Question Paper of University of Pune MCA Entrance - 2017

1. The number of multiples of 3 and 7 below 1000 is
   (a) less than 200 (b) between 201 and 250
   (c) between 251 and 300 (d) None of these

2. A integer is selected at random from among all the integers between 100 and 999, then the probability that a selected number has atleast one of three digit is 9 is
   (a) $\frac{6}{15}$ (b) $\frac{1}{3}$ (c) less than $\frac{1}{3}$ (d) greater than $\frac{1}{3}$

Consider the following function

$$f(n) = \begin{cases} 1 & \text{if } n = 1 \\ g(n) + f(n-1) & \text{otherwise} \end{cases}$$ and

$$g(n) = \begin{cases} 1 & \text{if } n = 1 \\ n + g(n-1) & \text{otherwise} \end{cases}$$

3. The value of f(10) is v, then
   (a) $v < 100$ (b) $201 \le v \le 300$ (c) $101 \le v < 200$ (d) None of these

4. The value of f(30) is v then
   (a) $v < 1000$ (b) $1001 < v < 2000$
   (c) $2001 < v < 3000$ (d) None of these

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5. Consider the set of equation given by $2x + 3y - z = 6$, $ky + \frac{z}{x} = 1$, and $k^2y + k^2z = 1$ where k is an integer not equal to 0, the set equationunique solution
   (a) infinite value of k
   (b) exactly one value of k
   (c) more than 1, but infinitely many values of k
   (d) N values of k

6. Consider the set equations given by $2x + 3y - z = 6$, $ky + \frac{z}{k} = 1$, and $k^2y + k^2z = 1$ where k is an integer not equal to 0, the set of equation has no solution
   (a) infinite value of k
   (b) exactly one value of k
   (c) more than I, but infinitly many value of k
   (d) N value of k

7. Consider the set of equations given by $2x + 3y - z = 6$, $ky + \frac{z}{k} = 1$, and $k^2y + k^2z = 1$ where k is an integer not equal to 0, the set of equation has Infinite solution
   (a) infinite value of k
   (b) exactly one value of k
   (c) more than 1, but infinitly many values of k
   (d) N values of k

8. Let $1 \le m \le n \le p$, the number of subsets of the set A = {1, 2, 3,.....p} having m, m as the least and the greatest element respectively is
   (a) $2^{n-m} - 1$ (b) 2^{n-m-1} (c) 2^{n-m} (d) None of these

9. In constructing a problem on vectors the three components of vector are chosen randomly from the digit 0 to 5 with replacement. The probability that the magnitude of the vector is 5,
   (a) $\frac{1}{6}$ (b) $\frac{1}{12}$ (c) $\frac{1}{24}$ (d) $\frac{1}{25}$

