Code No: 153CF **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech II Year I Semester Examinations, August/September - 2022
DISCRETE MATHEMATICS
(Common to CSE(AIML), CSE(DS), CSE(IOT))

Time: 3 Hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks
- - -

1.a) State and prove De-Morgan's Law using truth tables.
b) Write down the contrapositive, the converse, and the inverse of the conditional statement: "If the sky is cloudy then it will rain or it will not rain". [8+7]

2. Find the PDNF and PCNF by constructing the truth table:
$(P \wedge Q) \vee (\neg P \wedge R) \vee (Q \wedge R)$ [15]

3.a) Draw the Hasse diagram for the Poset (P(S), /), where S={2, 3, 4, 5, 6, 10, 12, 20, 25} and P(S) is the power set of S.
b) Draw the Venn diagrams for each of these combinations of the sets A, B, C, and D.
i) $(A \cap B) \cup (C \cap D)$ ii) $A \cup (B \cap C \cap D)$ [7+8]

4. Using Substitution method and master theorem solve the following recurrence relation:
$T(n) = T(n/4) + T(n/2) + cn^2$ [15]

5. What is Inclusion-Exclusion principle? Write down the applications of inclusion and exclusion. [15]

6. Using generating function, solve the $y_{n+2} - 4y_{n+1} + 3y_n = 0$, given $y_0 = 2$, $y_1 = 4$. [15]

7.a) Define planar graph. Mention its structural properties.
b) Discuss graph coloring problem in brief. [8+7]

8. What is a tree? Explain various graph traversal techniques with illustrative examples. [15]

---ooOoo---