1**
	iv.	The grammar A → AA | (A) | e is not suitable for predictive parsing because the grammar is: (a) Ambiguous (b) Left recursive		**1**
	v.	Which of the following grammar rules violate the requirements of an operator grammar? I. P -> QR II. P -> QsR III. P -> ε IV. P -> QtRr (b) I and III only		**1**
	vi.	If a state does not know whether it will make a shift operation or reduction for a terminal is called _____. (a) Shift/reduce conflict (b) Reduce /shift conflict		**1**
	vii.	Which is not true about syntax and semantic parts of a computer language? (c) Both (a) and (b)		**1**
	viii.	The graph that shows basic blocks and their successor relationship is called _____. (b) Flow Graph		**1**
	ix.	_____tree is used to depict the way control enters and leaves activations. (a) Activation		**1**
	x.	In which allocation, names are bound to storage as program is compiled _____. (a) Static		**1**
Q.2	i.	For pass structure definition	2 Marks	**2**
	ii.	Explanation of role of lexical analyser	3 Marks	**3**
	iii.	Explain different phases of compiler Diagram.	4 Marks 1 Mark	**5**
OR	iv.	Any two of the following terms- For each definition	 2.5 Marks each (2.5 Marks*2)	**5**
Q.3	i.	For definition of ambiguous grammar	2 Marks	**2**
	ii.	For first set calculation For results For follow set calculations For results	2 Marks 2 Marks 2 Marks 2 Marks	**8**
OR	iii.	For first set For follow set For parsing table For ambiguous or not verify	2 Marks 2 Marks 3 Marks 1 Mark	**8**
Q.4	i.	Definition example.	2 Marks 1 Mark	**3**
	ii.	First Follow SLR table Ambiguous or not	1 Mark 1 Mark 4 Marks 1 Mark	**7**
OR	iii.	Leading and trading For table	4 Marks 3 Marks	**7**
Q.5	i.	For syntax directed definition with example.	3 Marks 1 Mark	**4**
	ii.	4 difference	1.5 Marks each (1.5 Marks*4)	**6**
OR	iii.	Three address codes For quadruples For triples For indirect triples	3 Marks 1 Mark 1 Mark 1 Mark	**6**
Q.6		Attempt any two:		
	i.	Activation record Block diagram	3 Marks 2 Marks	**5**
	ii.	Basic blocks Flow graphs Example	1 Mark 2 Marks 2 Marks	**5**
	iii.	For flow chart For loop invariant computation	2 Marks 3 Marks	**5**

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