1] prove by induction on n that $1+2+3+\ldots+n$ that $\sum_{i=0}^{n} i = n(n+1)/2$
(1.6) → pg no

2] prove by induction on $n\ 1^2+2^2+3^2+\ldots+n^2 = \sum_{i=0}^{n} i = n(n+1)(2n+$
1) /6 (1-7) → pg no

3] prove by induction on n that $1+2+3+\ldots+(3n-2) = \frac{n(3n-1)}{2}$ for
$n > 0$ (pg no:- 1.8)

4] prove that $\sqrt{2}$ is not rational. (pg no:- 1.4)

5] Design FA which accept even number of 'a's and even number b's. (pg no:- 1-40)

6] Design a moore machine determine reside module 4 for binary number. (Ref class note book)

7] construct a mealy machine that print 'a' whenever the sequence '01' is encountered in any input binary string. (Ref class note book)

8] Draw transition diagram for recognition the set of all operation in c language. (pg no:- 1-37)

9] Design FA which accept even number of a's and even number b's. (pg no:- 1-40)

10] conversion of mealy machine to moore machine give one example. (Ref class note book)

11] construct a mealy machine that print 'a' whenever the sequence '01' is encountered in any input binary string. (Ref class note book)

12] construct the finite state machine. (FSM) in given in the following table test wheather the string 101101, 1111 are accept by M. (pg no:- 1-44)

state	0	1
→ q_0	q_0	q_1
q_1	q_3	q_0
q_2	q_0	q_3
q_3	q_1	q_2

13] convert the RE $(a/b)^*$ abb into NFA E and find the equivalent minimum state DFA. (Pg No:- 2.99)

14] Explain the DFA Minimization algorithm with an example (Pg No:- 2.70)

15] Construct DFA equivalent to the NFA $M = \{P, q, r\}$, $\{0,1\}$, $\delta, P, \{q, s\}$. where δ is defined in the following table: (Pg No:- 2.27)

δ	0	1
P	$\{q, s\}$	$\{q\}$
q	$\{r\}$	$\{q, r\}$
r	$\{s\}$	$\{p\}$
s	-	$\{P\}$

16] convert the given NFA to DFA. (Pg No:- 2.41)

δ	0	1
q^0	$\{q^0, q^1\}$	$\{q^1, q^0\}$
q^1	$\{q^2\}$	$\{q^1\}$
q^2	$\{q^3\}$	$\{q^1, q^3\}$
q^3		
Final state	ϕ	$\{q^2\}$

17] Convert the given DFA from ε-NFA.
(Pg No:- 2.57)

	ε	0	1
p	-	{p}	{q}
q	{p}	{q}	{r}
*r	{q}	{r}	-

18] Construct NFA for the Regular Expression b+ba* (Pg No:- 2.81)

19] Prove L = {a^p | p is a prime} is not regular. (Pg No:- 2.132)

20] Convert the RE (b|a)* baa into NFA and find the equivalent minimum state DFA. (Pg No:- 2.90).

21] Show that L = {0^n 1^(n+1) | n>0} is not regular. (Pg No:- 2.132)

22] Construct NFA equivalent to (0+1)* (00+11). (Pg No:- 2.83)

23] Which of the following languages is regular? justify.
(Pg No:- 2.137)

i] L = {a^n b^m | n,m ≥ 1}.

ii] L = {a^n b^n | n, ≥ 1}

24] Design FA which accept even number of 0's and even number of 1's (Pg No:- 1-32)

1] Finite state machine is _____ tuple machine. [b]

a] 4 b] 5 c] 6 d] unlimited

2] The minimum number of states required to recognize an octal number divisible by 3 are/is [b]

a] 1 b] 3 c] 5 d] 7.

5] conside the following two statements: [c]

S1: $\{0^{\wedge}2n \mid n>=1\}$ is a regular language

S2: $\{0^{\wedge}m\ 0^{\wedge}n\ 0^{\wedge}(m+n) \mid m>=1$ and $n>=2\}$ is a regular language.

Which of the following statements is correct?

a] only S1 is correct b] only S2 is correct c] Both S1 and S2 are correct

d] None of S1 and S2 is correct answer is correct.

4] Language of finite automata is generated by [d].

a] Type 0 b] Type 1 grammar. c] Type 2 Grammar d] Type 3 gramm
grammar.

