Questions (Set-4)

1. Suppose you and your team of four scientists discover a small amount of a hypothetical resource, which could benefit both society and the scientific community.
   This resource could either be used to generate enormous amounts of energy to benefit society, or as a fuel to power rockets as it is very efficient.
   Two of the scientists want to share it with the community and the other two want to use it for society. As a scientist, what do you think is the most efficient way to use this limited resource? Can you think of any other way to resolve this conflict? Or do you agree with one group and why? And how would you work as a team to find a Consensus? **- (SB)**

2. It is 2:10 in your watch. The angle between the hour hand and minute hand is? **-(1M)**
   A) 0 degrees
   B) 5 degrees
   C) 7.5degrees
   D) 2.5 degrees

3. Let the minimum value of $x^2 + 2x + 3$ be A and the maximum value of $-x^2 + 4x + 6$ be B. Then calculate the average value of A and B. **-(3M)**
   A) 5
   B) 6
   C) 7
   D) 8

4. .If all the letters of the word CARE are taken and permuted and arranged in alphabetical order as in a dictionary, then what is the rank of the word RACE? **-(1M)**
   A) 18
   B) 19
   C) 20
   D) 21

5. Aditi travels 3/8th journey at 25km/h, half of the remainder by bus at 36km/h and the rest by cycle at 12km/h. Find the approximate average speed of Aditi during its entire journey. **-(5M)**

   A) 20.11 kmph
   B) 20.98 kmph
   C) 22.12 kmph
   D) 22.18 kmph

6. An error of 3% is made while computing the length of a rectangle while an error of 2% is made while computing the breadth of the same rectangle. The percentage of error while computing the area of the rectangle is **--(3M)**

   A) 6%
   B) 6.06%
   C) 5%
   D) 5.06%

7. Consider the following equation, what is the sum of possible values of x for which the equation is satisfied? Also, what is the solution to x famously known as ? **-(3M)**

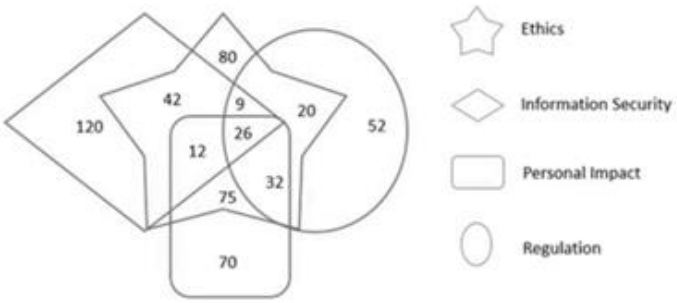
$$x = \sqrt{1 + \sqrt{1 + \sqrt{1 + \sqrt{1+..\infty}}}}$$

   A) 3.142
   B) 1.570
   C) 1.618
   D) 3.236

8. Given that $|y| < 1$, find the value of $3 + 6y + 9y^2 + 12y^3 + \ldots$ **-(5M)**

   A) $\frac{3}{(1-y)^2}$
   B) $\frac{6}{(1-y)^2}$
   C) $\frac{3}{(1+y)^2}$
   D) $\frac{3}{(1+y)^3}$

9. In a large company, all employees are required to complete a minimum of three different types of training to qualify for a promotion. **-(3M)**



Based on the diagram, how many employees qualify for promotion?

A) 47
B) 70
C) 79
D) 154

10. Three of the following four are alike in a certain way (based on the English alphabetical series) and hence form a group. Which of the following does not belong to that group? **-(3M)**

A) TWZX
B) PSWT
C) ILOM
D) ADGE

11. Find the odd one out?-**(1M)**

A) Direct Current
B) Alternating Current
C) Electric Charge
D) Electric Potential

12. Shruti wants to bake a cake in the oven for her mother's birthday. She has two-hour glasses to measure the time. With a 7-minute hourglass and a 3-minute hourglass, can you explain the quickest way to measure time for baking a cake for 8 minutes by Shruti. **-(3M)**

13. The Airport Economic Regulatory Authority cleared 88% reduction in charges in City X and asked the operator to submit fresh rate slabs for approval. With this order, both the landing and parking of planes and the user development fee will come down at the said airport.Which of the following may be an effect of the said reduction in charges at the airport? **-(3M)**

A) All airlines in the country will prefer to move their headquarters to city X.

