Course Title: Discrete Mathematical Structures   Class: B.Tech.
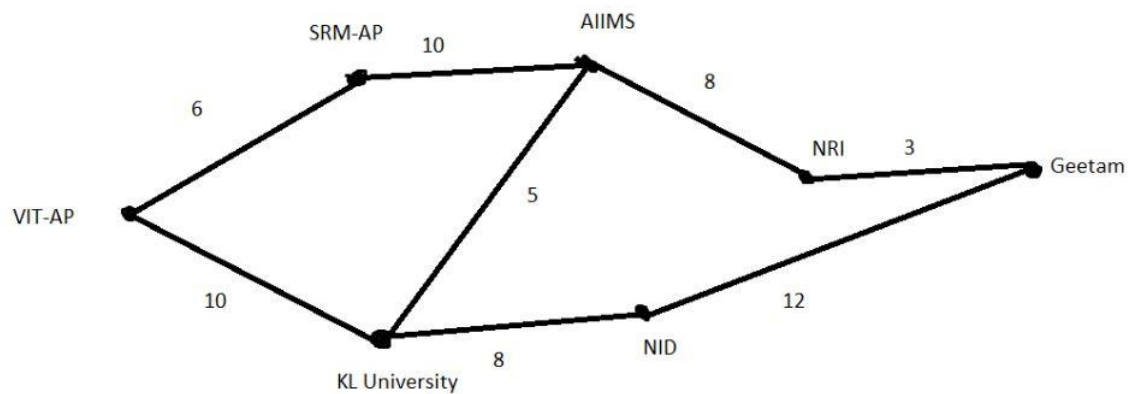Course Code: MAT1003   Semester: FALL

Dr. Tanuj Kumar

1) Test the validity of the following arguments (without using truth table)
   If John takes a walk daily, he will not get fat.
   If he will not take car, he will walk.
   John will get fat.
   Therefore John must have taken the car.   **-10 Marks**

2) A) One encrypted message is received as "QTORHG". This message is encrypted with the help of the function $f(p) = (3p + 7) \mod 26$. What was the original message?   **-07 Marks**
   B) Decrypt the cipher text "GOPQRUTA" that was encrypted with the block cipher $\sigma(1)=2$, $\sigma(2)=4$, $\sigma(3)=1$, and $\sigma(4)=3$.   **-05 Marks**

3) If I have some apples, some bananas, some Cherries, and some dragon fruits and each fruit is more than 10 in numbers. In how many different ways I will get total of 10 fruits and I should have at least one fruit of each type.   **-08 Marks**

4) Check whether the set of integers under modulo 8 with binary operation * defined by a*b= (a+b)/2 is a group or not?   **-05 Marks**

5) The relation defined on the set of all human beings as {(a,b)| a is brother of b}. Check whether the above defined relation is a poset or not?

                                                              -05 Marks

6) A cable company wanting to lay line to multiple neighborhoods. They need to minimize the length of cable used, so they will save money. Following is the Layout of the their neighborhood. Help them to set up the network.
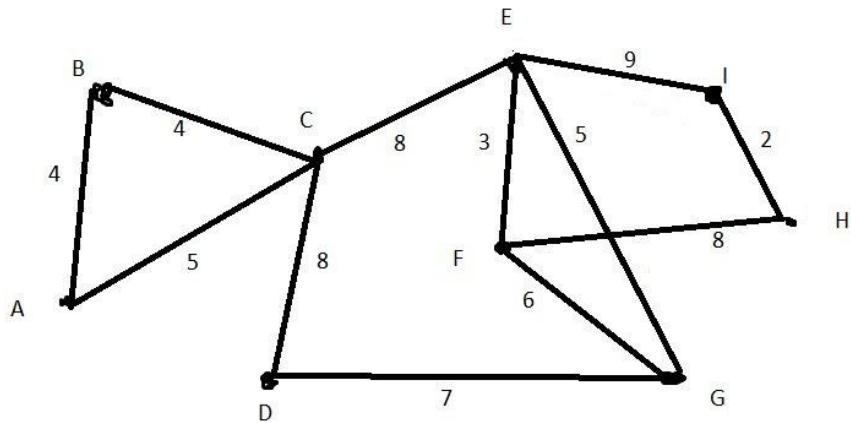
7) VIT-AP University have planned for inter university sports. Geetam University team is going to attend the same. They have following map. Help them to find the shortest path to attend the sports in VIT-AP University using Dijkstra's Algorithm.