5] Design a NFA for the language: [c].

L: {an/n is even or divisible by 3}.

Which of the following methods can be used to simulate the same.

a] e-NFA b] power construction method c] Both (a) and (b).

d] None of the mentioned

6] Number of states reaquire to accept string ends 101. [b].

a] 3 b] 4 c] 2 d] can't be represented.

7] The ratio of (elements) number of input to the number of output
in mealy machine can be given as: [a].

a] 1 b] n: n+1 c] n+1: n d] None of the mentioned

8] The number of elements present in the e-closure(f2) in the given
diagram: [c].

a] 0 b] 1 c] 2 d] 3

9] Regular expression for all strings starts with ab ends with ba is : [c]
a] aba* b* ba b] ab(ab)* ba c] ab(a+b)* ba d] All of the mentioned.

Explanation : The given string ab(a+b)* ba starts with ab and ends with ba.

10] A grammer is said to be ambiguous grammar if it :- [c].
a] produces more than one (right.) derivation tree.
b] produces more than one left most derivation.
c] produces more than one right most derivation
d] All.

11] Backtracking is allowed in. [b].
a] NDFA b] DFA c] Both a & b d] None A

12] which of the following regular expression identity is true ? [b].
a] r(*) = r* b] (r* s*)* = (r+s)* c] (r+s)* = r* + s* d] r* s* = r* + s*

13] Which of the following does not represents the given language ?
Language : [d].
a] 0+01 b] {0} ∪ {01} c] {0} ∪ {0}{1} d] {0}^n {01}.

14] In moore machine, output is produced over the change of :- [b].
a] transition b] states c] Both d] None of the mentioned.

15] Transition function of NFA machine is given by. [d].
a] Σ x Q -> Σ b] Q x Σ -> Σ c] Q x Σ -> Q d] Q x Σ -> 2 power Q.

16] Transition function of DFA machine maps. [d].
a] Σ x Q -> Σ b] Q x Q -> Σ c] Σ x Σ -> Q d] Q x Σ -> Q.

17] A language is regular if and only if. [a]:
a] accepted by DFA b] accepted by PDA.

c] accepted by LBA d] accepted by Turing machine.

18] Regular expression are. [a].

a] Type 0 language. b] Type 1 language.

c] Type 2 language d] Type 3 language.

19] The given NFA corresponding to which of the following Regular expressions? [a].

a] $(0+1)^*(00+11)(0+1)^*$ b] $(0+1)^*(00+11)^*(0+1)^*$

c] $(0+1)^*(00+11)(0+1)$ d] $(0+1)\cdot(00+11)(0+1)$

20]. The non-kleene star operation accepts the following string of finite length over set $\Sigma = \{0,1\}$ where string is contains even number 0 and 1. [b].

a] 01, 0011, 010101 b] 0011, 11001100 c] ε, 0011, 11001, 00 d] ε, 0011, 1100110

21] finite automata needs minimum 0 number of stacks.

22] $L = \{\varepsilon, a, aa, aaa, aaaa, \ldots\}$ is represented by a^*.

23] An e-NFA is Quintuple in representation.

24] L is a regular language if and only if the set of Equivalence classes of L is finite.

25] The regular expression of language which is starting and ending with different symbols is Automata.

26] The finite automata is called NFA when there exists multiple paths for a specific input from current state to next state.

27] The output alphabet can be represented as; Δ

8] ε-closure of state is combination of self state and ε-reachable state

9] context free Grammars has: 4 tuples

10] The generators of languages are Grammars.

11] The finite automata is called DFA when there exists one path for a specific input from current state to next state.

12] TO describle the complement of a language, (is defined). It is very important to describe the Alphabet of that language over which the language is defined.

13] A Language for which no DFA exist is a Regular Language

14] Regular expression are Type 3 language.

15] While applying pumping lemma over a language we consider a string w that belong to L and fragment it into 3 parts

16] $L = \{a, aa, aaa, aaaa, \ldots\}$ is represented by a^*.

17] Regular expressions are closed under union.

18] precedence of regular expression in decreasing order is *, ., +

19] $(a+b)^*$ is equivalent to $(a^*b^*)^*$.

20] The minimum number of states required to recognize an octal number divisible by 3 are/is 3.