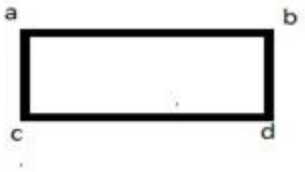
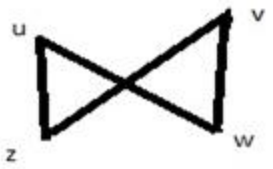
b. Define kernel. Show that the kernel of group homomorphism f from G to G' is a Normal subgroup. **8M**

(or)

9. a. State and prove fundamental theorem of group homomorphism. **8M**

b. Verify whether the following graphs are isomorphic (or) not. **7M**





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Reg. No: | | | | | | | | | | |

VELAGAPUDI RAMAKRISHNA

SIDDHARTHA ENGINEERING COLLEGE

(AUTONOMOUS)

II/IV B.Tech. DEGREE EXAMINATION, NOVEMBER, 2018

Third Semester

INFORMATION TECHNOLOGY

17IT3302 DISCRETE MATHEMATICS FOR INFORMATION TECHNOLOGY

Time: 3 hours ***Max. Marks: 70***

Part-A is compulsory

Answer One Question from each Unit of Part - B

Answer to any single question or its part shall be written at one place only

PART-A

10 x 1 = 10M

1. a. Define tautology.
   b. Define predicate.
   c. Define compatibility relation on a set A.
   d. Define Hasse diagram.
   e. Is the relation "≥" on the set of integers is partially ordered set?
   f. Find the generating function for the sequence 1, 1, 1 .....
   g. Define function.
   h. Define group and give example.
   i. Define permutation group.
   j. Define simple graph.

PART-B

4 x 15 = 60M

UNIT-I

2. a. Construct the truth table for the following proposition. **8M**
$\{[(p \vee q) \rightarrow r] \wedge (\neg p)\} \rightarrow (p \rightarrow r)$

b. Test the validity of the argument.
If Clifton does not live in France, then he does not speakFrench.
Clifton does not drive a datsun.
If Clifton lives in France then he rides a bicycle.
Either Clifton speaks French (or) he drives a datsun.
Hence Clifton rides a bicycle. **7M**

(or)

3. a. Test the validity of the argument. **7M**
No mothers are males
Some males are politicians
Hence some politicians are not mothers

b. A new born child can be given 1, 2 or 3 names. In how many ways can a child be named if we can choose from 300 names (no name can be repeated). **8M**

UNIT–II

4. a. Let S be the set of all non-zero integers and A = S x S. If R is a relation on A given by (a, b) R(c, d) if and only if ad = bc. Show that R is an equivalence relation. **8M**

b. Determine whether the function $f: N \times N \rightarrow N$ defined by f (m, n) = 2m + 3n is onto or not. **7M**

(or)

5. a. In how many ways can 12 oranges be distributed among three children A, B, C so that A gets at least four, B & C gets at least two but C gets no more than five. **8M**

b. Draw the Hasse diagram representing the positive divisors of 36.**7M**

UNIT–III

6. a. Solve the recurrence relation $a_n - 2a_{n-1} + a_{n-2} = 5n$ for $n \geq 2$. **8M**

b. If f : ZxZ $\rightarrow$Z, Z is the set of integers is given by f (x,y) = x * y = x + y - xy, show that the binary operation * is commutative and associative. Find the identity element and the inverse of each element. **7M**

(or)

7. a. Solve the recurrence relation $a_n - 2a_{n-1} + a_{n-2} = 5n$ for $n \geq 2$. **8M**

b. Show that any subgroup of a cyclic group (G, *) is cyclic. **7M**

UNIT–IV

8. a. Prove that the sum of the degrees of all the vertices of an undirected graph is twice the number of edges of the graph and hence even. **7M**