M.M. ENGINEERING COLLEGE, MULLANA (AMBALA)

DEPARTMENT OF CSE

Tutorial / Assignment Sheet No. : 2.1

Branch / Semester: CSE / 4th **Course Name:** Discrete Mathematics **Course Code:** BCSE-508

Topics covered: Basic counting techniques, pigeon-hole principle, permutation and combination (Unit-2)

Date of Release: 09.02.2021 **Last date of submission:** 16.02.2021 **Total Marks:** 30

Tutorial / Assignment Outcomes:

i) **Able to solve general problems related to counting techniques & Pigeonhole principle.**

ii) **Able to map & solve real life problems using the concepts of counting techniques & Pigeonhole principle.**

Q. No.	"All Questions are compulsory"	Marks
	Section-A (Each question of 1 mark)	
1.	In how many ways can an organization containing 30 members elect a president, treasurer, and secretary (assuming no person is elected to more than one position)?	1
2.	How many different signals, each consisting of 9 flags hung in a vertical line, can be formed from a set of 5 indistinguishable yellow flags, three indistinguishable green flags, and a red flag?	1
3.	A farmer buys 4 cows, 3 pigs and 5 hens from a man who has 7 cows, 6 pigs and 9 hens. How many choices does the farmer has?	1
4.	Suppose a laundry bag contains many red, white, and blue socks. How many socks need to select to be sure of getting a pair with the same color?	1
5.	Find the minimum number of elements that one need to take from the set S = {1, 2, 3, ..., 9} to be sure that two of the numbers add up to 10.	1
6.	Find value of n if P (n, 2) = 72.	1
	Section-B (Each question of 2 mark)	
7.	In how many ways can 2 English books, 3 Science books, and 2 Hindi books be arranged on a shelf so that all books of the same subjects are together?	2
8.	A student must take five classes from three areas of study. Numerous classes are offered in each discipline, but the student cannot take more than two classes in any given area. Using the pigeonhole principle, show that the student will take at least two classes in one area.	2
	Section-C (Each question of 4 mark)	
9.	There are 50 students in each of the senior and junior classes. Each class has 25 male and 25 female students. In how many ways can an 8 students committee be formed so that there are 4 females and 3 juniors in the committee?	4
10.	Let L be a list (not necessarily in alphabetical order) of the 26 letters in the English alphabet (which consists of 5 vowels, A, E, I, O, U, and 21 consonants). a) Show that L has a sublist consisting of four or more consecutive consonants. b) Assuming L begins with a vowel, say E, show that L has a sublist consisting of five or more consecutive consonants.	 2 2
	Section-D (6 mark question)	
11.	Out of 12 employees, a group of four trainers is to be sent for "Personality Development" training of one month. i) In how many ways can the four employees be selected? ii) What if there are two employees who refuse to go together for training? iii) What if there are two employees who want to go together that is either they both go or both do not go for training? iv) What if there are two employees who refuse to go together and there are two employees who want to go together?	6
12. a)	A word that reads the same when read in forward or backward is called palindrome. How many seven-letter palindromes can be formed from English alphabets?	1
b)	We are given digits 1, 2, 3, 7, 8 and 5. If repetitions are not permitted then: i) How many four digit numbers can be formed using given digits? ii) How many four digit numbers less that 5000 can be formed using given digits? iii) How many four digit even numbers can be formed using given digits? iv) How many four digit odd numbers can be formed using given digits? v) How many four digit numbers that contain both the digits 3 and 5 can be formed using given digits?	5

Note for students: Students are required to submit handwritten solutions of given assignment / tutorial sheet on or before Last date of submission otherwise penalty in terms of deduction in marks will be made as per following rule:

If submitted on or before last date then Deduction of marks = 0

If submission delayed by (1-7) days then Deduction of marks = 5

If submission delayed by (8-14) days then Deduction of marks = 10

If submission delayed by more than 15 days then Deduction of marks = 12.5