Discrete Mathematics

K1 Level Questions

UNIT I

1. The instruction is based on some prior knowledge / information is called …………
    a. **Recursion**
    b. Recurrence
    c. Induction
    d. None of the above.
2. The Fibonacci number can be defined as follows
    a. **$F_0=1,F_1=1,F_n=F_{n-1}+F_{n-2}$**
    b. $F_0=1,F_1=1,F_n=F_{n-1}-F_{n-2}$
    c. $F_0=1,F_1=1,F_n=F_{n+1}+F_{n+2}$
    d. None of the above
3. ^nC_r can be defined as follows
    a. **$^nC_0=1$, $^nC_n=1$, $^nC_r=(n-1)\,C_r+(n-1)\,C_{r-1}$**
    b. $^nC_0=1$, $^nC_n=1$, $^nC_r=(n-1)\,C_r+(n-1)\,C_{r+1}$
    c. $^nC_0=1$, $^nC_n=1$, $^nC_r=(n-1)\,C_r-(n-1)\,C_{r-1}$
    d. none of the above
4. Find the F_4 of the Fibonacci number .
    a. 2
    b. 3
    c. 4
    d. **5**
5. Find the F_3 of the Fibonacci number .
    a. 2
    b. **3**
    c. 4
    d. 5
6. A procedure that contains a procedure call to itself is known as
    a. **Recursive procedure**
    b. Telescopic form
    c. Iteration procedure
    d. None of these
7. A polynomial defined recursively is said to be in………..
    a. Recursive procedure
    b. **Telescopic form**
    c. Iteration procedure
    d. None of these
8. A method of writing a polynomial in recursive form is called

a. Recursive procedure
b. Telescopic form
c. Iteration procedure
d. None of these

9. Telescopic form is also called
   a. Recursive procedure
   b. Horner's method
   c. Iteration procedure
   d. None of these
10. The process repeated for finding S(K) is called
    a. Closed form
    b. Open form
    c. Sequence form
    d. None of the above

UNIT II

1. Find the roots of the equation a^3-4 a^2-11a+30=0
   a. 2,3,5
   b. 2,-3,5
   c. 4,3,5
   d. 4,3,-5
2. Recurrence relation of order can be solved using
   a. Generating functions
   b. Generating relations
   c. Iteration method
   d. None of the above
3. Consider the list of all sequences of length six of A's and B's that satisfy the following conditions:
   a. There are no two adjacent A's.
   b. There are never three B's adjacent.

   What is the next sequence after ABBABB in lex order?

   (a) ABABAB
   (b) ABBABA
   (c) BABABA
   (d) BABBAB
4. The domain of the function that assign to each pair of integers the maximum of these two integers is ____________
   a) N

b) Z

c) Z^{+}

d) Z^{+} X Z^{+}

5. Power set of empty set has exactly __________ subset.
a) One
b) Two
c) Zero
d) Three

6. to the Cartesian product A x B. Is it True or False?
a) True
b) **False**

7. What is the cardinality of the set of odd positive integers less than 10?
a) **10**
b) 5
c) 3
d) 20

8. Which of the following two sets are equal?
a) A = {1, 2} and B = {1}
b) A = {1, 2} and B = {1, 2, 3}
c) **A = {1, 2, 3} and B = {2, 1, 3}**
d) A = {1, 2, 4} and B = {1, 2, 3}

9. The set of positive integers is ______________
a) **Infinite**
b) Finite
c) Subset
d) Empty

10. What is the Cardinality of the Power set of the set {0, 1, 2}.
a) **8**
b) 6
c) 7
d) 9

Unit III

1. Which of the following statement is a proposition?

a)Get me a glass of milkshake

b)God bless you!

c)What is the time now?

