1. A mathematical model of a machine with the ability of a read-head to move left as well as right is a _____
   - DFA
   - **2DFA**
   - both a and b
   - none

2. 2DFA tuples are_____
   - 4
   - **5**
   - 6
   - 7

3. Full form of ID _____
   - Input data
   - Indistinguishable
   - none
   - **Instantaneous description**

4. For a 2DFA, δ is defined as :
   - $Q \times \Sigma \rightarrow Q$
   - **$Q \times \Sigma \rightarrow Q \times \{L,R\}$**
   - both a and b
   - None

5. Let P and Q be two regular expressions over Σ and if P does not contain ϵ then R = Q + RP has a unique solution given by
   - $R=PQ*$
   - $R=PQ+$
   - **$R=QP*$**
   - none

6. Select a Regular expression which generates all strings that start with ab and end with bba
   - aba*b*bba
   - ab(ab)*bba
   - **ab(a+b)*bba**
   - all

7. A DFA is minimal, if and only if
   - All its states are reachable from the start state
   - All its states are distinguishable
   - **both a and b**
   - none

8. $R.\epsilon = \epsilon.R =$
   - 0
   - Φ
   - **R**
   - ϵ

9. (S+T)R =
   - **SR+TR**
   - RS+RT
   - both a and b
   - none

10. Construct a RE that generates of odd numbers of 1's.
    - (11)+1
    - **(11)*1**
    - both a and b

- none

11. Construct a RE for even number of 1's.
   - **(11)***
   - (11)+
   - both a and b
   - none

12. Standard representations of regular languages are:
   - Regular expressions
   - DFA
   - regular grammars
   - **All**

13. Regular set is L={0,1,10,100,1000,...}, but Regular expression is represented as____
   - **(0+10*)**
   - (0+1)*
   - (010*)
   - (010*)

14. The regular expression is (a+b)* then regular set is_____
   - **L={(ε)a,b,aa,ab,ba,bb..}**
   - L={a,b,aa,ab,ba,bb..}
   - both a and b
   - none

15. Set of strings of a's and b's ending with abb. How it can be represented by regular expression.
   - (a+b)+abb
   - **(a+b)*abb**
   - both a and b
   - none

16. $R.\Phi=\Phi.R=$
   - R
   - 0
   - **Φ**
   - none

17. A CFG is said to be in CNF, if all productions are of the form:
   - **A→BC, A→a**
   - A→aC, A→ab
   - both a and b
   - none

18. A CFG is _____ if there exists unique LMD/RMD
   - ambiguous
   - **unambiguous**
   - both a and b
   - none

19. If there are different parse trees for LMD and RMD then the grammar is called
   - **ambiguous**
   - unambiguous
   - recursive
   - unrestricted

20. _____ is useful to display the derivations as trees.
   - Derivation Tree
   - Parse Tree
   - **both a and b**

- none

21. In derivation tree all leaf nodes of the tree are labelled by _____ of the grammar
   - **Terminals**
   - non-terminals
   - both a and b
   - none

22. In derivation tree the interior nodes are labelled using_____
   - Terminals
   - **non-terminals**
   - both a and b
   - none

23. Derivation tree is also called_____
   - **Parse Tree**
   - A-Tree
   - B-Tree
   - none

24. A derivation, in which, in each step left most variable is replaced, is called
   - **LMD**
   - RMD
   - both a and b
   - none

25. A derivation, in which, in each step right most variable is replaced, is called
   - LMD
   - **RMD**
   - both a and b
   - none

26. CFLs are not closed under___
   - Intersection
   - Difference
   - Complement
   - **all**

27. The CFG for defining palindrome over {a or b}. The productions P are S → ε|a|b, S → aSa, S → bSb and the grammar is G=({S}, {a,b}, P. S). This grammar is_____
   - Ambiguous
   - **Unambiguous**
   - both a and b
   - done

28. CNF full form is_____
   - Canonical normal form
   - **Chomsky normal form**
   - both a and b
   - none

29. Which of the production rule can be accepted by Chomsky Normal Form?
   - A → BC
   - A → ε
   - S → a
   - **all**

30. _____ is always stationed at one of the tape cells and provides communication for the interaction between the tape and the control unit.
   - Tape
   - control unit

- **Head**
- none

31. What are the components of a TM?
- tape
- head
- control unit
- **all**

32. A decision problem which can be solved by some algorithm is called
- Undecidable
- **Decidable**
- both a and b
- none

33. How many tuples are used to represent PDA _____.
- 4
- 5
- 6
- **7**

34. Which of the following is an ε production
- S → A
- **A → ε**
- B → a
- none

35. Which of the following is an unit production
- **S → A**
- A → ε
- B → a
- none

36. The format: A → aB refers to which of the following?
- CNF
- BNF
- **GNF**
- none

37. A variable which is not leading to terminal or terminal string is called
- **Non-generating symbol**
- null variable
- start variable
- none

38. The Grammar G=
- **(V,T,P,S)**
- (V,T,S)
- (T,P,S)
- none

39. Type2 grammar is called_____
- **CFG**
- CSG
- URG
- RG

40. CFG is recognized by_____

- FA
- TM
- **PDA**
- LBA

41. A grammar G=(V,T,P,S) is said to be regular, if it is _____
- Recursive Grammar
- non-linear
- **either right-linear or left-linear**
- none

42. A PDA chooses the next move based on
- Current state and stack top
- next input symbol
- **both a and b**
- none

43. Choose one which is not a regular expression?
- [(a+b)*(aa+bb)]*(a+b)
- **[(0+1)-(0b+a1)*(a+b)]**
- (01+11+10)*
- none

44. A production of the form A → B, where A and B are both non-terminals is called a_____
- **Unit production**
- ε production
- both a and b
- none

45. Which production is Useless production for the Grammar: S → A, A → aA, A → ε, B → bA
- S → A
- A → aA
- A → ε
- **B → bA**

46. Reduction of the grammar means
- Elimination of useless symbols
- Elimination of ε productions
- Elimination of unit productions
- **all**

47. The transition function for TM is defined as
- **Q × Σ → Q × Σ × {L,R,N}**
- Q × Σ → 2^Q
- Q × (Σ ∪ {ε}) → Q
- none

48. The language accepted by a Turning Machine is
- **Recursively enumerable language**
- regular language
- Context sensitive language
- Context free language

49. A grammar with at most one variable (non-terminal) at the right side of a production is a
   - **Linear grammar**
   - nonlinear
   - both a and b
   - none

50. A decision problem which cannot be solved by some algorithm is called
   - **Undecidable**
   - Decidable
   - both a and b
   - none