

Dear student following is a Moderate level [O ● O] test paper. Score of 18 Marks in 15 Minutes would be a satisfactory performance. Questions 1-10(+3, -1) (All questions have only one option correct)

- Q.1** If the best and the worst paper never appear together, then six examination papers can be arranged in how many ways -  
 (A) 120 (B) 480  
 (C) 240 (D) None of these
- Q.2** There are 3 candidates for a post and one is to be selected by the votes of 7 men. The number of ways in which votes can be given is-  
 (A)  $7^3$  (B)  $3^7$   
 (C)  ${}^7C_3$  (D) None of these
- Q.3** How many even numbers of 3 different digits can be formed from the digits 1, 2, 3, 4, 5, 6, 7, 8, 9 (repetition is not allowed)  
 (A) 224 (B) 280  
 (C) 324 (D) None of these
- Q.4** The figures 4, 5, 6, 7, 8 are written in every possible order. The number of numbers greater than 56000 is-  
 (A) 72 (B) 96  
 (C) 90 (D) 98
- Q.5** In how many ways n books can be arranged in a row so that two specified books are not together-  
 (A)  $n! - (n - 2)!$  (B)  $(n-1)!(n - 2)$   
 (C)  $n! - 2(n - 1)$  (D)  $(n - 2)n!$
- Q.6** There are 5 roads leading to a town from a village. The number of different ways in which a villager can go to the town and return back, is-  
 (A) 25 (B) 20  
 (C) 10 (D) 5
- Q.7** In a circus there are ten cages for accommodating ten animals. Out of these four cages are so small that five out of 10 animals cannot enter into them. In how many ways will it be possible to accommodate ten animals in these ten cages-  
 (A) 66400 (B) 86400  
 (C) 96400 (D) None of these
- Q.8** The number of 5 digit telephone numbers having at least one of their digits repeated is-  
 (A) 90,000 (B) 100,000  
 (C) 30,240 (D) 69,760
- Q.9** All possible four digit numbers are formed using the digits 0, 1, 2, 3 so that no number has repeated digits. The number of even numbers among them is-  
 (A) 9 (B) 18  
 (C) 10 (D) None of these
- Q.10** The number of ways in which 5 boys and 3 girls can be seated in a row so that each girl is between two boys-  
 (A) 2880 (B) 1880  
 (C) 3800 (D) 2800



MATHEMATICS IIT JEE ( SEPT. 2<sup>nd</sup> WEEK CLASS TEST 3) (PERMUTATION & COMBINATION) ANSWER KEY

Name : ..... Roll No. : .....

	A	B	C	D		A	B	C	D		A	B	C	D
1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	4	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	7	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	5	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	8	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	6	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	9	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
										10	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**ANSWER KEY**

<b>Que.</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<b>Ans.</b>	B	B	A	C	B	A	B	D	C	A

**SOLUTIONS**
**Sol.1 (B)**

If the best and the worst appear always together, the number of ways  $5! \times 2$ .  
Therefore required number of ways

$$6! - 5! \times 2 = 480$$

**Sol.2 (B)**

1<sup>st</sup> man can vote in 3 ways. 2<sup>nd</sup> man can vote in 3 ways.

Similarly all other men can vote in 3 ways individually, hence the total number of ways  $3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 = 3^7$  ways.

**Sol.3 (A)**

The number will be even if last digit is 2, 4, 6 or 8 i.e., the last digit can be filled in 4 ways and remaining two digits can be filled in  ${}^8P_2$  ways. Hence required number of numbers are  ${}^8P_2 \times 4 = 224$ .

**Sol.4 (C)**

Required number of ways =  $5! - 4! - 3!$   
 $120 - 24 - 6 = 90$

[Number will be less than 56000 only if either 4 occurs on the first place or 5, 4 occurs on the first two places].

**Sol.5 (B)**

Total number of arrangements of n books =  $n!$

If two specified books always together then number of ways =  $(n - 1)! \times 2$

$$\begin{aligned} \text{Hence required number of ways} &= n! - (n - 1)! \times 2 \\ &= n(n - 1)! - (n - 1)! \times 2 \\ &= (n - 1)! (n - 2). \end{aligned}$$

**Sol.6 (A)**

The man can go in 5 ways and he can return in 5 ways.

Hence, total number of ways are  $5 \times 5 = 25$ .

**Sol.7 (B)**

At first we have to accommodate those 5 animals in cages which can not ether in 4 small cages, therefore number of ways are  ${}^6P_5$ . Now after accommodating 5 animals we left with 5 cages and 5 animals, therefore number of ways are  $5!$ . Hence required number of ways =  ${}^6P_5 \times 5! = 86400$ .

**Sol.8 (D)**

Using the digits 0, 1, 2, ..... , 9 the number of five digit telephone numbers which can be formed is  $10^5$  (since repetition is allowed)

The number of five digit telephone, numbers which have none of the digits repeated

$$= {}^{10}P_5 = 30240$$

$\therefore$  The required number of telephone numbers

$$= 10^5 - 30240 = 69760.$$

**Sol.9 (C)**

In forming even numbers, the position on the right can be filled either 0 or 2. When 0 is filled, the remaining positions can be filled in  $3!$  ways and when 2 is filled, the position on the left can be filled in 2 ways (0 cannot be used) and the middle two positions in  $2!$  ways (0 can be used). Therefore the number of even numbers formed =  $3! + 2(2!) = 10$ .

**Sol.10 (A)**

First, we seat 5 boys, which can be done in  $5!$  ways  $B \times B \times B \times B \times B$ . Three girls can be seated in places marked 'x' in  ${}^4P_3$  ways.

$$\therefore \text{Total ways} = 5! \cdot {}^4P_3 = 2880.$$