

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

T -2 MAKEUP EXAMINATION- April 2018

B. Tech. II Semester (CSE, ECE, IT)

COURSE CODE: 10B11MA211

MAX. MARKS: 25

COURSE NAME: DISCRETE MATHEMATICS

COURSE CREDITS: 4

MAX. TIME: $1\frac{1}{2}$ Hrs

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

1. Prove that if $|A| = n$ then $|P(A)| = 2^n$. [2 Marks]
2. (a) Discuss the problem of Tower of Hanoi and prove it by the method of induction. [3 Marks]
 (b) Let $A = \{1,2,3,4,5,6,7,8,9,10\}$, determine the truth set of the following statements
 (i) $(\forall x \in A)(x + y < 15)$ (ii) $(\exists y \in A)(x + y < 15)$ [2 Marks]
3. (a) The minimum number of cards that one must pick from a standard deck of 52 cards, to ensure that at least two cards are from the same suit is ...? [1 Mark]
 (b) Using the principle of inclusion-exclusion find the number of integers from 1 to 1000 (both inclusive), that are divisible by 3 or 5 or 7. [4 Marks]
4. (a) Test the validity of the following argument: [2.5 Marks]
 If I study then I will not fail in mathematics.
 If I do not play cricket then I will study.
 I failed in mathematics.
 Therefore, I must have played cricket.
 (b) There are two restaurants next to each other. One has a sign that says "Good food is not cheap", and the other has the sign that says "cheap food is not good". Verify whether these signs are logically equivalent or not? [2.5 Marks]
5. Answer the following with justification:
 (a) There are 25 telephones in an office. Is it possible to connect them with wires so that each telephone is connected with exactly 6 others? [1 Mark]
 (b) Draw the complement of $K_{4,4}$ [1 Mark]
 (c) For which values of n , K_n is not a wheel? [1 Mark]
6. (a) Let G be a graph with v number of vertices and e number of edges. Suppose M is the maximum degree of the vertices, and m is the minimum degree of the vertices of G . Show that:
 (i) $m \leq 2e/v$ (ii) $M \geq 2e/v$ [3 Marks]
 (b) Show that no pair of integers x, y satisfies the equation $154x + 260y = 3$. [2 Marks]
