Branch : CSE & IT Batch: (Hinglish)

WEEKLY TEST – 01

Subject : Compiler Design

Topic : Lexical Analysis & Syntax Analysis

Maximum Marks 15

Q.1 to 5 Carry ONE Mark Each

[MCQ]

1. What is the input to the first phase of compiler?

(a) Token stream (b) Character stream

(c) Syntax tree (d) None of these.

[MSQ]

2. Select the functionality of lexical analyzer

(a) Lexical analyzer produces syntax error and line number.

(b) It matches the longest prefix of the identifier.

(c) It recognizes tokens and produces a stream of lexeme.

(d) It recognizes white space, comments, and ignore them.

[NAT]

3. Consider the following program:

```
int main ()
{
    printf("%d + %d = %d", 5, 2, 7); /*sum*/
    return 0;
}
```

How many numbers of tokens are there in program after preprocessing?

[MCQ]

4. Match the following phases of the compiler in List I with the input required in List II.

List I	List II
(a) Lexical analyzer	(i) Token stream
(b) Syntax analyzer	(ii) Intermediate representation.
(c) Semantic analyzer	(iii) Character stream
(d) Code generator	(iv) Syntax tree.

(a) 1 – (i); 2 – (ii); 3 – (iv); 4 – (iii)

(b) 1 – (iii); 2 – (i); 3 – (ii); 4 – (iv)

(c) 1 – (i); 2 – (ii); 3 – (iii); 4 – (iv)

(d) 1 – (iii); 2 – (i); 3 – (iv); 4 – (ii)

[MCQ]

5. Calculate the token in the following C program using lexical analyzer.

```
int main ()
{
    int a, * b;
    a = 20;
    b = & a;
    printf("%d%d", a, * b);
}
```

(a) 28 (b) 31

(c) 34 (d) 30

Q.6 to 10 Carry ONE Mark Each

[MCQ]

6. Which of the following is lexical error.

(a) 123gate (b) gate123

(c) gate_123 (d) None of these

[MCQ]

7. _____derivation used by top-down parser while parsing any input string.

(a) Leftmost derivation

(b) Rightmost derivation

(c) Leftmost derivation in reverse.

(d) Rightmost derivation in reverse.

[MCQ]

8. Which of the following are present in FIRST(S) ∩ FIRST(F)?

$S \rightarrow E$

$E \rightarrow Ff \mid Gh$

$F \rightarrow ef \mid Gh \mid \in$

$G \rightarrow Gg \mid \in$

(a) {e, f, g, h} (b) {e, f, h, ∈}

(c) {e, g, h, ∈} (d) {e, g, h}

[MCQ]

9. Which of the following is valid set of FIRST (E) U FOLLOW (B)

$S \rightarrow aBDh$

$B \rightarrow cC$

$C \rightarrow bC / \in$

$D \rightarrow EF$

$E \rightarrow g / \in$

$F \rightarrow f / \in$

(a) {g, f, h, ∈} (b) {a, g, f}

(c) {b, g, h} (d) None of these

[NAT]

10. How many terminals are there in FIRST(A) for the following grammar?

$A \rightarrow BC \mid a$

$B \rightarrow Cb \mid dB \mid \varepsilon$

$C \rightarrow aA \mid g$

Answer Key

1. **(b)**
2. **(b,c,d)**
3. **(20)**
4. **(d)**
5. **(b)**
6. **(a)**
7. **(a)**
8. **(d)**
9. **(a)**
10. **(3)**

Hints and Solutions

1. (b)

First phase of complier is lexical analyzer. Input to lexical analyzer is character stream and output of lexical analyzer is token stream.

2. (b, c, d)

(a) Lexical analyzer produces lexical error corresponding line number. So option A is incorrect.
(b) It makes the longest prefer of the identifier. Correct.
(c) Lexical analyzer recognizer lexemes and produces a stream of tokens. So option C is Incorrect.
(d) It recognizes white space, comments, and ignore them correct.

3. (20)

After preprocessing program will be:

int(1) main(2) (3))(4)
{(5)
printf(6) "(7) % d + % d =%d"(8) ,(9) 5(10) ,(11) 2(12) ,(13)
7(14))(15) ;(16)
return(17) 0(18) ;(19)
}(20)

So, total 20 tokens are there after preprocessing.

4. (d)

Lexical analyzer takes character stream as input. Syntax analyzer takes token stream as input. Semantic analyzer takes stream as input. Semantic analyzer takes syntax tree as input. Code generator takes intermediate representation as input.

5. (b)

Given program:

int(1) main(2) (3))(4)
{(5)
int(6) a(7) ,(8) *(9) b(10) ;(11)
a(12) =(13) 20(14) ;(15)
b(16) =(17) &(18) *a*(19) ;(20)
printf(21) "(22) %d%d"(23) ,(24) a(25) ,(26) *(27) b(28))(29) ;(30)
}(31)

6. (a)

123gate is not a valid token, therefore it will give lexical error.

7. (a)

Top down parser uses leftmost derivation while parsing any input string.

8. (d)

Solution- **({e, g, h})**

First of all non-terminals.

S	{e, f, g, h}
E	{e, f, g, h}
F	{e, g, h, ∈}
G	{g, ∈}

So, FIRST(S) ∩ FIRST (F) = {e, f, g, h} ∩ {e, g, h, ∈}

= {e, g, h}

9. (a)

First(E)= {g, ∈}

Follow (B) = {First(D)- ∈} U {h} = {g, f, h}

So, First(E) U Follow(B) = {g, f, h, ∈}

So, option a is correct.

10. (3)

FIRST(A) = FIRST(BC) ∪{a}

= {a, g, d} ∪ {a}

= {a, g, d}

So, 3 terminals are present in FIRST(a).