d)The only odd prime number is 2

2. The truth value of a given statement is
‘4+3=7 or 5 is not prime’.
a) False
b) True
3. Which of the following option is true?
a) If the Sun is a planet, elephants will fly
b) 3 +2 = 8 if 5-2 = 7
c) 1 < 3 and 3 is a positive integer
d) -2 > 3 or 3 is a negative integer
4. What is the value of x after this statement, assuming initial value of x is 5?
‘If x equals to one then x=x+2 else x=0’.
a) 1
b) 3
c) 0
d) 2
5. Let P: I am in Bangalore. , Q: I love cricket. ; then q -> p(q implies p) is:
a) If I love cricket then I am in Bangalore
b) If I am in Bangalore then I love cricket
c) I am not in Bangalore
d) I love cricket
6. Let P:If Sahil bowls, Saurabh hits a century. ,Q: If Raju bowls , Sahil gets out on first ball. Now if P is true and Q is false then which of the following can be true?
a) Raju bowled and Sahil got out on first ball
b) Raju did not bowled
c) Sahil bowled and Saurabh hits a century
d) Sahil bowled and Saurabh got out
7. The truth value of given statement is
‘If 9 is prime then 3 is even’.
a) False
b) True
8. Let P: I am in Delhi. , Q: Delhi is clean. ; then q ^ p(q and p) is:
a) Delhi is clean and I am in Delhi
b) Delhi is not clean or I am in Delhi
c) I am in Delhi and Delhi is not clean
d) Delhi is clean but I am in Mumbai

9. Let P: This is a great website, Q: You should not come back here.

   Then ‘This is a great website and you should come back here.’ is best represented by:

   a) ~P V ~Q

   b) P ∧ ~Q

   c) P V Q

   d) P ∧ Q

10. Let P: We should be honest., Q: We should be dedicated .,R: We should be overconfident.

    Then ‘We should be honest or dedicated but not overconfident.’ is best represented by:

    a) ~P V ~Q V R

    b) P ∧ ~Q ∧ R

    c) P V Q ∧ R

    d) P V Q ∧ ~R

11. Which of the following statements is the negation of the statements “4 is odd or -9 is positive”?

    a) 4 is even or -9 is not negative

    b) 4 is odd or -9 is not negative

    c) 4 is even and -9 is negative

    d) 4 is odd and -9 is not negative

12. Which of the following represents: ~A (negation of A) if A stands for “I like badminton but hate maths”?

    a) I hate badminton and maths

    b) I do not like badminton or maths

    c) I dislike badminton but love maths

    d) I hate badminton or like maths

13. The compound statement A v ~(A ∧ B) is always
    a) True
    b) False
    c)Tautology
    d)not a tautology

14. Which of the following are De-Morgan’s law

    a) P ∧ (Q v R) Ξ (P ∧ Q) v (P ∧ R)

    b) ~(P ∧ R) Ξ ~P v ~R , ~(P v R) Ξ ~P ∧ ~R

    c) P v ~P Ξ True , P ∧ ~P Ξ False

    d) None of the mentioned

15. What is the dual of (A ∧ B) v (C ∧ D) ?

a) (A V B) v (C v D)

b) (A V B) ^ (C v D)

c) (A V B) v (C ∧ D)

d) (A ∧ B) v (C v D)

16. ~ A v ~ B is logically equivalent to

a) ~ A → ~ B

b) ~ A ∧ ~ B

c) A → ~B

d) B V A

17. Negation of statement (A ∧ B) → (B ∧ C)

a) (A ∧ B) →(~B ∧ ~C)

b) ~(A ∧ B) v (B v C)

c) ~(A →B) →(~B ∧ C)

d) None of the mentioned

18. Which of the following satisfies commutative law?

a) ∧

b) v

c) ↔

d) All of the mentioned

19. If the truth value of A v B is true, then truth value of ~A ∧ B can be

a) True if A is false

b) False if A is false

c) False if B is true and A is false

d) None of the mentioned

Unit IV

1. If P is always against the testimony of Q ,then the compound statement P→(P v ~Q) is a

a) Tautology

b) Contradiction

c) Contingency

d) None of the mentioned

2. Propositional logic uses symbols to stand for statements and..

a. Nonstatements

b. The relationships between subject and predicate
c. Truth values
d. The relationships between statements

3. The symbolization for a conjunction is...

a. $p \rightarrow q$
b. *p & q*
c. p v q
d. ~ *p*

4. In a disjunction, even if one of the statements is false, the whole disjunction is still...

a. False
b. Negated
c. True
d. Both true and false

5. In a conditional statement, the first part is the antecedent and the second part is the...

a. Predicate
b. Consequent
c. Subject
d. Disjunct

6. The name of the following argument form is... $p \rightarrow q \Rightarrow \sim p \vee q$

a. Contradiction
b. Disjunctive syllogism
c. Modus tollens
d. Tautology

7. In a truth table for a two-variable argument, the first guide column has the following truth values:

a. T, T, F, F
b. F, F, T, T
c. T, F, T, F
d. T, F, F, F

8. In using the short method, your overall goal is to see if you can...
a. Show that all the statements of the argument are true
b. Prove invalidity in the most efficient way possible
c. Prove validity in the most efficient way possible
d. Prove that the conclusion is false

