MATHS

BOOKS - MTG WBJEE MATHS (HINGLISH)

PERMUTATIONS AND COMBINATIONS

Wb Jee Workout Category 1 Single Option Correct Type

1. The value of the expression

$$\binom{26}{4} + \binom{31}{4} + \binom{30}{4} + \binom{29}{4} + \binom{28}{4} + \binom{27}{4} + \binom{26}{5}$$

equal

A. $\binom{32}{4}$

B. $\binom{32}{5}$

C. $\binom{32}{5}$

D. $\binom{31}{5}$

Answer: B

2. If $\begin{pmatrix} 10 \\ x-1 \end{pmatrix} > 2\begin{pmatrix} 10 \\ x \end{pmatrix}$,then

A. $x \varepsilon$ [2,9]

B. x=8,9,10

C. $x \varepsilon$ [6,10]

D. None of these

Answer: B

3. There are 15 bulbs in a room .Each one of them can be operated independently .The number of ways in which the room can be lighted

A. $8^5 - 1$

B. $(32)^2 - 1$

C. $(32)^4 - 1$

D. $8^4 - 1$

Answer: A

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4. Ten different letters of an alphabet are given.Words with five letters are formed from these given letters .Then the number of words which have at least one letter repeated is

A. 69760

B. 24320

C. 99777

D. Non of these

Answer: A

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5. The remainder obtained when

1!+2!+3!+.......+100 ! Is divided by 12 ,si

A. 7

B. 6

C. 8

D. 9

Answer: D

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6. The values of $\sum_{r=1}^{10} r\, P\,(r,r)$ i

A. P(11,11)

B. P(11,11)-1

C. P(11,11)+1

D. None of these

Answer: B

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7. Number of 4 digit numbers $b_1b_2b_3b_4$ such that $b_1 > b_2 > b_3 > b_4$ is equal to

A. 84

B. 260

C. 210

D. 720

Answer: C

8. The value of the expression

$$^{23}C_6 \sum_{j=1}^{5} {}^{28-j}C_5 + \sum_{k=1}^{5} {}^{33-k}C_{28-k} \text{ is}$$

A. $^{33}C_6$

B. $^{23}C_{16}$

C. $^{33}C_7$

D. None of these

Answer: A

9. If $\dfrac{^nP_r - 1}{a} = \dfrac{^nP_r}{b} = \dfrac{^nP_r + 1}{c}$,then which of the following hold good?

A. C^2=a(b+c)

B. $a^2 = c(a + b)$

C. $b^2 = a(b + C)$

D. $\dfrac{1}{a} + \dfrac{1}{b} + \dfrac{1}{c} = 1$

Answer: C

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10. The number of permutations from the letter A to G so that neither the set BEG nor CAD appears is

A. $\dfrac{7!}{(3!)^2}$

B. $3! \times (3^2) \times 89$

C. $\dfrac{7!}{(3!)^3}$

D. None of these

Answer: B

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11. A child atttempts to open a five disc-lock.He takes 5 seconds time to dial a particular number on the disc.If he does so for 5 hrs .Every day,then the numbers of days he would be sure to open the lock is

A. 30

B. 28

C. 27

D. 25

Answer: B

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12. The interior angles of a regular polygon measure $120°$ each.The number of diagionals of the polygon is

A. 9

B. 15

C. 44

D. 35

Answer: A

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13. Number of permutations of 10 different objects taken all at a time in which particular 4 never comes together is

A. $10! \times 4!$

B. 10!-4!

C. $\dfrac{7!6!}{4!}$

D. 10! -7! 4!

Answer: D

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14. if $\sum\limits_{r=1}^{m} \left(r^2 + 1\right)r! = 100 \times 101!$ then m equals

A. 100

B. 101

C. 102

D. None of these

Answer: A

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15. The straight lines $l_2 || l_2 || l_3$ and lies in the same plane A total of m points are taken on l_1 ,n points on l_2 and k point on l_3, then maximum number of triangles formed with vertices at these points are

A. $^{m+n+k}C_3 - \left(^{m}C_3 + {}^{n}C_3 + {}^{k}C_3\right)$

B. $^{m}C_3 + {}^{n}C_3 + {}^{k}C_3$

C. $^{m+n+k}C_3$

D. none of these

Answer: A

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16. In a town ,no two persons have identical set of teeth and there is no person without a teeth.Also no person has more than 32 teeth.If we disregard the shape and size of tooth and consider only the positioning of teeth then maximum population of town is

