Bansilal Ramnath Agarwal Charitable Trust’s VISHWAKARMA INSTITUTE OF TECHNOLOGY, PUNE –37

(An Autonomous Institute Affiliated to SPPU)

Discrete Mathematics (ES1030) HA 3

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| **Question** | **Statement** |
| 1 | A computer password consists of a letter of the alphabet followed by 3 or 4 digits. Find the total number of passwords that can be created and the number of passwords in which no digit repeats. |
| 2 | A Label identifier for a computer program consists of one letter followed by three digits. If repetitions are allowed, how many distinct label identifiers are possible? |
| 3 | If telephone area codes are three digit numbers whose middle digit must be 0 or 1. Codes whose last two digits are 1's are being used for some other purposes. With these conditions, how many area codes are available? |
| 4 | On an English test, a student must write two essays. For the first essay, the student must select from topics A, B, and C. For the second essay, the student must select from topics 1, 2, 3, and 4. How many different ways can the student select the two essay topics? Show all possibilities using tree diagram |
| 5 | i) Determine the number of distinguishable arrangements for MISSISSIPPI. ii) How many seven letter words can be formed using the letters of the word BENZENE? |
| 6 | Out of 12 employees, a group of four trainees is to be sent for ‘Software testing and QA’ training of one month. a) In how many ways can the four employees be selected? b) In how many ways a group can be selected if two of the 12 employees refuse to go together? |
| 7 | How many permutations of the letters ABCDEFGH contain a) the string ED? b) the string CDE? c) the strings BA and FGH? d) the strings AB, DE, and GH? e) the strings CAB and BED? f) the strings BCA and ABF? |
| 8 | If repetitions are not permitted, how many four digit numbers can be formed from digits 1, 2,3,5,7 and 8 ? How many of these numbers are less than 5000? How many of these numbers contain both the digits 3 and 5 ? |
| 9 | 13 people on a softball team show up for a game. How many ways are there to choose 10 players to take the field? How many ways are there to assign the 10 positions by selecting players from 13 people who show up? Of the 13 people who show up, three are women. How many ways are there to choose 10 players to take the field if at least one of these players must be a women? |
| 10 | A bag contains six white marbles, and five white marbles. Find the number of ways four marbles can be drawn from the bag a) if they can be of any color b) two must be white and two red c) they must be of the same color |
| 11 | How many strings of eight English letters are there a) if letters can be repeated? b) if no letter can be repeated? c) that start with X, if letters can be repeated? d) that start with X, if no letter can be repeated? e) that start and end with X, if letters can be repeated? f) that start with the letters BO (in that order), if letters can be repeated? g) that start and end with the letters BO (in that order), if letters can be repeated? h) that start or end with the letters BO (in that order), if letters can be repeated? |
| 12 | In how many ways can a photographer at a wedding arrange six people in a row, including the bride and groom, if a) the bride must be next to the groom? b) the bride is not next to the groom? c) the bride is positioned somewhere to the left of the groom? |
| 13 | How many bit strings of length 10 contain a) exactly four Is? b) at most four Is? c) at least four Is? d) an equal number of Os and 1 s? |
| 14 | Draw a tree diagram to show the number of ways so that four friends Amit, Bob, Chetan and Danny sit, so that Bob and Danny always sit together. Hence find the possible ways of this sitting arrangement. |
| 15 | How many different signals, each consisting of eight flags in a vertical line, can be formed from a set of four indistinguishable red flags, three indistinguishable white flags and a blue flag? |