IEM KOLKATA

PERMUTATIONS AND COMBINATIONS

Instructor: Akash Bhattacharya

Q1) How many different salads can be made from cauliflower, tomatoes, onions, potatoes and carrots?
(a) 16 (b) 28 (c) 31 (d) 32

Q2) Gautam Gambhir has to select the Indian team consisting of 4 bowlers, 6 batsmen and 1 wicket keeper from a group of 8 batsmen, 3 wicket keepers and 6 bowlers. How many possible combinations can GG have?
(a) 17 (b) 126 (c) 63 (d) 64

Q3) In how many ways can 5 members form a committee out of 10 be selected, so that,

(i) two particular members must be included
(ii) two particular members must not be included.

(a) 56,56 (b) 28,56 (c) 56,28 (d) 64,36

Q4) In how many ways can you place N coins on a board with N rows and N columns such that every row and every column contains exactly one coin?
(a) N (b) $N(N-1)(N-2)....2.1$ (c) N^2 (d) N^N

Q5) If ${}^{15}C_{3r} = {}^{15}C_{r+3}$, then find r.

Q6) Find the number of ways in which 10 students can form a ring?

Q7) Find the total number of ways, in which 10 beads can be strung into a necklace.

Q8) In a cricket tournament 5 matches were played, then in how many ways result can be declared?

Q9) Eight friends meet at a party. Each shakes hand with each of the other once. The number of possible handshakes is
(a) 64 (b) 56 (c) 28 (d) 20

Q10) In a plane, there are 16 non-collinear points. Find the number of straight lines formed.
(a) 120 (b) 64 (c) 84 (d) 150

Q11) A committee of 5 members is going to be formed from 3 trainees, 4 professors and 6 research assciates. How many ways can they be selected, if

(i) in committee, there are 2 trainees and 3 research associates?
(a) 15 (b) 45 (c) 60 (d) 9 (e) None

(ii) there are 4 professors and 1 research associate or 3 trainees and 2 professors?
(a) 12 (b) 13 (c) 24 (d) 52 (e) None

Q23) If ${}^{56}P_{r+6} : {}^{54}P_{r+3} = 30800$, then find ${}^{r}P_2$.
(a) 1840 (b) 2640 (c) 1640 (d) 820

Q24) There is a 7-digit telephone number with all different digits. If the digit at extreme right right and extreme left are 5 and 6 respectively, then how many such telephone numbers are possible?
(a)120 (b) 100000 (c) 6720 (d) 30240

Q25) There are 5 tasks and 5 persons. Task 1 cannot be assigned to either person 1 or person 2. Task 2 must be assigned to either person 3 or person 4. Every person is to be assigned one task. In how many ways can this assignment be done?
(a) 6 (b) 12 (c) 24 (d) 144

Q26) In how many ways, can 15 people be seated around two round tables with seating capacities of 7 and 8 people?
(a) $\frac{15!}{8!}$ (b) $\frac{7!}{88!}$ (c) ${}^{15}C_8 \times 6! \times 7!$ (d) ${}^{15}C_8 \times 8!$

Q28) In how many different ways, 5 boys and 5 girls can sit on a circular table, so that the boys and girls are alternate?
(a) 2880 (b) 2800 (c) 2680 (d) 2280

Q5) Suppose in a box, there are 20 red, 30 black, 40 blue and 50 white balls. What is the minimum number of balls to be drawn, without replacement, so that you are certain about getting 4 red, 5 black, 6 blue and 7 white balls?

Q29)

Q30)

Q31)

Q32)