Unit-2 Counting Principles
(QB)

1. There are 18 mathematics majors and 325 computer science majors at a college.

   a) In how many ways can two representatives be picked so that one is a mathematics major and the other is a computer science major?

   b) In how many ways can one representative be picked who is either a mathematics major or a computer science major?

2. An office building contains 27 floors and has 37 offices on each floor. How many offices are in the building?

3. A multiple-choice test contains 10 questions. There are four possible answers for each question.

   a) In how many ways can a student answer the questions on the test if the student answers every question?

   b) In how many ways can a student answer the questions on the test if the student can leave answers blank?

4. A particular brand of shirt comes in 12 colors, has a male version and a female version, and comes in three sizes for each sex How many different types of this shirt are made?

5. A password in a computer system has the following requirements:

1. The length is between 6 and 8 characters

2. Each character can be an uppercase letter, a lowercase letter, or a digit

3. Each password must contain at least one digit

 • How many possible passwords are there?

6. What is the minimum number of students required in a discrete mathematics class to be sure that at least six will receive the same grade, if there are five possible grades, A, B, C, D, and F?

7. How many ways are there to form a 3 member subcommittee from a group of 12 people?

8.How many ways are there to choose a president, vice-president, and secretary from a group of 12 people?

9. From a group of 7 men and 6 women, five persons are to be selected to form a committee so that at least 3 men are there in the committee. In how many ways can it be done?

10.How many ways can 8 boys and 8 girls be seated in a row

    a) If any person can sit next to any other
    b) If boy and girl must occupy alternate seats.

11. How many ways can 3 exams be scheduled within a 5 days period. so that no two exams are scheduled on same date.

12. In how many different ways can the letters of the word 'OPTICAL' be arranged so that the vowels always come together?

13. In how many ways can 10 software engineers and 10 civil engineers be seated around a round table so that they are positioned alternatively?

14. In how many different ways can the letters of the word 'LEADING' be arranged in such a way that the vowels always come together?

15. There are 4 oranges, 5 apples and 6 mangoes in a basket. In how many ways can a person make a selection of fruits among the fruits in the basket?

16. How many 8 digit mobile numbers can be formed if any digit can be repeated and 0 can also start the mobile number?

17. There are 6 periods in each working day of a school. In how many ways can one organize 5 subjects such that each subject is allowed at least one period?

18. An event manager has ten patterns of chairs and eight patterns of tables. In how many ways can he make a pair of table and chair?

19. In how many different ways can the letters of the word 'MATHEMATICS' be arranged such that the vowels must always come together?

20. A bag contains 2 white balls, 3 black balls and 4 red balls. In how many ways can 3 balls be drawn from the bag, if at least one black ball is to be included in the draw?