Consider the following arrangement of numbers the sum of numbers on line 1 is 1, sum of number line 2 is 8, sum of number of line 3 is 26 and so on....

```
                1
            3   2   3
        6   5   4   5   6
   10   9   8   7   8   9   10
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Based on this next two question are

10. The smallest line number for which the sum of numbers on that line exceeds 1000000 is v, then
    (a) $1000 \le v \le 1500$ (b) $1501 \le v \le 3000$
    (c) $3001 \le v \le 5000$ (d) None of these

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11. If we arrange all numbers in the triangle shown above in ascending order then we get following list 1, 2, 3, 3, 4, 5, 5, 6, 6, 7, 8, 8, 9, 9, 10, 10 and we can see that the position of number 8 in this list is 12. Then the position of 100 in the list if we arrange all number in the triangle with 2017 rows in ascending order in a list, is
    (a) less than 200 (b) between 201 and 1000
    (c) between 10001 and 1000000 (d) None

12. Seven digit from the numbers 1, 2, 3, 4, 5, 6, 7, 8, 9 are chosen at random then the probability that a number formed of 7 digit r_7, and r_7 is divisible by 9 is
    (a) $\frac{2}{9}$ (b) $\frac{7}{36}$ (c) $\frac{1}{9}$ (d) $\frac{7}{12}$

13. Three couples meet from lunch two days after deepawali. It is so happened that each husband was the brother of one of the wives and each wife was the sister of the husbands; that is their were three brother – sister pairs in the groups. The following facts are known about this group.

Hema was exactly 26 weeks older than her husbands who was born in august.

Mr. Wagh's sisters, who was married to Hema's brother's brother in law married him on her birthday, which was in January.

Madhwi Wagh was not as tell as Vishal Bhargav.

Anant's sisters was taller than Bina.

Jiten was 50 years olds.

Then the first name of Mrs. Batliboi.

(a) was Bina (b) was Hema (c) was Madhvi (d) cannot determined

14. If R be the number of ways of choosing triplet (x, y, z) such that z is greater than equal to may (x, y, z) and x, y, z $\in$ {1, 2, 3.... n, n + 1} then which one of the following is not correct expression are

(a) $\binom{n+1}{3}+\binom{n+2}{3}$ (b) $\binom{n+1}{2}+2\binom{n+1}{3}$

(c) $1^2 + 2^2 + 3^2 + ... n^2$ (d) $2\binom{n+1}{3}-\binom{n+1}{2}$

15. Consider the following equation TEN + TEN + FOURTY = 60 where each letter represents a different digit then the value of represented by TRYHARD is

(a) less than 740000

(b) between 7400000 to 8600000

(c) Data insufficient

(d) None of these

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16. Let α and β be the roots of $2x^2 - 3x + 4 = 0$ the sum of the roots of the quadratic, whose roots are the reciprocal of roots of the given equation is

(a) $\frac{3}{4}$ (b) $\frac{3}{2}$ (c) $-\frac{3}{2}$ (d) $-\frac{3}{4}$

17. The greatest integer which divides nl + 1, whose n belongs to set of natural numbers and $n \geq 3$ is

(a) 2 (b) 3 (c) n (d) None of these

18. Let frac(x) represents the fraction part of x then frac$\left(\frac{5^{200}}{8}\right)$ is

(a) $\frac{1}{4}$ (b) $\frac{1}{8}$ (c) $\frac{3}{8}$ (d) $\frac{5}{8}$

19. Which is not correct ?

(a) the greatest integer less than equal to $\left(\sqrt{2}+1\right)^6$ is 197

(b) the integer next above $\left(\sqrt{3}+1\right)^{2n}$ contains 2^{m+1} as a factor

(c) The greatest integer less than equal to $4\left(\sqrt{3}+7\right)^m$ is a multiple of 2

(d) If $R=6\left(\sqrt{6}+4\right)^{2n+1}$ and f is the fractional part of R, the product of R and f is 20^{2n+1}

20. Three critics review a book. Odds in favour of the books are 5 : 3, 4 : 3, and 3 : 4 respectively. For the three critics. The probability that majority are in favour of the books is

(a) $\frac{35}{49}$ (b) $\frac{125}{343}$ (c) $\frac{164}{343}$ (d) $\frac{209}{343}$

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21. $r > 1$ and $n > 2$ are positive integers given that (3r)th and (r + 2)th term in the binomial expansion of $(1 + x)^{2n}$ are equal then

(a) $n = 2r$ (b) $n = 2r + 1$ (c) $n = 3r$ (d) None of these

22. There are 10 points in a plane of these no three are collinear but 4 points are concyclic. The number of circles that can be drawn through atleast three points of these is

(a) 116 (b) 120 (c) 117 (d) None of these

23. In a binomial expansion of $(a - b)^n$, $n \geq 5$, the sum of the 5th and 6th term is zero. Then $\frac{a}{b}$ equals