9. The four logical connectives are…

a. Conjunctions, conditionals, compounds, and disjunctions
b. Conjunctions, statements, disjunctions, and conditionals
c. Conditionals, disjunctions, negations, and conjunctions
d. Conjuncts, disjuncts, conditionals, and negations

10. A conditional is symbolized like this…

a. $p \vee q$
b. $\boldsymbol{p \rightarrow q}$
c. $p * q$
d. $p \,\&\, q$

11. A conditional is false only when the antecedent is…

a. True and the consequent is false
b. False and the consequent is false
c. True and the consequent is true
d. False and the consequent is true

12. In a conditional statement, *unless* means "if not" and introduces…

a. A negation
b. The conjunct
c. The consequent
d. The antecedent

13. It is impossible for a valid argument to have true premises and…

a. A true conclusion
b. A negated conclusion
c. A conditional
d. A false conclusion

14. The special variables T and F are called -------- of each other.
a. Duals
b. Ordered pairs
c. Truth values
d. Both a and c

15. A sum of elementary products is called---------
a. disjunctive normal form
b. PDNF
c. PCNF
d. Both b and c

16. A product of elementary sums is called -------------
a. conjunctive normal form
b. PCNF
c. PDNF

d. none

17. Disjunctions of minterms is known as ----------Principal disjunctive normal form
    a. DNF
    b. CNF
    c. PDNF
    d. PCNF

Unit V

1. If aRa for all a,b belongs to R then it is called ----------
    a. Reflexive
    b. Transitive
    c. Anti-symmetric
    d. symmetric
2. If aRb implies bRa for all a, b belongs to R then the relation is called -------------
    a. Reflexive
    b. Transitive
    c. Anti-symmetric
    d. symmetric
3. If aRb and bRa implies a = b for all a, b belongs to R then the relation is called -----------
    a. Reflexive
    b. Transitive
    c. Anti-symmetric
    d. symmetric
4. If aRb implies bRc implies aRc for all a, b belongs to R then the relation is called --------
    a. Reflexive
    b. Transitive
    c. Anti-symmetric
    d. symmetric

5. If R satisfies reflexive, anti-symmetric and transitive then it is called--------
    a. Partial order relation
    b. Equivalence relation
    c. Total order relation
    d. None
6. If R satisfies reflexive, symmetric and transitive then it is called--------
    a. Partial order relation
    b. Equivalence relation
    c. Total order relation
    d. None

7. If a poset satisfies either a<=b or b<=a then it is called ----------
    a. Linear order
    b. Total order
    c. Chain
    d. Both a and b

8. If a<=c and b<=c then c is called ----------
   a. Upper bound
   b. Lower bound
   c. Glb
   d. lub
9. If l<=a and l<=b then l is called ----------
   a. Upper bound
   b. Lower bound
   c. Glb
   d. Lub
10. ----------- is a poset.
   a. Lattice
   b. Join
   c. Meet
   d. <=
11. -----------is a graphical representation of poset.
   a. Hasse diagram
   b. Pi diagram
   c. Venn diagram
   d. None
12. ------------is represented graphically as a Hasse diagram.
   a. Poset
   b. Coset
   c. Either a or b
   d. none
13. If <= is a total order then the poset is called a ---------
   a. chain
   b. total order
   c. linear order
   d. none
14. Every ---------- is a lattice.
   a. Chain
   b. Total order
   c. Total order relation
   d. Both a and c
15. A lattice which has both 0 and 1 is called a ---------
   a. bounded lattice.
   b. Complete
   c. Both a and b
   d. None
16. In (D(24),<=), where <= is the order ‘divisor of’, the least element is ---- and the greatest element is ----
   a. 1 and 24
   b. 24 and 1
   c. 1
   d. 24

