Mid Semester Exam March-2022 (Division A) - System Software (CS306)

Section - I

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* Required

1. Question *

Find out regular expression for each of the following

Set of all strings of 0's and 1's beginning with 1 and not having two consecutive 1's.

A. 1(11*1)*+1(00*1)*11*
B. 1(00*1)*+1(00*1)*00*
C. 1(00*1)*+1(00*1)*11*
D. 1(00*1)*+1(00*1)*00*

- ○ A
- ◉ B
- ○ C
- ○ D

16. Question *

Consider the following statements S1 and S2:

S1: There is an algorithm that can detect if L(G) is infinite given a context-free grammar G.

S2: There is a method for determining whether two context-free grammars give the same language.

Which of the following statements is correct?

A. S1 is not correct and S2 is correct
B. Both S1 And S2 are correct
C. Both S1 And S2 are not correct
D. S1 is correct and S2 is not correct

- ○ A
- ○ B
- ○ C
- ◉ D

12. Question *

Remove the ambiguity and find out which of the following grammar is unambiguous.

E -> E+E
E -> E*E
E -> 5 | 6 | 7

A. E -> E+T |T
T -> T*F |F
F -> 5 | 6 |7

B. E -> E*E
T -> T+F |F
F -> 5 | 6 |7

C. E -> E+E | T
T -> T*F |F
F -> 5 | 6 |7

D. None of these

- (●) A
- ( ) B
- ( ) C
- ( ) D

14. Question *

Consider the following grammar G:

S -> qABC
A -> a | bbD
B -> a | ∈
C -> b | ∈
D -> c | ∈

Which is the FOLLOW(A)?

A. {q, b, c, a}
B. {$, a, b, c}
C. {a, b, $}
D. { ∈, a, b, c}

- [ ] A
- [ ] B
- [x] C
- [ ] D

18. Question *

Consider the following grammar:

S → PR
R → S | ε
P → id

The grammar's predictive parser table, M, has the entries M[S, id] and M[R, $].

A. {S → PR} and { }
B. {S → PR} and {R → *S}
C. {F → id} and {R → ε}
D. {S → PR} and {R → ε}

- ○ A
- ○ B
- ○ C
- ◉ D

6. Question *

The language generated by the grammar

S -> AB
A -> BC | a
B -> CC | b
C -> a , is

A. Infinite
B. Empty
C. Both a and b
D. None of these

- ○ A
- ○ B
- ◉ C
- ○ D

9. Question *

Construct a CFG to generate a language for

L = {a^nba^n : n>=1}

A. S -> aAa
   A -> aAa | b

B. A -> aAa
   S -> aAa | b

C. S -> aAa| a
   A -> aAa | b

D. None of the above

- (●) A
- ( ) B
- ( ) C
- ( ) D

3. Question *

The number of tokens in the following C statement is

(i). printf ("i = %d, &i = %x", i, &i);

(ii).
```
int main ( )
{
/* find max of a and b*/
 int a=20, b=30;
 if (a<b)
 return (b);
 else
 return (a);
}
```

A. (i) = 10, (ii) = 32
B. (i) = 9, (ii) = 32
C. (i) = 10, (ii) = 42
D. (i) = 21, (ii) =42

- [ ] A
- [x] B
- [ ] C
- [ ] D

13. Question *

Consider the grammar

S -> P*QRc | ∈
P -> +Pb |ba
Q -> *QC | cb
R -> cRa |ac

Find the FIRST(S) :

A. {a, b, c, ∈}
B. {+, *}
C. { ∈}
D. {+, *, ∈}

- [ ] A
- [ ] B
- [x] C
- [ ] D

Roll No. (Example - U11CS111) *

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Name *

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2. Question *

The following tasks are involved in lexical analysis:

A. a) Building a uniform symbol table
   b) Parsing the source code into tokens
   c) Building a literal and identifier table

B. a) To build a uniform symbol table
   b) To initialize the variables
   c) To organize the variables in a lexical order

C. a) To initialize the variables
   b) To organize the variables in a lexical order
   c) Building a literal and identifier table

D. None of the mentioned

- (●) A
- ( ) B
- ( ) C
- ( ) D

15. Question *

Consider the following macro

```
MACRO
INCR  &MEM _VAL, &INCR_VAL, &REG=AREG
MOVER &REG, &MEM_VAL
ADD &REG, &INCR_VAL
MOVEM &REG, & MEM_VAL
MEND
```

(Macro call: INCR A, B (Actual parameters A, B)) for above definition will be

A. INCR A, B, AREG
B. INCR_D INCR_VAL=B, REG=BREG, MEM_VAL=A
C. INCR_D INCR_VAL=B, MEM_VAL=A, REG=BREG
D. All of above

- (●) A
- ( ) B
- ( ) C
- ( ) D

5. Question *

In a DFA, the maximum sum of in degree and out degree over a state is determined as follows:

$$\Sigma = \{a, b, c, d\}$$

A. 6+6
B. 6+16
C. It is depend on the language
D. 4+0

- ○ A
- ○ B
- ◉ C
- ○ D

10. Question *

Eliminate the left recursion from the following grammar.

