MASTER’S P.U COLLEGE, HASSAN, 573201.

KCET ONLINE TEST-29, MAY-2020  **MATHEMATICS**  **TIME: 45Mins MARKS: 30**

**TOPIC**: **PERMUTATIONS & COMBINATIONS, BINOMIAL THEOREM, AREAS . DATE: 27/05/2020**

**KEY**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **A** | **C** | **B** | **C** | **C** | **B** | **C** | **D** | **C** | **C** | **B** | **A** | **A** | **C** | **A** |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| **C** | **B** | **B** | **B** | **B** | **C** | **B** | **B** | **B** | **B** | **B** | **C** | **B** | **C** | **A** |

**HINTS AND SOLUTIONS**

1. (a) .
2. (c) The number of ways that the candidate may select 2 questions from  and 4 from 

3 questions from  and 3 from 

4 questions from  and 2 from 

Hence total number of ways are 200.

1. (b) The total number between 10 and 1000 are 989 but we have to form the numbers by using numerals 0 is not occuring so the numbers containing any ‘0’ would be excluded *i*.*e*.,

Required number of ways



.

**Aliter :** Between 10 and 1000, the numbers are of 2 digits and 3 digits.

Since repetition is allowed, so each digit can be filled in 9 ways.

Therefore number of 2 digit numbers 

and number of 3 digit numbers 

Hence total ways .

1. (c) 

Three vowels can be arrange at 6 places in  ways. Hence the required number of arrangements .

1. (c) Since number of derangements in such a problems is given by 

 Number of derangements are =.

1. (b)   .
2. (c) The total number of words .

The number of words in which BH come together are .

Hence required number of ways in which  and  never came together are .

1. (d) Out of 10 persons,  is in and  and  are out of the team, so we have to select 4 more from 7 remaining. This can be done in  ways. These 5 persons can be arranged in a line in  ways. Hence the number of possible arrangements is .
2. (c) Since 5 does not occur in 1000, we have to count the number of times 5 occurs when we list the integers from 1 to 999. Any number between 1 and 999 is of the form . The numbers in which 5 occurs exactly once .

The numbers in which 5 occurs exactly twice=

The numbers in which 5 occurs in all three digits 

Hence, the number of times 5 occurs is .

1. (c) Let  denote the exponent of 3 in . The greatest integer less than 100 divisible by 3 is 99.

We have 



Now  

and 



Thus .

1. (b) Seven boys can be seated in a row in  ways. Hence the total no. of arrangement such that no two girls seated together .
2. (d) Expression  .
3. (c) Since (*n*+2)th term is the middle term in the expansion of , therefore .

Since (*n*+1)th and (*n*+2)th terms are middle terms in the expansion of (1+*x*)2n+1, therefore  and  But  

1. (b)  Number of terms = 100;

∴ Coefficient of *x*99 =  =  =  ==– 5050.

1. (a)  Hence coefficient of .
2. (a) In the expansion of , the general term is 

For *x*7, we must have 22 – 3*r* = 7 ⇒ *r* = 5, and the coefficient of *x*7 =

Similarly, in the expansion of  the general term is 

For *x*–7 we must have, 11 – 3*r* = –7 ⇒ *r* = 6, and the coefficient of is .

As given, .

1. (c) 

For coefficient of *x*, 

Hence, 

According to question, .

1. (a) ****

If  is independent of *x*, then .

So term independent of 

1. (c) ** **
2. (b) Accordingly, ⇒ 

**

*Y*

*y* = *mx*

1–*m*

*O*

*X*

1. (b) The equation of curve is   ⇒ 

This is a parabola whose vertex is 

Hence point of intersection of the curve and the line *i*.*e*.,or





∴ 

Also,  ⇒ ⇒ 

⇒ ⇒ 

*i.e.*, *m* is imaginary

Hence, .

1. (b) Curve  is symmetrical about *x*-axis and passes through origin. Also for or . So curve does not lie in and  curve lies wholly on .

*x =* 2*a*

*X*

*O*

*Y*

Area , (Put 

, (Applying Gamma function).

1. (b) Solving the equations,

*C*

*B*

*A*

*O*

*Y*

*X*

 …..(i)

 …..(ii)

Put  in (i),



⇒ 

*i.e.*, or 1

 gives imaginary value of *y* for equation (ii) hence neglected.

 and 

Required area = 2 times the hatched areas

 

 

.

1. (b) The lines are 

1

1

1

1

*y* = – *x* + 1

*y* = *x* + 1

*y* = *x* – 1

*y* = – *x* – 1

*Y*

*X*

, , 

Area .

1. (c) Required area 

(0,0)

(*a*28/3, 27/3*a*)

*Y*

*X*

1. (b)

*y = – x*

*y = x*2

*Y*

(*–*1*,*1)

(1*,*1)

### X

*y = x*

Required area = 2 (shaded area in first quadrant)

=.

1. (c) Given equations of curves  and  and ordinates  to We know that area bounded by the curves 





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1. (a) Area of the circle in first quadrant is *i*.*e*., . Also area bounded by curve and -axis is 2 *sq*. *unit*. Hence required area is .