17. If L is a lattice then -----= b
    a. **avb**
    b. a <=b
    c. a>=b
    d. none
18. The elements of an arbitrary lattices satisfy -------- inequalities.
    a. **modular and distributive**
    b. only distributive
    c. only modular
    d. none
19. If S is a sublattice of L then its closed under --------
    a. **join and meet**
    b. join
    c. meet
    d. none
20. Injective lattice homomorphism is called -----------
    a. **lattice monomorphism**
    b. lattice isomorphism
    c. either a or b
    d. none
21. Surjective lattice homomorphism is called -----------
    a. **lattice epimorphisms**
    b. lattice isomorphism
    c. either a or b
    d. none **lattice epimorphisms**
22. Bijective lattice homomorphism is called -----------
    a. **lattice isomorphisms**
    b. lattice epimorphisms
    c. lattice epimorphisms
    d. none
23. Every meet-homomorphisms is an ----------map
    a. **order preserving**
    b. lattice epimorphisms
    c. lattice isomorphisms
    d. none
24. Every ------------- is an order preserving map.
    a. **meet-homomorphisms and join –homomorphisms**
    b. meet-homomorphisms
    c. join –homomorphisms
    d. none

Discrete mathematics

K2 Level Questions

UNIT I

1. **Define Recursion**

   Answer: The instruction is based on some prior knowledge / information is called Recurrsion.
2. **Define Recursion procedure**

   Answer: A procedure that contains a procedure call to itself is known as Recursion procedure

3. **Define Telescopic form**
   Answer: A polynomial defined recursively is said to be Telescopic form
4. **Define Horner's method**
   Answer: The method of writing a polynomial in recursion form is called Horners method
5. **Define Discrete function**
   Answer: A sequence of integer with the function of form N into Z
6. **Define recursive procedure**
   Answer: A procedure that contains a procedure call to itself is called recursive procedure

7. Define One to one function

   A function is said to be One to one if and only if f(a) = f(b) implies that a = b for all a and b in the domain of f.
8. What is the Cartesian product of A = {1, 2} and B = {a, b}?

   ANSWER: **{(1, a), (2, a), (1, b), (2, b)**
9. What is the rank, in direct insertion order, of the permutation 5, 4, 6, 3, 2, 1? ANSWER: **717**
10. Find the roots of the equations $a^2-8a+16=0$
    a. **4,4**

UNIT II

1. **What is solving the relation**
   The process of finding a closed from expression for the terms of a sequence from its recurrence relation is called solving the relation
2. **Define Closed form**
   The process repeated for finding S(K) is called Closed form
3. **Define Sequence of integers**
   A function from N into Z is called Sequence of integers
4. **Define Discrete Function**
   A sequence of integers are called discrete function

5. **Define Initial condition**

   The terms not defined by the formula are said to form the Initial conditions
6. **Define Discrete relation**

   The linear recurrence relation with constant co efficient is simply called Discrete relation
7. Find the order of D(K)-3D(K-1)=0

   ANSWER: 1
8. Find the degree C(K) – 5C(K-1) + 6 C(K-2)= 2K-7

   ANSWER: 2
9. Find the order of S(K)-4S(K-1)-11S(K-2)+30S(K-3)=4^K

   ANSWER: 3
10. Find the roots of the equations $a^2+10a+9=0$

    ANSWER: 1, 9

UNIT III

1. Give an example for proposition statement?

   The only odd prime number is 2
2. Let P:If Sahil bowls, Saurabh hits a century. ,Q: If Raju bowls , Sahil gets out on first ball. Then write P v Q.

   If Sahil bowls, Saurabh hits a century OR If Raju bowls, Sahil gets out on first ball.
3. Let p: I am in Delhi , q: Delhi is clean; then write q ∧ p.

   Delhi is clean and I am in Delhi
4. Write any one connective with example.

   Conjunction: Let p: I am in Delhi , q: Delhi is clean; then q ∧ p is:

   Delhi is clean and I am in Delhi
5. Write the truth table for Negation.

P	**~p**
T	**F**
F	**T**
6. Write an example for Compound Statement.

   1 < 3 and 3 is a positive integer
7. Give an example for Atomic statement

   3 is a positive integer
8. How to write a conditional statement?

   If…… Then
9. How to write a biconditional statement?

   If and only if
10. In disjunction, when will the statement become FALSE?

If both the statements P and Q is false then the compound statement is also false.

UNIT IV

1. Define Tautology.

   A tautology is a logical statement in which the conclusion is equivalent to the premise.

