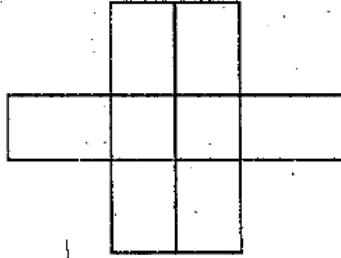


Permutations and Combinations

Q 1.

Six X's have to be placed in the squares of figure below in such a way that each row contains at least one X. In how many different ways can this be done? (IIT JEE – 1978 – 2 Marks)



Q 2.

In how many ways can a pack of 52 cards be (IIT JEE - 1979 – 3 Marks)

- (i) Divided equally among four players in order
- (ii) Formed into 4 sets, into 4 groups of 13 cards each.
- (iii) In 4 sets, three of them having 17 cards each and the fourth just 1 card?

Q 3.

Five balls of different colors are to be placed in five boxes of different size. Each box can hold all five. In how many different ways can we place the balls so that no box remains empty?

(IIT JEE – 1981 – 4 Marks)

Q 4.

m men and n women are to be seated in a row so that no two women sit together. If $m > n$ then show that the number of ways in which they can be seated is $m! (m + 1)! / (m - n + 1)!$

(IIT JEE – 1983 – 2 Marks)

Q 5.

7 relatives of a man comprises 4 ladies and 3 gentlemen; his wife has also 7 relatives: 3 of them are ladies and 4 gentlemen. In how many ways can they invite a dinner party of 3 ladies and 3 gentlemen so that there are 3 of man's relatives and 3 of the wife's relatives? (IIT JEE – 1985 – 5 Marks)

Q 6.

A box contains two white balls, three black balls and four red balls. In how many ways can three balls be drawn from the box if at least one black ball is to be included in the draw? (IIT JEE – 1986 – 2 ½ - Marks)

A student is allowed to select almost n books from a collection $(2n + 1)$ books. If the total number of ways in which he can select at least one book is 63, find the value of n . **(IIT JEE – 1987 – 3 Marks)**

Q 8.

Eighteen guests have to be seated, half on each side of a long table. Four particular guests desire to sit on one particular side and three others on the other side. Determine the number of ways in which the sitting arrangements can be made. **(IIT JEE – 1991 – 4 Marks)**

Q 9.

A committee of 12 is to be formed from 9 women and 8 men. In how many ways this can be done if at least five women have to be included in a committee? In how many of these committees.

(a) The women are in majority?

(B) The men are in majority?

(IIT JEE – 1994 – 4 Marks)

Q 10.

Prove by permutation of otherwise $(n^2)! / (n!)^n$ is an integer ($n \in \mathbb{I}$). **(IIT JEE – 2004 – 2 Marks)**

Q 11.

If total number of runs scored in n matches is $(n + 1)/4 (2^{n+1} - n - 2)$ where $n > 1$, and the runs scored in the k^{th} match are given by $k \cdot 2^{n+1-k}$, where $1 \leq k \leq n$. Find n . **(IIT JEE – 2005 – 2 Marks)**