B. Tech - sem-III, (2014 course), IT
winter-2018

B. Tech. Sem - III (Inf. Tech.) (2014 COURSE) (CBCS) : WINTER - 2018

SUBJECT: DISCRETE MATHEMATICS

Day: Monday
Date: 26/11/2018

W-2018-2306

Time: 10.00 AM TO 01.00 PM
Max Marks : 60

N.B. :

1) All questions are **COMPULSORY.**
2) Figures to the right indicate **FULL** marks.
3) Use of non-programmable calculator is **ALLOWED.**
4) Assume suitable data, if necessary.

Q.1 It was found that in the first year of computer science of 80 students 50 know Cobol, 55 know 'C', 46 know Pascal. It was also known that 37 know 'C' and Cobol, 28 know 'C' and Pascal. 25 know Pascal and Cobol. 7 students however know none of the languages. **(10)**

Find :

i) How many know all the three languages?
ii) How many know exactly two languages?
iii) How many know exactly one languages?

OR

Q.1 Without constructing truth tables, show that : **(10)**

i) $(p \rightarrow q) \Rightarrow p \vee q$

ii) $(p \wedge q) \Rightarrow p \rightarrow q$

Q.2 If $a = \{1, 2, 3, 4, 5\}$ and $R = \{(1,2), (3,4), (4,5), (4,1), (1,1)\}$ find transitive closure. **(10)**

OR

Q.2 Write a short note on Chains and Anti chains. **(10)**

Q.3 Determine discrete numeric functions corresponding to following generating functions **(10)**

i) $\frac{1}{1+z}$ ii) $\frac{3-5z}{1-2z-3z^2}$

OR

Q.3 Solve : $a_n = 2a_{n-1} + 3a_{n-2} + 5^n$, $n \geq 2$ with $a_0 = -2$, $a_1 = 1$ **(10)**

Q.4 In how many ways can 7 books be arranged on shelf so that **(10)**

i) two particular books are together
ii) these two books are not together

OR

Q.4 An eight member committee is to be formed from a group of 10 men and 15 women. In how many ways can the committee be chosen if: **(10)**

i) the committee must contain 4 men and 4 women
ii) there must be more men than women

P.T.O.

Q.5 State Euler's formula for a planar graph. Draw 2 non-isomorphic simple planar graphs with 6 nodes and 9 edges. **(10)**

OR

Q.5 Define following terms: **(10)**

- **i)** Eulerian graph
- **ii)** Hamiltonian graph
- **iii)** Eulerian path
- **iv)** Hamiltonian circuit

Q.6 Assuming suitable example, write steps to find shortest path using Prim's algorithm. **(10)**

OR

Q.6 What is Binary Search Tree explain with example. Draw full binary tree with 5 terminal vertices and 4 internal vertices. What is the level and height of the tree? **(10)**

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