A. 2^{32}

B. 32^2

C. $2^{32} - 1$

D. $2^{32} + 1$

Answer: C

17. The number of signals that can be given using any number of flags by 5 different colours ,is

    A. 225

    B. 325

    C. 215

    D. 315

Answer: B

18. The number of divisors of the form 4n +2 (n $\geq$ 0) of the integer 240 is

    A. 10

B. 6

C. 4

D. 8

Answer: C

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19. Let A be the set of n ($\geq$ 3) distinct elements.The number of triplets

(a,b,c) of the elements of A in which at least co-ordinates are equal is

A. P_3

B. $n^3 - {}^nC_3$

C. $3n^2(n-2)$

D. n(3n-2)

Answer: D

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20. Number of diagonals in a decagon is

A. 45

B. 36

C. 46

D. 35

Answer: D

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21. $^{2n}P_n$ is equal to

A. $(n+1)!\left(^{2n}C_n\right)$

B. $n! \times \left(^{2n}C_n\right)$

C. $n! \times \left(^{2n+1}C_n\right)$

D. $n! \times \left(^{2n+1}C_{n+1}\right)$

Answer: B

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22. The letters of the word 'TRIANGLE` are arranged in all possible ways .How many of thm begin with A and end with N?

A. 120

B. 720

C. 1680

D. 60

Answer: B

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23. Out of 8 given points .3 are collinear.How many different straight lines can be drawn by joining any two points from those 8 points ?

A. 26

B. 28

C. 27

D. 25

Answer: A

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24. How many odd number of six significant digits can be formed with the

digits 0,1,2,5,6,7 when no digit is repeated?

A. 120

B. 96

C. 360

D. 288

Answer: D

25. A polygobn has 44 diagonals .The number of the sides is

    A. 10

    B. 11

    C. 12

    D. 13

Answer: B

26. If $^{n-1}C_3 + ^{n-1}C_4 > {}^nC_3$ then n is just greater than integer

    A. 5

    B. 6

    C. 4

D. 7

Answer: D

27. For $4 \le r \le n$

$$\binom{n}{r} + 4\binom{n}{r+1} + 6\binom{n}{r+2} = 4\binom{n}{r+3} + \binom{n}{r+4} \text{ equals}$$

A. $\binom{n+4}{r+4}$

B. $\binom{n+4}{r}$

C. $\binom{n+3}{r-1}$

D. $\binom{n+4}{r+3}$

Answer: A

28. Number of way in which a composite number N can be resolved into two factors which are co-prime to each other if N is of the form $2^2 3^2 5^2 7^2$,is

    A. 2

    B. 2^2

    C. 2^4

    D. 2^3

Answer: D

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29. A 5 -digit number divisble by 30 us to be formed using the digits 0,1,2,3,4,5 without repetition to the digit.The numbers of ways it can be done is

    A. 36

B. 24

C. 48

D. 60

Answer: B

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30. How many different numbers each of the six digit can be formed using the digit 1,2,1,2,3,3, ?

A. 90

B. 92

C. 88

D. 94

Answer: A

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1. A zoo has 20 zebras ,12 jiraffes ,11 lions and 3 tigers.The number of ways a tourist can visit these animals so that he must see at least one tiger

A. $21 \times 13 \times 12 \times 3$

B. 7.2^{43}

C. $7.21 \times 13 \times 12 - 1$

D. 6.2^{43}

Answer: B

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2. the number of ordered triplets of positive integers which stisfies th einequality $15 < x + y + x \le 45$

A. $^{45}C_2 - {}^{12}C_2$

B. $^{45}C_3 - {}^{14}C_3$

C. $^{46}C_3 - {}^{15}C_3$

D. None of these

Answer: B

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3.   If

$$\frac{{}^nC_r + 3 {}^nC_{r+1} + 3 {}^nC_{r+2} + {}^nC_r + 3}{{}^nC_r + 4 {}^nC_{r+1} + 6 {}^nC_{r+2} + 4 {}^nC_{r+2} + 4 {}^nC_{r+3} + {}^nC_r + 4} = \frac{r + k}{n + k}$$

,then the value of k equals

A. 1

B. 2

C. 4

D. None of these

Answer: C

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4. Number of four letter words consisting equal number of vowels and consonants,(repetition,being,allowed) is

    A. 11025

    B. 210×243

    C. 105×243

    D. None of these

Answer: D

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5. The number of ways of selecting 10 balls out of an unlimited number of white,red ,blue and green balls is

