VIT-AP University, Amaravati

FAT

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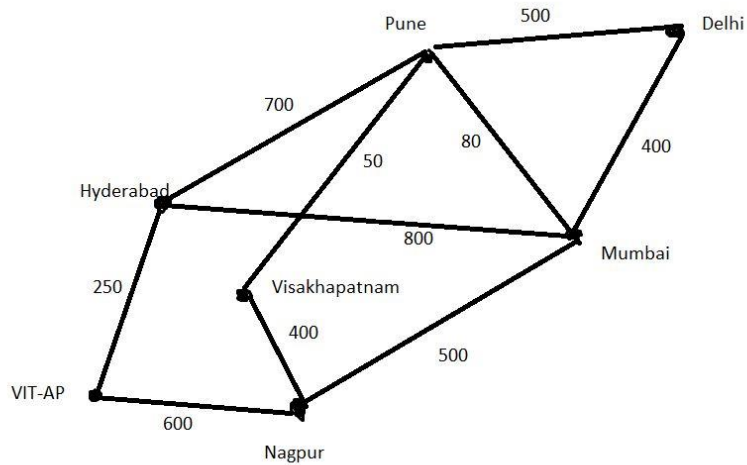Course Code: MAT1003   Semester: FALL

Dr. Tanuj Kumar

1) Translate the statement "The product of any two positive integers is always positive" into a logical expression (Using Nested Quantifiers).**-04 Marks**

2) Check the validity of the following arguments using truth table:
   "If it snows, then I will study discrete mathematics"
   "If I study discrete mathematics, I will get an A"

   Therefore if it snows, I will get an A.   **-10 Marks**

3) Let John have some number of mangoes. He was doing some calculation and finally he conclude that, if he distribute mangoes equally to three friends, he will have 2 extra mangoes; if he equally distribute among four friends, he will have 3 extra mangoes; and if he equally distribute among five friends, he will have one mango at the end. How many mangoes John have with him?   **-10 Marks**

4) A) Check whether the relation defined by {(a,b)| a is cousin of b} defined on the set of all human being, is an equivalence relation or not? **-6 Marks**
   B) The relation (a,b) such that "a" and "b" have the same age, is defined on the set of all people. Is it an equivalence relation?   **-05 Marks**

5) Check the Permutation defined on the set X={1,2,3,4,5} as $\sigma(1)=5$, $\sigma(2)=3$, $\sigma(3)=4$, $\sigma(4)=2$, $\sigma(5)=1$ with the composition of permutation is a group or not?   **-05 Marks**

6) For some official work I need to visit Delhi from VIT-AP university. Due to some protest and current pandemic situation I can not visit directly to Delhi. The following map shows the distance between various cites in between. Help me to find the shortest distance from VIT-AP to Delhi using Dijkstra's Algorithm.

-10 Marks

7) Indian cricket team was doing catching practice. The fielding coach informed them that they will throw ball to 4 other players. Some players done this, but others did not throw any ball to catch. How many players received the ball including first player, if no one passes more than once, and if the practice ends after there have been 16 players who catches the ball but did not throw to anyone. **-10 Marks**