A -> Ac | Aad | bd |c

A. A -> bdA' | bcA'
   A' -> cA' | adA'
   A' -> ε
B. A -> bdA | bcA'
   A' -> cA | adA'
C. A -> bdA | A
   A -> cA | adA
   A -> ε
D. None of these

- ○ A
- ○ B
- ○ C
- ◉ D

11. Question *

Which of the following grammar structures is (are) ambiguous?

(A) E-> E+T | T
T-> T*F | F
F-> id

(C) S-> aSbS| bSaS| ε

(D) S-> aPQ
P-> bQb
Q->P| ε, where ε denotes empty string

Choose the correct answer from the options presented below:

A. (A) and (C) only
B. (B) only
C. (C) and (D) only
D. (A),(B) and (C) only

- ○ A
- ○ B
- ◉ C
- ○ D

7. Question *

Find out regular expression for each of the following:
(i) String over alphabets {a, b, c} where first b followed by first a.
(ii) All strings 0's and 1's not containing the substring 011.

A. (i) c*bb(a+b+c)* (ii) 1*+1*0(0+10)*
B. (i) aa*+bb*ba(a+b+c)* (ii) 1*+1+1*0(0+11)*1
C. (i) c*+c*ba(a+b+c)* (ii) 1*+1*0(0+10)*+1*0(0+10)*1
D. None of these

- ○ A
- ○ B
- ◉ C
- ○ D

4. Question *

Which of the following languages corresponds to the below DFA?

A. L = {x ϵ {0, 1} * | x ends in 1 and does not contain substring 01}
B. L = {x ϵ {0, 1} |x ends in 1 and does not contain substring 00}
C. L = {x ϵ {0, 1} * |x ends in 1 and does not contain substring 11}
D. L = {x ϵ {0, 1} * |x ends in 1 and does not contain substring 00}

- ○ A
- ○ B
- ◉ C
- ○ D

8. Question *

How many derivation trees are there?

S->bA	S->aB
A->a	B->b
A->aS	B->bS
A->bAA	B->aBB

A. 1
B. 2
C. 3
D. 4

- [ ] A
- [x] B
- [ ] C
- [ ] D

19. Question *

Consider the following grammar

S -> AaAb | BbBa
A -> ε
B -> ε

Non Terminal	Input Symbol		
	a	B	$
S	S->AaAb	S->BbBa	
A	1.---------	A-> ε	
B	A-> ε	2.-------	

Test whether the grammar is LL(1) or not and find out the missing entries in the parsing table.

A. Given grammar is LL(1) and missing entries - 1. A-> ε, 2. B-> ε
B. Given grammar is LL(1) and missing entries - 1. A-> AaAb, 2. B-> ε
C. Given grammar is LL(1) and missing entries - 1. A-> ε, 2. B-> BaBb
D. None of these

- (●) A
- ( ) B
- ( ) C
- ( ) D

17. Question *

Which of the following statements about a predictive parser is correct?

A. Recursive Descent parser
B. no backtracking
C. Both a & b
D. None of the above.

- ○ A
- ○ B
- ◉ C
- ○ D

20. Question *

Consider the following context free grammar where the set of terminal is {a, b, c, d, f}

S -> daA | Bf
A -> aS | baA | ε
B -> caAB | ε

The following is a partially filled LL(1) parsing table.

	A	B	C	D	f	$
S			**1**	S->daA	**2**	
A	A->aS	A->baA	**3**		A-> ε	**4**
B			**5**		B-> ε	

Which of the following options represents the correct combination for the numbered cells in the table? ("Blank" indicates that the associated cell is empty)

A. 1.S->Bf 2. Blank 3. Blank 4. A-> ε 5. B->ca
B. 1. Blank 2. S->Rf 3. Blank 4. Blank 5. B->ca
C. 1. S->Bf 2. S->Bf 3. A-> ε 4. A-> ε 5. B->caAB
D. 1. S->Af 2. S->Bf 3. B-> ε 4. A-> ε 5. B->caA

- ○ A
- ○ B
- ◉ C
- ○ D

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