## COMPILER DESIGN CSE-3151— INSEM2 SCHEME

<mark>Q1.</mark>	Th	e to	tal number of Kernel items generated for the grammar given is
E'-	<del>)</del> E		
E-3	>E+	T T	-
<mark>(0.5</mark>	<mark>5)</mark>		
	1.	4	
	2.	<mark>**</mark> 6	5
	3.	7	
	4.	5	
			be the first symbol of the input string 'w' and X be the stack top symbol. Which of the TRUE w.r.t Predictive parsing algorithm when 'X' is equal to 'u'? $(0.5)$
		1.	Declare error.
		2.	Output the production, pop the stack and push the production to the stack.
		3.	**Pop the stack and let 'u' point to next symbol of 'w'.
		4.	None of the mentioned.
<mark>Q3.</mark>	In I	LR-p	parsing program, which of the following is TRUE when (ACTION[s,a]= shift t)? (0.5)
		1.	Pop symbols off the stack.
		2.	** Push 't' onto the stack and let 'a' point to the next input symol.
		3.	Push GOTO [t,A] onto the stack.
		4.	Output the productions and let state 't' be the current stack top.
	clo		er the following augmented grammar with $\{\#, @, <, >, a, b, c\}$ as the set of terminals. Let $(S' \rightarrow S)$ . The number of items in the set GOTO(GOTO( $I_0, <), <$ ) is
5-)	5#0	:S  S	SS   S@   <s>  a   b   c</s>
(0.5	<mark>5)</mark>		
		1.	1
		2.	6
		3.	7
		4.	<mark>**</mark> 8
			struct the Canonical LR(0) collection for a grammar, we need to define an augmented or G and two functions namely:

<mark>(0.5)</mark>

1. \*\* CLOSURE, GOTO

2. SHIFT, REDUCE.

- 3. REDUCE, GOTO.
- 4. None of the mentioned.

Q6. For given grammar,

P --> MN M --> Le | E

N --> NeML | g

L --> f | E

Consider {e,f,g,\$} as {0,1,2,3}. What is the follow of M using bottom up approach?

## (0.5)

- 1. {3}
- 2. {0,3}
- 3. **\*\***{0,1,2,3}
- 4. {1,3}

Q7. Consider a grammar –

For a sentence "n+n\*n", the handles in the right-sentential form of the reduction are

## (0.5)

- 1. n, n+n and n+n\*n
- 2. \*\*n, E+n and E\*n
- 3. n, E+n and E+n\*n
- 4. n, E+n and E+E\*n

Q8. Which among the following test does NOT match the given regular expression pattern? rege(x(es)?|xps?) (0.5)

- 1. regexps
- 2. regexes
- 3. regexp
- 4. \*\*regep

Q9. Choose the correct option.

I)The states of LR(0) automaton are the sets of items from the canonical LR(0) collection.

II)If  $A \rightarrow \alpha \bullet B\beta$  is in CLOSURE(I) and  $B \rightarrow \gamma$  is a production then add item  $B \rightarrow \gamma \bullet (0.5)$ 

1. \*\*I – TRUE, II – FALSE

- 2. I-TRUE, II TRUE
- 3. I-FALSE, II FALSE
- 4. I-FALSE, II-TRUE

Q10. In LR automata, leads to ONLY state change. (0.5)

- 1. \*\*Goto
- 2. Shift
- 3. Reduce
- 4. Accept
- Q11. For the given grammar, compute the FIRST and FOLLOW set for each non-terminal by considering 'E' as the start symbol. (2)

	First -1M	FOLLOW-1M
E	(, a,b,c,*, +, <b>ε</b>	\$,)
E'	+,٤	\$,)
T	(, a,b,c,*, <b>ε</b>	\$,),+
		4.
T'	(, a,b,c,*, <b>ε</b>	\$,),+
F	(, a,b,c,*, <b>ε</b>	(, a,b,c,*,+, \$,)
_		
Р	(, a,b,c, <b>ε</b>	(, a,b,c,*,+, \$,)
F'	*, E	(, a,b,c,*,+, \$,)

Q12. Illustrate with the help of suitable syntactic constructs that give rise to grammars which results in conflicts when used for Shift Reduce Parsing (2)

Two types of conflicts exist:

1) Shift reduce conflict: The below example shows a configuration with shift reduce conflict during parsing. This can be solved by giving priority to shift action.

If we have a shift-reduce parser in configuration

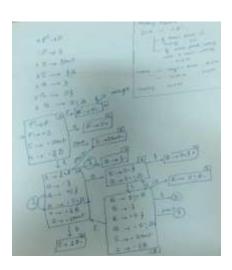
2) Reduce-Reduce conflicts: In the below grammar we see that both stmt and expr begin with id and so the following configuration gives rise to reduce-reduce conflict. The solution is to change one of them to procid.

Examples- 1M, Explanation-1M

Q13. Consider the following CFG,

$$\begin{array}{ccc} P & \rightarrow & S \\ S & \rightarrow & \mathbf{stmt} \mid \{B \\ B & \rightarrow & \} \mid S\} \mid S; B \end{array}$$

- (a) Construct a LR(0) DFA and construct SLR(1) parse table.
- (b) Assuming that an SLR(1) parser resolves shift-reduce conflicts by choosing to shift, show the operation of such a parser on the input string {stmt;} (3)



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1					-			
2		41	91		47			
15		46	48		12			
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1		3.1	2.2					
F		10	40		15.			
1	8.6	96		4.8			-	9
2		11.5	14	-	16			
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max(r) = 3								
4-107 = 2018.43								
section : 1 : 1 5								

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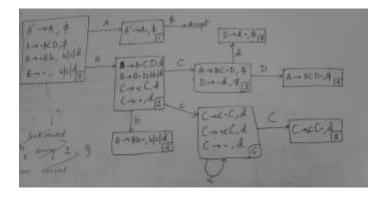
Q14. How does an LR parser make shift-reduce decisions? For the grammar given, construct LR(1) DFA. (3)

 $A \rightarrow BCD$ 

 $B \rightarrow Bb \mid \epsilon$ 

 $C \rightarrow cC \mid \epsilon$ 

D<del>→</del>d



State 0 – 1.5M Remaining -1.5M