2. Give an example for contradiction.

   ~[(p v q) ↔ ~(p v q)]

3. In a conditional statement, what is the name of the first part of the statement?

   antecedent

4. In a conditional statement, what is the name of the first part of the statement?
   Consequent
5. In a truth table for a two-variable argument, What are the truth values of first guide column ?

   T, T, F, F

6. How to symbolize a conditional statement?
   $\boldsymbol{p \rightarrow q}$
7. The special variables T and F are called -------- of each other.
   Duals
8. Define DNF.
   A sum of elementary products is called disjunctive normal form
9. Define CNF.
   A product of elementary sums is called conjunctive normal form
10. Define PDNF.
    Disjunctions of minterms is known as Principal disjunctive normal form (PDNF)

UNIT V

1. What is the condition for reflexive?
   If aRa for all a,b belongs to R then it is called Reflexive
2. How to define symmetric condition in relation?
   If aRb implies bRa for all a, b belongs to R then the relation is called symmetric
3. How to define anti-symmetric condition?
   If aRb and bRa implies a = b for all a, b belongs to R then the relation is called Anti-symmetric
4. If aRb implies bRc implies aRc for all a, b belongs to R then the relation is called:
   Transitive
5. If R satisfies reflexive, anti-symmetric and transitive then it is called--------
   Partial order relation
6. If R satisfies reflexive, symmetric and transitive then it is called--------
   Equivalence relation

7. If a poset satisfies either a<=b or b<=a then it is called ---------

    Total order

8. Define Lattice.

    Both LUB and GLB are exists for a poset then it is called Lattice

9. What is the name of a graphical representation of poset.

    Hasse diagram

10. Define bounded lattice.

    A lattice which has both 0 and 1 is called a bounded lattice

Discrete Mathematics

K3 Level Questions

UNIT I

1. Consider D, defined by $D(k)=5.2^k$, $k\geq 0$. Find the recurrence relation on D.
2. Find the recurrence relation satisfying $y_n=A(3)^n+B(-4)^n$.
3. Find the recurrence relation satisfying $y_n=(A+B_{n)}4^n$.
4. Find the recurrence relation for the Fibonacci sequence.
5. Find the closed form expression for the recurrence relation
   D(k)-2D(k-1)=0, D(0)=5.
6. Find the characteristic equation of
   J(k)-4J(k-1)+4J(k-2)=0
7. For the sequence defined by $A(k)=k^2-k$, $k\geq 0$, obtain recurrence relation if A is a sequence of integers.
8. Solve the recurrence relation S(K) + 5S(K-1)=0, S(0)=6
9. Solve the recurrence relation S(K)-8s(K-1)-4s(K-2)=0,K>2 With S(0)=3 and S(1)=2.
10. Solve the recurrence relation S(K)-8S(K-1)-9s(K-2)=0, s(0)=1 and s(1)=0.

Unit II

1. Write the procedure for finding the particular solution
2. Solve T(K)-7T(K-1) + 10 T(K-2)=6+8K with T(o)=1 and T(1)=2
3. Solve s(K)-s(k-1)-6s(K-2)=-30 where s(0)=20,s(1)=-5
4. Solve s(K)-3s(K-1)-4s(k-2)=4
5. Solve $s(K)-4s(k-1) + 4s(K-2)=3K+2^K$,s(0)=1,s(1)=1
6. Solve s(K)-5s(K-1)+6s(K-2) =2, S(0)=1, S(1)=-1
7. Solve the recurrence relation Q(K)-6Q(K-1)+8Q(K-2)=2 with Q(0)=1 and Q(1)=2
8. Solve $s(k)+5s(k-1)+ 6s(k-2)=3K^2-2k+1$
9. Write the procedure foe finding the generating function of a given recurrence relation.
10. Find the generating function of the recurrence relation S(K)=2s(K-1),s(0)=1

UNIT III

1. Explain connectives with truth table.
2. Write short notes about conjunction with example.
3. Describe about disjunction with example.
4. Illustrate with example and truth table about negation.
5. Write short notes about conditional statements with example.
6. Explain about biconditional statements with example.
7. Find a truth value for $(r\wedge p)\rightarrow s$.

8. Write a truth table for $p \rightarrow (\sim q \wedge r)$
9. How to generate well-formed formula using rules?
10. Construct the truth table for $\sim(\sim P \wedge \sim Q)$.

