

Date Planned : __ / __ / __	Daily Tutorial Sheet - 4	Expected Duration : 90 Min
Actual Date of Attempt : __ / __ / __	JEE Archive	Exact Duration : _____

39. mn squares of equal size are arranged to form a rectangle of dimension m by n where m and n are natural numbers. Two squares will be called 'neighbours' if they have exactly one common side. A natural number is written in each square such that the number in written any square is the arithmetic mean of the numbers written in its neighbouring squares. Show that this is possible only if all the numbers used are equal. (1982)
40. If ${}^nC_{r-1} = 36$, ${}^nC_r = 84$ and ${}^nC_{r+1} = 126$, then find the values of n and r . (1979)
41. Let $n_1 < n_2 < n_3 < n_4 < n_5$ be positive integers such that $n_1 + n_2 + n_3 + n_4 + n_5 = 20$. The number of such distinct arrangements $(n_1, n_2, n_3, n_4, n_5)$ is: (2014 ADV.)
42. The total number of ways in which 5 balls of different colours can be distributed among 3 persons so that each person gets at least one ball, is: (2012)
(A) 75 (B) 150 (C) 210 (D) 243
43. Let n and k be positive integers such that $n \geq \frac{k(k+1)}{2}$. The number of solutions (x_1, x_2, \dots, x_k) , $x_1 \geq 1, x_2 \geq 2, \dots, x_k \geq k$ for all integers satisfying $x_1 + x_2 + \dots + x_k = n$ is: (1996)
44. Using permutation or otherwise, prove that $\frac{n^2!}{(n!)^n}$ is an integer, where n is a positive integer. (2004)
45. In how many ways can a pack of 52 cards be. (1979)
(i) Divided equally among four players in order.
(ii) Divided into four groups of 13 cards each
(iii) Divided in 4 sets, three of them having 17 cards each and the fourth just one card?
46. Six cards and six envelopes are numbered 1,2,3,4,5,6 and cards are to be placed in envelopes so that each envelope contains exactly one card and no card is placed in the envelope bearing the same number and moreover the card numbered 1 is always placed in envelope numbered 2. Then the number of ways it can be done is (2014 ADV.)
(A) 264 (B) 265 (C) 53 (D) 67

Paragraphs for Q.47 and 48.

PARAGRAPH "A"


There are five students S_1, S_2, S_3, S_4 and S_5 in a music class and for them there are five seats R_1, R_2, R_3, R_4 and R_5 arranged in a row, where initially the seat R_i is allotted to the student $S_i, i=1,2,3,4,5$. But, on the examination day, the five students are randomly allotted the five seats. (2018 ADV.)

(There are two questions based on PARAGRAPH "A", the question given below is one of them)

47. The probability that, on the examination day, the student S_1 gets the previously allotted seat R_1 , and NONE of the remaining students gets the seat previously allotted to him/her is:
(A) $\frac{3}{40}$ (B) $\frac{1}{8}$ (C) $\frac{7}{40}$ (D) $\frac{1}{5}$

PARAGRAPH “A”

There are five students S_1, S_2, S_3, S_4 and S_5 in a music class and for them there are five seats R_1, R_2, R_3, R_4 and R_5 arranged in a row, where initially the seat R_i is allotted to the student $S_i, i=1,2,3,4,5$. But, on the examination day, the five students are randomly allotted the five seats.

- 48.** For $i=1,2,3,4$, let T_i denote the event that the students S_i and S_{i+1} **do NOT sit** adjacent to each other on the day of the examination. Then, the probability of the event $T_1 \cap T_2 \cap T_3 \cap T_4$ is: 

- (A) $\frac{1}{15}$ (B) $\frac{1}{10}$ (C) $\frac{7}{60}$ (D) $\frac{1}{5}$

- 49.** The number of 5 digit numbers which are divisible by 4, with digits from the set $\{1,2,3,4,5\}$ and the repetition of digits is allowed, is **(2018 ADV.)**

- 50.** In a high school, a committee has to be formed from a group of 6 boys $M_1, M_2, M_3, M_4, M_5, M_6$ and 5 girls G_1, G_2, G_3, G_4, G_5 . **(2018 ADV.)**

- (i) Let α_1 be the total number of ways in which the committee can be formed such that the committee has 5 members, having exactly 3 boys and 2 girls
- (ii) Let α_2 be the total number of ways in which the committee can be formed such that the committee has at least 2 members, and having an equal number of boys and girls.
- (iii) Let α_3 be the total number of ways in which the committee can be formed such that the committee has 5 members, at least 2 of them being girls
- (iv) Let α_4 be the total number of ways in which the committee can be formed such that the committee has 4 members, having at least 2 girls such that both M_1 and G_1 are NOT in the committee together.

	List-I		List-II
P.	The value of α_1 is	1.	136
Q.	The value of α_2 is	2.	189
R.	The value of α_3 is	3.	192
S.	The value of α_4 is	4.	200
		5.	381
		6.	461

The correct option is:

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|------------|--|------------|--|
| (A) | $P \rightarrow 4; Q \rightarrow 6; R \rightarrow 2; S \rightarrow 1$ | (B) | $P \rightarrow 1; Q \rightarrow 4; R \rightarrow 2; S \rightarrow 3$ |
| (C) | $P \rightarrow 4; Q \rightarrow 6; R \rightarrow 5; S \rightarrow 2$ | (D) | $P \rightarrow 4; Q \rightarrow 2; R \rightarrow 3; S \rightarrow 1$ |