Welcome Quiz for Freshers, 2020

Department of Software Engineering

Shahjalal University of Science and Technology

Total Marks: 1000 **Time: 3600 seconds**

(Answer all the questions in the spaces provided on the question sheets)

Name : _____

Registration No. :	**2**	**0**	**1**	**9**	**8**	**3**	**1**	**0**		

1. 10101010 + 10101010101 = ?

   Ans :

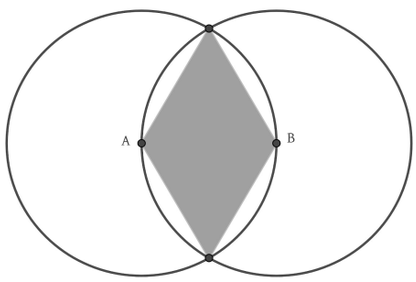
2. How many trailing zeros are there in the decimal value of **2020!** (2020 factorial) ?

   Ans :

3. Take a **3** digit number. Reverse it. Now subtract the smaller one from the other one. Reverse the result. Add it to the result. What is the probability of the result to be **1089** ?

   Ans :

4. In the figure below, both the circles have a radius of **4** meters. Both the circles pass through the center of each other. Calculate the area of the filled region.

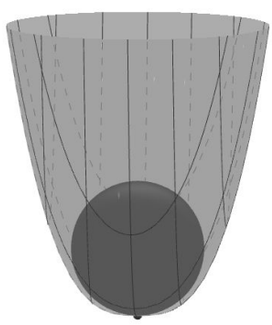


   Ans :

5. What is the greatest possible number comprising of 5 digits, when divided by each 16, 24, 30 and 36 will always give remainder of 10 ?

   Ans :

6. A sphere with radius **R** is placed in a cup, which has axially symmetrical shape formed by rotation of $y = x^3$ curve. What is the maximum possible value of **R** if the bottom of the sphere touches the bottom of the shape ?



   Ans :

7. If there exists only one ordered pair of natural numbers (x, y) for which $x^3 - y^3 = xy + 61$, then xy = **?**

   Ans :

8. What are the **last two** digits of 5^{19} ?

   Ans :

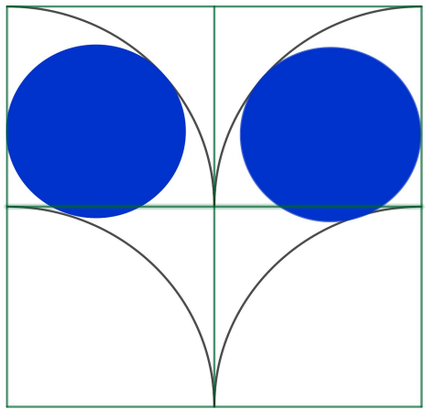
9. You are very fond of hare and you bought one pair of new born hare in January, 2020.
Hares start breeding when their age is 2 years and one pair of hares give birth one pair of new offsprings each year after they are matured (when they are at least 2 years old).
You have to find the number of pairs of hares you will have in January, 2030. You can assume no hare dies by this time.

Ans :

10. $\frac{1}{2^0} + \frac{2}{2^1} + \frac{3}{2^2} + \frac{4}{2^3} + \cdots \frac{n+1}{2^n} = f(n)$, $f(1021) = ?$

Ans :

11. Here the length of the side of the large square is **8**. The square is divided into **4** equal squares and in each square a quarter arc is drawn . Each of the two circles are just touching the two arcs and a side as shown. What is the area of each circle?



Ans :

12. Find the **remainder** when **-31** is divided by **11**.

Ans :

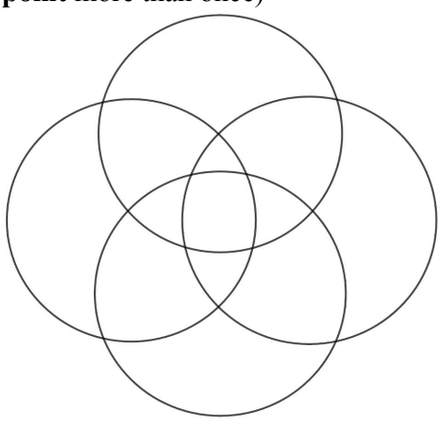
13. So, you have heard about Coronavirus, the recent epidemic. Suppose **1**% of the population are infected with it. A special medical test has been created to determine whether a subject has it or not. The test has a **98**% accuracy for positive results and **97**% accuracy for negative results.
Now you took the test and the result is positive. What are the chances of you being actually infected? [Don't panic]

Ans :

14. If you choose two diagonals of a regular **octagon**, find the probability that they intersect with each other.

Ans :

15. Can you draw the picture **without lifting** your pen? (You cannot **overwrite** any line but you can **touch any intersecting point** more than once)

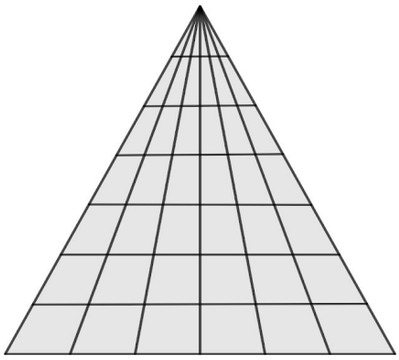


Ans :

16. $1 \times 11 \times 22 \times 33 \times 44 \times 55 \times 66 \times 77 \times 88 \times 99 = x$, What is the last digit of x?

Ans :

17. How many triangles are there in the figure?

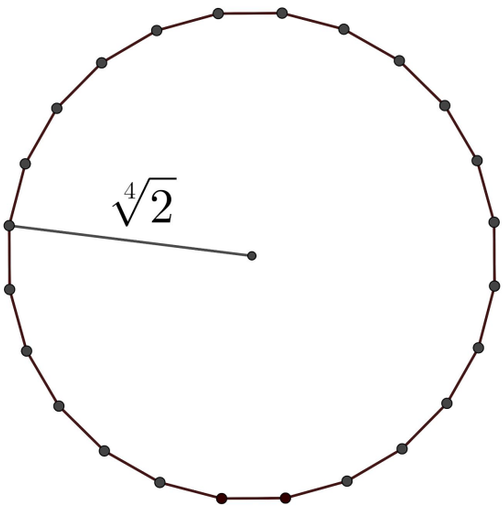


Ans :

18. There lives 7 dwarves in a jungle. One day, a mighty witch came and gives them a test. He who fails the test, will be killed by the witch.
The witch tells them to stand in a line in **ascending order** of their heights (no one has the same height), that is, the shortest dwarf stands at the front of the line and the tallest one stands at the back. Then the witch will put a hat on each of the dwarves head. The hat will be either black or white. But the dwarves can't see the hat they will wear. **Each dwarf can only see the hats of the dwarves who are shorter than him that is, will stand in front of him**. Finally, the witch will ask every dwarf the color of the hat he wears. If he can't answer, he has to die.
When any dwarf answers the question, all other dwarves can hear it. The query of the witch will start from the end of the line (tallest dwarf).
The dwarves planned altogether after knowing everything about the test and then stood in the line as mentioned above.
You have to tell how many dwarves will survive at the **maximum** at the worst case if they answer wisely?

Ans :

19. Here you are given a regular **24-gon** (polygon having 24 side). If the distance of any vertex from the center is $2^{\frac{1}{4}}$, the area of the polygon can be represented as $\frac{a}{b} \times (\sqrt{3}-1)$ where **a**,**b** is coprime. **(a+b)=?**



Ans :

20. What are the **most** frequent and **least** frequent digits in the range of **1** to **1000**?

Ans :