TALENT DEVELOPMENT CENTRE
INDIAN INSTITUTE OF SCIENCE, KUDAPURA
Challakere, Chitradurga District, Karnataka-577536
MATHS ASSIGNMENT: 05

1. In a city, the bus route numbers consist of a natural number less than 100, followed by one of the letters A,B,C,D,E and F. How many different bus routes are possible?

2. (a) How many different 4 digit numbers can be formed using digits 1,2,4,5,7,8,9 with no digit repeated in any number
   (b) How many different 4 digit even numbers can be formed using digits 1,2,4,5,7,8,9 with no digit repeated in any number

3. Find the number of permutations of the letters of the word PROPORTIONAL. How many of these start with P and end with P?

4. Find the number of permutations of the word VIVEKANANDA having the string NN?

5. Consider all the permutations of the word SCHOOL and arrange them in alphabetical order as in a dictionary. Which is the first word? Which is the last word? What is the serial number of the word SCHOOL in this dictionary?

6. The number of diagonals in a polygon is 20. Find the number of sides of the polygon.

7. There are 20 points in the plane out of which 5 are collinear. Find the number of straight lines which can be formed using these points. How many triangles can be formed?

8. On a circle, there are 12 points. How many cyclic quadrilaterals can be drawn by using these points?

9. There are 12 points in the plane of which some are collinear. If 52 distinct lines can be drawn joining these points, how many points are collinear?

10. There are some points in the plane, no three of which are collinear. If the ratio of the triangles and the number of lines that can be formed using these points is 5:3, find the number of points.

11. There are 10 men and 4 women. You are required to form 6 member committees. How many ways you can do this? What is the possible number of such committees if each committee should contain exactly two women members? How many such committees are possible if each committee has to contain at least two women members?

12. There are 8 books on a shelf. One has to select four books. In how many ways you can do this? If the condition is that you should not choose two adjacent books, what is your answer?

13. How many 5 letter words can be formed using the letters of the word EQUATION so that each word should contain 3 vowels and 2 consonants?

14. How many seating arrangements are possible with 8 people around a round table?

15. How many different key rings can be made of four different colour-coded keys?

16. Consider the word ROTOR. Whichever way you read it, from left to right or from right to left, you get the same word. Such a word is known as **palindrome**. Find the maximum possible number of 5-letter palindromes.

17. In a party, each person shakes hand with everyone else. If the number of hand-shakes is 231, how many people are there in the party?

(b) In a chess tournament, every player plays with every other exactly once. Two players withdrew from the play and the number of games played were 17 less than the games originally planned. How many players remained in the game?

18. Find the number of permutations of the word ENGINEERING. How many of these

   a) begin with E and end with E   b) have all the 3 E's together

   c) begin with GIN and end with GRIN

19. (a) Find x, if $\binom{x}{4} = \binom{x}{5}$

   (b) If $P_r^n = 3024, C_r^n = 126$,find 'r'.

20. Find x, if $\binom{99}{40} + \binom{99}{x} = \binom{100}{59}$

21. The mean weight of 35 students is 45kg If the weight of the teacher be included, the mean weight increases by 500g. find the weight of the teacher

22. Find the mean, median and mode of the following data:
     15,20,25,18,14,15,25,15,18,16,20,25,20.25,18

23. The table given below shows the frequency distribution of the scores obtained by 200 candidates in class X examination .Calculate the Median, Variance and Standard deviation.

Scores	200-250	250-300	300-350	350-400	400-450	450-500	500-550	550-600
No. of students	30	15	45	20	25	40	10	15

24. The median of the following data is 525. Find the values of x and y, if the total frequency is 100.

CI	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000
Freq	2	5	X	12	17	20	Y	9	7	4

25. Draw Histogram to represent the following distribution

C I	10 -15	15 - 20	20 - 30	30 - 50	50 -80
frequency	6	10	10	8	18

26. Kashyap hits the target 7 times out of10 shots. Find the probability of missing the shots.

27. A letter is chosen at random from the English alphabets before the letter 'R'. Find the probability that it is a (i) vowel (ii) a consonant (iii) a letter of the word - INDIA

28. (a) Find the probability of getting 5 Wednesdays in the month of August.

(b)Find the probability of getting 53 Wednesdays in (i) a non-leap year (ii) a leap year

29 If two dice are rolled simultaneously, find the probability of getting
   (i)   4 exactly once (ii) 5 at least once (iii) 6 at most once

   (b).A die is rolled thrice. what is the probability that it shows
       (i) odd number at least once   (ii) even number at most once

30.Two fair dice are thrown. What is the probability that the two scores do not add up to 7?

31.Two friends Amar and Akbar tries to solve a math problem related to PROBABILITY.
   If the probability of solving the problem by Amar is $\frac{1}{3}$ and that of Akbar is $\frac{1}{2}$, then,
   what is the probability that one of them solves it?

32. In a class of 30 students, two are absent. What is the probability that their names are next to each other in the alphabetical list of names?

33. For a school student council, 5 boys and 5 girls are nominated. A committee of 6 has to be formed. What is the probability that the council will have at least 4 boys?

34. Two customers Ramu and Shamu are visiting a particular shop in the same week. Each is equally likely to visit the shop on the day. What is the probability that both will visit the shop on   (i) the same day (ii) consecutive days (iii) different days

35. One card is drawn from a well shuffled deck of 52 cards. Find the probability of getting
   (i) A red king (ii)a face card (iii) neither spade nor an ace (iv)either a queen or a diamond

36.A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball is double that of a red ball, determine the number of blue balls in the bags.

37.A bag has 15 tickets numbered from 1 to 15. Two tickets are drawn at random from a bag. Find the probability that both the numbers drawn are : (i) Odd   (b) Prime

38. Two cards are drawn at random from a well shuffled deck of 52 cards, find the probability that
   a) both are same colour   c) both are aces
   b) both belong to the same suit   d) one Q and one K

39.A bag contains 12balls out of which 'x' are white
   (i) If one ball is drawn at random, find the probability that it is white.
   (ii) If 6 more balls are put to the bag, then the probability of drawing a white ball will be double that in (i) find 'x'.

40.A number is randomly selected from the set of all 3-digit numbers, each of which contains atleast one 5. What is the probability that it is divisible by 5?

41 What is the probability of selecting three cards with sum 18 from 10 cards numbered 0,1,2,3,4,5,6,7,8,9?

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