A. 270

B. 280

C. 286

D. 90

Answer: C

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6. In an examination of 9 papers,a candidate has to pass in more papers than the number of papers in which he fails in order to get the success.The number of ways in which he can be failed is

A. 128

B. 256

C. 255

D. $9 \times 8!$

Answer: B

7. A delegation of four friends is to be selected from a group of 12 friends .The number of ways,the delegation be selected if two particular friends redused to be together and two other particular friends wish to be together only in the delegation is

A. 226

B. 114

C. 156

D. 170

Answer: A

8. Number of triangle formed by joining the vertices of n sided polygn which has no side common with that on the polygon is

A. $\dfrac{n(n-3)}{\cdot}(2)$

B. $\dfrac{(n-4)(n-5)}{3!}$

C. $\dfrac{n(n-4)(n-5)}{3!}$

D. None of these

Answer: C

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9. The number of ways of selecting 6 books from a library which has 8 books each on History ,Civies,Economics and Geography is

A. 36

B. 84

C. 66

D. None of these

Answer: B

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10. The number of ways in which 6 different nuts can be used in machine left without the nut is

A. 540

B. 180

C. 270

D. None of these

Answer: A

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11. In a certain test there are n questions .In this test 2^{n-1} students gave the wrong answers to at least I questions,where i=1,2,3 ...,n-1 n.If total number of wrong answer given is 2047 ,then n is equal to

A. 10

B. 11

C. 13

D. 12

Answer: B

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12. The different number of words formed by using the letters 4A's ,2C"s,1H,1D,1B if both C, do not occur together ,are

A. 7560

B. 1680

C. 60

D. 5880

Answer: D

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13. The value of the expression

$$2^k \binom{n}{0}\binom{n}{k} - 2^{k-1}\binom{n}{1}\binom{n-1}{k-1} + 2^{k-2}\binom{n}{2}\binom{n-2}{k-2} \cdots \cdots + (-1)^k$$

i

A. $\binom{n}{k}$

B. $\binom{n+1}{k}$

C. $\binom{n+1}{k+1}$

D. $\binom{n-1}{k-1}$

Answer: A

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14. The number of integral solutions to the system of equations $a_1 + a_2 + a_3 + a_4 + a_5 = 25$ and $a_1 + a_2 + a_3$ 10 are

A. $2^8 + 2^5$

B. $2^{10} + 2^5$

C. $2^{25} + 2^{10}$

D. None of these

Answer: B

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15. The numbers of ways of arranging the word 'ARRANGE' so that neither 2A's nor 2R's occur together are

A. 900

B. 240

C. 660

D. 71

Answer: C

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1. If $^nC_r + 3\,^nC_{r+1} + 3\,^nC_{r+2} + {}^nC_{r+3} = {}^{15}C_9$,then which of the following is true?

A. n=12

B. r=6

C. r=3

D. n=11

Answer: A::B::C

2. The value of the expression $\sum\limits_{r=0}^{n}\sum\limits_{p=0}^{n} {}^{n}C_{r}{}^{r}C_{p}$ equals

A. $2^{n}-1$

B. $3^{n}-1$

C. $n+2^{-n}-1$

D. $n-2^{n}-1$

Answer: B

3. The number of rectangles excluding squares from the rectangle of size 8×7 is

A. 784

B. 840

C. 896

D. None of these

Answer: B

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4. If n is an integer greater than 1,than the value of

$a - {}^nC_1(a-1) + {}^nC_2(a-2) + \ldots\ldots + (-1)^n \cdot {}^nC_n(a-n)$ is

A. a^n

B. $(-a)^n$

C. 0

D. 1

Answer: C

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5. If $^nC_4$, $^nC_5$ and $^n{_-}(C)6$ are in A.P., then n is

A. 3

B. 7

C. 14

D. 4

Answer: B::C

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6. A vehicle registration numebr consists of 2 letters of English alphabet followed by 4 digits,where the first digit in not zero.Then the total number of vehicles with distinct registration number is

A. $26^2 \times 10^4$

B. $^{26}P_2 \times {}^{10}P_4$

C. $^{26}P_2 \times 13 \times {}^6P_6$

D. $26^2 \times 9 \times 10^3$

Answer: D

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7. The number of words that can be made with the letters of the word CALCULATE such that suceach word starts and ends a consonant, is

A. $\dfrac{5 \times 7!}{2}$

B. $\dfrac{3 \times 7!}{2}$

C. $2 \times 7!$

D. 12600

Answer: A::D

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8. The number of ways of arranging n (> 2) distinct objects in a line so that two particular objects are never together is

A. $(n - 2)!^{n-1}P_2$

B. n!-(2(n-1))!

C. 2(n-1)!

D. none of these

Answer: A::B

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9. How many numbers between 5000 and 10000 can be formed using the digits 1,2,3,4,5,6,7,8,9 each digit appearing not more than once in each number?

