PVP 14

Code: CS3T1

II B.Tech - I Semester – Regular/Supplementary Examinations
November - 2018

DISCRETE MATHEMATICS
(COMPUTER SCIENCE & ENGINEERING)

Duration: 3 hours   Max. Marks: 70

PART – A

Answer ***all*** the questions. All questions carry equal marks
11x 2 = 22 M

1.
a) Write the truth table for $\overline{P \vee Q}$.
b) Check whether the formula P →P is a tautology or not .
c) Verify whether $P \wedge (\neg P \vee Q) \Rightarrow (Q \rightarrow R)$.
d) What is Rule P and Rule T.
e) Define free and bound variables with examples.
f) Give an example for a partially ordered set which is not a lattice.
g) Define sub-Boolean algebra.
h) Is there a graph with degree sequence (1, 2, 3, 4, 5). Justify your answer.
i) Define minimal spanning tree.
j) Is $K_{3,3}$ a planar graph. Explain your answer.
k) Define chromatic number of a graph.

PART – B

Answer any ***THREE*** questions. All questions carry equal marks.

3 x 16 = 48 M

2. a) Prove that $P \rightarrow (Q \rightarrow R) \Leftrightarrow (P \rightarrow Q) \rightarrow R$. 8 M

b) Prove that $(P \vee Q) \wedge (P \rightarrow R) \wedge (Q \rightarrow R) \Rightarrow R$. 8 M

3. a) Prove

$q \wedge (u \rightarrow r) \wedge \{(r \wedge s) \rightarrow (p \vee t)\} \wedge \{q \rightarrow (u \wedge s)\} \wedge \neg t \Rightarrow p \vee d$,

using the rules of inference . 8 M

b) Show that 8 M

$\forall(x)(p(x) \vee q(x)) \Longrightarrow (\forall(x))p(x) \vee \exists(x)\, q(x)$

4. a) Show that (S_{24}, D) is a lattice, where S_6= {1, 2, 3, 4, 5, 6, 8, 12, 24} and D is the relation of 'division'. 8 M

b) Define Boolean algebra and write its properties. 8 M

5. a) State and prove "The First Theorem of Graph Theory".

4 M

b) Define isomorphism between two graphs. Give an example for two graphs which are not isomorphic. 6 M

c) Define a tree with an example and prove any one of its properties. 6 M

6. a) State and prove Euler's formula. 8 M

b) Explain Planar graph, Multigraphs, Euler circuits and Hamilton graph with examples for each. 8 M