Unit IV

1. Verify whether $(p \vee q) \rightarrow p$ is a tautology
2. Verify whether $(p \vee q) \rightarrow r$ is a contradiction or tautology.
3. Using truth table prove that $q \Rightarrow p \rightarrow q$.
4. Write any four logical identities with truth table.
5. Using replacement process show that $(\quad \rightarrow \quad \wedge (\quad \rightarrow \quad \Leftrightarrow (\quad \vee \quad \rightarrow$
6. By replacement process show that $q \vee (p \wedge \sim q) \vee (\sim p \wedge \sim q)$ is a tautology.
7. Write the procedure to obtain a disjunctive normal form of a formula.
8. Define DNF and CNF with example.
9. Obtain a DNF of $p \rightarrow ((p \rightarrow q) \wedge \sim (\sim q \wedge \sim p)$
10. Obtain a CNF of $p \rightarrow ((p \rightarrow q) \wedge \sim (\sim q \wedge \sim p)$.

Unit V

1. Prove that $(N, \leq)$ is a poset.
2. Explain about Hasse diagram with example.
3. Draw the Hasse diagram for the poset $(X, \leq)$, where X = The set of all positive integers which are divisors of 12 and n = 12.
4. Prove that Every chain is a lattice.
5. Show that, In any Lattice $(L, \leq)$, the operations $\vee$ and $\wedge$ are isotone.
6. Prove: Every meet-homomorphism is an order preserving map.
7. Prove: Every join-homomorphism is an order preserving map.
8. Prove: Any chain is modular.
9. Show that the lattice N_5 is not modular.
10. Prove: Let f be an isomorphism from a poset $(L, \leq)$ onto a poset $(M, \leq')$. If L is a lattice, then M is also a lattice and f is a lattice isomorphism.

Discrete Mathematics

K4 Level Questions

UNIT I

1. Write $p(x)=x^3-6x^2+11x-6$ in telescopic form.
2. Write $p(x)=x^5+3x^4-15x^3+x-16$ in telescopic form.
3. Solve the recurrence relation
   S(k)-4S(k-1)-11S(k-2)+30S(k-3)=0
   S(0)=0, S(1)=-35, S(2)=-85.
4. Write the recurrence relation for Fibonacci numbers and solve it.
5. Solve: S(k)+6S(k-1)+12S(k-2)+8S(k-3)=0

UNIT II

1. Using the generating function solve the difference equation y_{n+2}- Y_{n+1}- $6y_n$=0 given Y_1=1 ,Y_0=2
2. Solve the recurrence relation S(n)=S(n-1)+2(n-1) with S(0)=3,S(1)=1 by finding its generating function
3. Solve T(K)=7T(K-1)-10T(K-2), T(0)=4 and T(1)=17usinf generating functions
4. Solve S(K)-7s(K-2)+6S(K-3)=0 where s(0)=8,s(1)=6, S(2)=22 using generating functions
5. Solve S(K) + 5S(K-1)=9, S(0)=6 using generating functions.

Unit III

1. Construct the truth table of the formula(~P ∨ Q) ∧ (~Q ∨ P)
2. Find the truth value for the formula (→ → ⇒ → → →
3. Write a note about TF-statements with example.
4. Give the negation of the following statements: i) London is city ii)8+7<20 iii) It is cold iv) He is a good student.
5. Write the following statement in symbolic form: p: Asha is smart and q: Veena is smart
   - i) Asha is smart and veena is not smart
   - ii) Neither Asha nor Veena are smart.
   - iii) Asha is smart or Veena is not smart
   - **iv)** Veena is smart or Asha is not smart

Unit IV

1. Find a conjunctive normal form of (p ∧ ~ (q ∨ r)) ∨ (((p∧ q) ∨ ~ r) ∧p)
2. Obtain PDNF and PCNF of p ⟷ q(using truth table).
3. By not using truth table directly find PCNF and PDNF for p ⟷ q.
4. Find the minterm normal form of p →(~q ∧ r).
5. Obtain PCNF of (p ∧ ~ (q ∨ r)) ∨ (((p∧ q) ∨ ~ r) ∧p).

Unit V

1. Prove that (L M, ∧,∨) is a lattice.

2. Draw the Hasse diagram for the lattice $P(\{1,2,3,4\},\subseteq)$.
3. Prove: Every distributive lattice is modular.
4. Prove: Every chain is distributive lattice.
5. Show that the direct product of any two distributive lattices is a distributive lattice.