(a) $\frac{n-5}{6}$ (b) $\frac{n-4}{5}$ (c) $\frac{6}{n-5}$ (d) $\frac{5}{n-4}$

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24. In a certain code language CATALYST is coded is 242672616287 then ANZYME

(a) 5142625135 (b) 2213121422 (c) 2214121422 (d) 5142625145

25. The number of ways of selecting n things from 3n things of which n are one kind and alike, and n are of second kind and alike and rest are unlike is

(a) $(n + 2)2^{n-1}$ (b) $\binom{3n}{n}$ (c) $\binom{3n}{n} - \binom{2n}{n}$ (d) 3n

26. $\lim_{x \to 0^+} (2x)^x$

(a) 1 (c) 0 (c) does not exits (d) None of these

27. $\lim_{x \to \infty} \frac{\sqrt{16x+1}}{\sqrt{x+2}}$ is

(a) 16 (b) 8 (c) 4 (d) None of these

28. The sum of the numbers of the line 200 is

(a) less than 4000000 (b) between 4000001 and 7000000
(c) between 7000001 and 8000000 (d) None of these

29. If $a \in [-20, 0]$, then the probability that the graph of the function $y = 16x^2 + 8(a + 5)x - 7a - 5$ is strictly above the x axis is

(a) $\frac{7}{20}$ (b) $\frac{13}{20}$ (c) $\frac{17}{20}$ (d) $\frac{3}{20}$

30. A pack of cards is counted face downwards and it found that two cards are missing. Two cards are drawn and are found to be spade. The probability that the missing card is spade is

(a) $\frac{55}{2359}$ (b) $\frac{56}{2359}$ (c) $\frac{56}{2360}$ (d) $\frac{55}{2360}$

31. If points x and y are chosen randomly from the interval [0, 2] and [0, 1] respectively, then the probability that $y \leq x^2$ is

(a) $\frac{1}{2}$ (b) $\frac{2}{3}$ (c) $\frac{3}{4}$ (d) $\frac{1}{4}$

32. The value of a and b so that the coefficient of x^n in the expansion of $\frac{(ax+b)}{(1-x)^2}$ may be (2n + 1) are

(a) 1, 1 (b) 1, 2 (c) 2, 3 (d) None of these

33. Consider the following equation ADA + MODULA + MODULA2 = HASKELL where each letter represents a different digit, then the value of represented by DESKTOP is

(a) less than 2468000 (b) between 2468001 and 3468000

(c) Data insufficient (d) None of these

2	6	2	5
3	10	11	1
2	X	12	5
1	2	7	3

34. Assuming that there is no noise is the given data, the value of x

(a) 13 (b) 12 (c) 9 (d) 6

35. Consider the spiral arrangement of the numbers that start with zero and go on increasing by 1 to from a matrix shown below is such a 5 × 6 matrix with elements from 0 through 29

20	21	22	23	24	25
19	06	07	08	09	26
18	05	0	01	10	27
17	04	03	02	11	28
16	15	14	13	12	29

Now consider such a 100 × 100 matrix and consider the sum of each row of this matrix. The minimum sum value obtained in all such sums will be

(a) between 1000 and 1500 (b) between 1501 and 3000

(c) between 3001 and 5000 (d) None of these

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B	5	Q
#		4
5	1	C

36. Assuming that there is no noise the value of # should be

(a) 6 (b) 7 (c) 0 (d) 1

DESC 1

You go on a land where there are two types of people those who are computer scientist and those who are not computer scientist. In computer science group there are people who like maths and who does not like maths. Those computer scientist who like maths always say

truth and those who doesn't like maths always lie. Other than these the person who does not like computer science and mathematics always say true and remaining always lie.

37. You meet a person M on desk 1, he tells you that his friend N told him "He lies yesterday". Then
 (a) you can surely deduct that M is liar.
 (b) you can surely deduct that N is liar
 (c) firmly say you cannot decide anything from the given data
 (d) None of these

38. A person on desk 1, tells you that "He is a computer scientist and like maths" then
 (a) you can surely deduct that he is not a computer scientist
 (b) you can surely deduct that he is not a computer scientist
 (c) firmly say we cannot deduct anything from given data
 (d) None of these

39. You meet a person on desk 1, she makes two statements
 (a) you can surely deduct that she is a computer scientist
 (b) you can surely deduct that she is not a computer scientist
 (c) you cannot deduct anything from the given data
 (d) None of these

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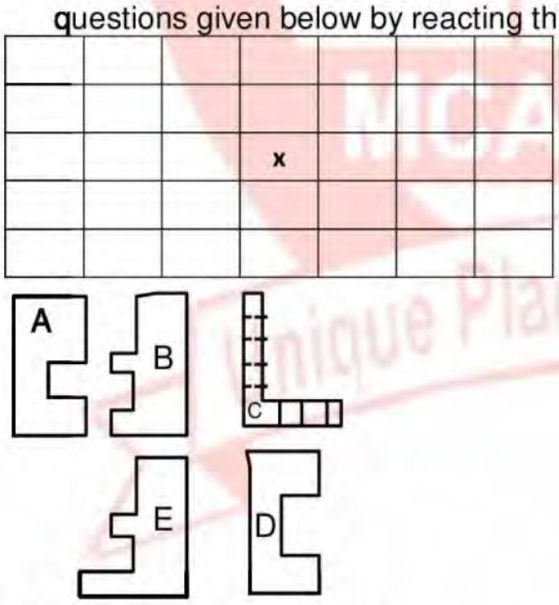
Here in the given grid you have to arrange these above given blocks these blocks are to be arranged in this way that you cannot rotate, turn around or flip it answer the two following questions given below by reacting this then the grid is of size 7 × 5



40. Then in which part 'x' lies
 (a) B (b) D (c) E (d) None of these

41. There are how many cases to arrange the gride
 (a) 0 (b) 1 (c) 3 (d) None of these