A. $5 \times {}^{8}P_3$

B. $5 \times {}^{8}C_8$

C. $5! \times {}^8P_3$

D. $5 \times {}^8C_3 \times 3!$

Answer: A::D

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10. 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

A. 75

B. 150

C. 210

D. $3^5 - \left({}^3C_1 \times 2^5 - {}^3C_2\right)$

Answer: B::D

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1. Eleven apples are distributed between a girl and a boy.Then which one of the following statements is true?

    A. Atleast one of them will receive 7 apples.

    B. The girl receives atleast 4 apples or the boy receives at least 9 apples.

    C. The girl receives atleast 5 apples or the boy receives atleast 8 apples

    D. The girl receives atleast 4 apples or the boy receives atleast 8 apples.

Answer: D

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2. Out of 7 consonants and 4 vowels,the number of words (not necessarily meaningful)that can be made,each consisting of 3 consonants and 2 vowels,is

A. 24800

B. 25100

C. 23200

D. 25400

Answer: C

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3. The number of ways in which the letters of the word ARRANGE can be permuted such that the R,s occur together is

A. $\dfrac{7!}{2!2!}$

B. $\dfrac{7!}{2!}$

C. $\dfrac{6!}{2!}$

D. $5! \times 2!$

Answer: C

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4. If $\dfrac{1}{^{5}C_r} + \dfrac{1}{^{6}C_r} = \dfrac{1}{^{4}C_r}$, then the value of r equals to

A. 4

B. 2

C. 5

D. 3

Answer: B

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5. The number of all numbers having 5 digits, with distinct digits is

A. 99999

B. $9 \times {}^9P_4$

C. ${}^{10}P_5$

D. ${}^9P_4$

Answer: B

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6. The greatest integer which divides (p+1) (p+2) (p+3) .....(p+q) for all p ε

N and fixed q ε N is

A. p!

B. q!

C. p

D. q

Answer: B

7. The number of selection of n objects from 2n objects of which n are identical and the rest are different is

A. 2^n

B. 2^{n-1}

C. $2^n - 1$

D. $2^{n-1} + 1$

Answer: A

8. If $(2 \leq r \leq n)$, then $^nC_r + 2\,^nC_{r+1} + \,^nC_{r+2}$ is equal to

A. 2. $^{n}C_{r+2}$

B. $^{n+1}C_{r+1}$

C. $^{n+2}C_{r+2}$

D. $^{n+1}C_{r}$

Answer: C

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9. A candidate is required to answer 6 out of 12 questions which are divided into two parts A and B,each containing 6 questions and he/she is not permirred to attempt more than 4 question from any part .In how many different ways can he/she make up his/her choice of 6 questions?

A. 850

B. 800

C. 750

D. 700

Answer: A

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10. There are 7 greeting cards,each of a different colour and 7 envelopes of same 7 colours as that of the cards .The number of ways in which the cards can be put in envelopes,so that exactly 4 of the cards go into envelopes of respective colour ,is

A. $^7C_3$

B. $2. \, ^7C_3$

C. $3!^4C_4$

D. $3!^7C_3^{\ 4}C_3$

Answer: B

1. If x and y are digit such that

17! =3556 xy 428096000,then x+y equals

    A. 15

    B. 6

    C. 12

    D. 13

Answer: A

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2. The letters of the word COCHIN are permuted and all permutations are arranged in an alphabetical order as in an English dictionary.The number of words tha appear before the word COCHIN is

    A. 96

B. 48

C. 183

D. 267

Answer: A

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3. If $^{n}C_{r-1}=36$, $^{n}C_{r}= 84$ and $^{n}C_{r+1}=126$, then the value of $^{n}C_{8}$ is

A. 10

B. 7

C. 9

D. 8

Answer: C

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4. From a collection of 20 consecutive natural numbers,four are selected such that they are not consecutive .The number of such selections is

    A. 284×17

    B. 285×17

    C. 284×16

    D. 285×16

Answer: A

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1. On the occasion of Dipawali festival ,each student of a class sends greeting cards to others.If there are 20 students in the class, the numbers of cards send by student is

A. $^{20}C_2$

B. $^{20}P_2$

C. $2 \times {}^{20}C_2$

D. $2 \times {}^{20}P_2$

Answer: B::C

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