136.

SHAHEED BHAGAT SINGH STATE TECHNICAL CAMPUS, FEROZEPUR

ROLL NO : | | | | | | | | | | | | |

Total number of pages:[2]

Total number of questions:06

B.Tech. -CSE/ 4th Sem

Discrete Structures (RG/RP)

Subject Code:BTCS402A /BTCS302/ BTCS402

M/18

(2011 batch onwards)

Time allowed: 3 Hrs

Max Marks:60

Important Instructions:

- **All questions are compulsory**

PART A (2×10)

Q.1. Answer in brief:

(a) Define a group with the help of an example.

(b) Define an equivalence relation with the help of an example.

(c) Define a field.

(d) What is Euler circuit?

(e) Define PIGEONHOLE principle.

(f) A non-directed graph G has 8 edges, Find the number of vertex, if the degree of each vertex is 2?

(g) In how many ways can 5 boys and 5 girls be seated around a table so that no two girls are together

(h) Define a tautology.

(i) Define minimal spanning tree.

(j) If $\{B,+,.,'\}$ is a Boolean algebra, then $(a+b)' = a'.b'$

(all CO's)

PART B (8×5)

Q.2. Find the homogeneous solution and particular solution of recurrence relation $a_{r+2} - 2a_{r+1} + a_r = 3r+5,\ a_0 = 1,\ a_1 = 2.$

OR

Use generating function to solve the recurrence relation $a_r = a_{r-1} + 2a_{r-2} + 2^r$, where $a_0 = 4,\ a_1 = 12$ CO3

Q.3. Sate and prove Euler's Theorem on graphs.

OR

Define Euler Circuit and Hamiltonian Circuit and also give examples of a graph

a. Which has an Euler circuit but not a Hamiltonian Circuit.
b. Which has a Hamiltonian Circuit but not anEuler circuit.
c. Which has both Hamiltonian Circuit and Euler circuit.
d. Which has neithera Hamiltonian Circuit nor an Euler circuit. CO5

Q.4. a. With the help of truth table, show that $p \Leftrightarrow q \equiv (p \vee q) \Rightarrow (p \wedge q)$.

b. Verify that proposition $p \vee \neg(p \wedge q)$ is a tautology.

OR CO2

Use Karnaugh map to find the minimal sum for $f(x, y, z, t) = xy' + xyz + x'y'z' + x'yzt'$

Q.5. Prove that every group of a cyclic group is cyclic. CO4

OR

In a class of 80 students, 50 students know English, 55 know French and 46 know German language. 37 students know English and French, 28 students know French and German, 7 students know none of the languages. Find out

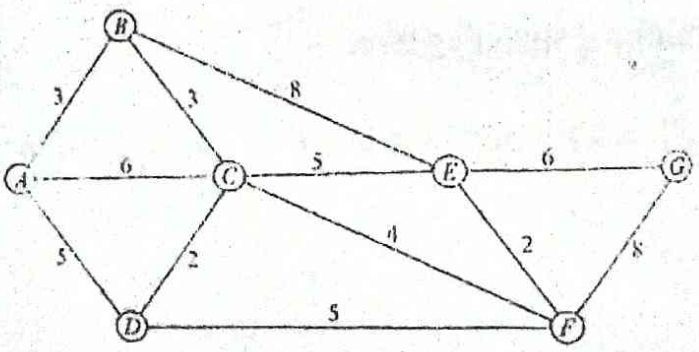
(a) How many students know all the three languages?

(b) How many know only one language? CO1

Q.6. Draw k-map and simplify the Boolean expression $\sum(0,2,6,8,10,12,14,15)$. CO2

OR

Define a spanning tree. Obtain a minimal spanning tree for the graph using Prim's algorithm



CO5