NATIONAL INSTITUTE OF TECHNOLGY PATNA

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

MID SEMESTER EXAMINATION – October, 2022

B. Tech (Computer Science and Engineering) III[rd] Semester

CS34110 – Discrete Mathematics and Graph Theory

Full marks:30

Q.no	Question	Marks	CO	BL
1	Determine whether the following functions are one-to-one, onto, or one-to-one onto: N is natural number i. f: N->N $f(j) = j^2+2$ one-to-one ii. f: N->N $f(j) = j \pmod 3$	06	CO1	Application
2	How many different relations are possible on a set of four elements? Determine whether the relation represented by the relation graph shown in Fig. 1 is reflexive, symmetric, antisymmetric and/or transitive.	06	CO1	Application
3	Find the number of bit strings of length 7 that do not have two consecutive 0s. Do not use the recurrence relation to solve the problem.	06	CO2	Analysis
4	How many positive integers not exceeding 500 are divisible by 3 or 5?	06	CO2	Evaluation
5	What is the minimum number of students, each of whom comes from one of the 50 states, who must be enrolled in a university to guarantee that there are at least 100 students who come from the same state?	06	CO2	Application

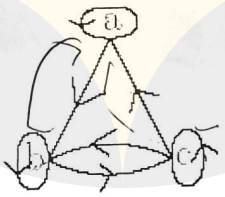

Fig. 1