B) The number of people in the country travelling by airplanes will rise drastically

C) Airlines will charge less when travelling to and from city X compared to other cities

D) People will travel to city X more often than any other city in the country

14. SACHIN : 2026471013 :: SEHWAG **-(1M)**

A) 20492226
B) 20481237
C) 20692428
D) 20692327

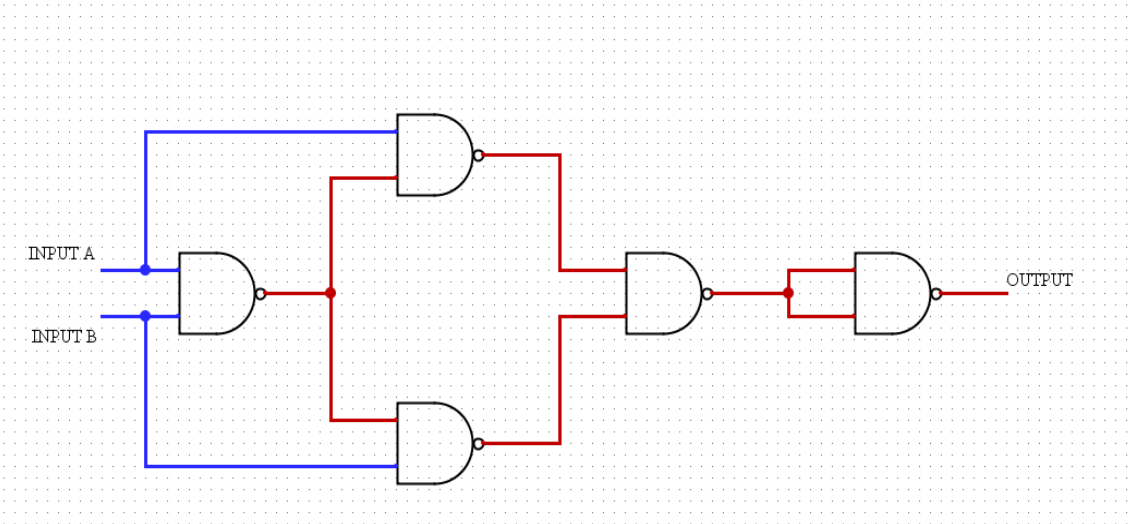
15. Which number replaces the question mark?**-(5M)**

1 , 5 , 21 , 73 , 233 , 717 , ?

A) 2173
B) 2151
C) 2195
D) 2129

16. David started on a trip to visit casinos, with few coins in his pockets. As soon as he visits any casino, the cash in his wallet increases by a factor of 2 and on his way out, he spends Rs. 100 for food and drinks. He visits 4 casinos on a particular day. After he visits the final casino, his pocket is empty, so how much money did he have initially? **-(3M)**

17. What is the output expression for the above circuit? **-(2M)**

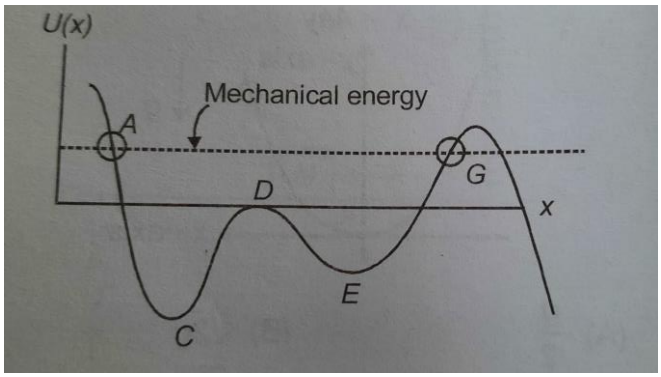


A) A'B + AB'
B) AB + A'B'
C) A + A'B
D) B + A'B

18. Given that the orbit is circular, calculate the time period (in hours) of a satellite orbiting the Earth which is at a height of 20000 km. Given the mass of Earth to be 5.98 x 10^24. **-(2M)**

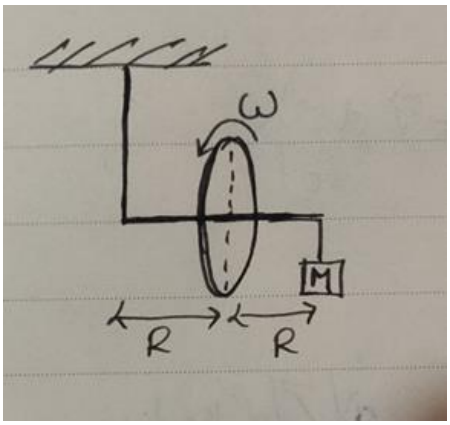
19. 300 g of ice at a temperature of -20°C is immersed in a calorimeter containing 200 g of water at 8°C. What is the temperature of the calorimeter and its contents after thermal equilibrium?**-(1M)**

20. A particle executing one dimensional motion moves under the effect of a PE curve as shown. At t=0 the particle was somewhere between A and G. Which of the following is not the correct option? **-(2M)**



(A) Kinetic energy is max at C.
(B) The velocity is zero at A and G.
(C) The force is zero at C,D,E.
(D) The force is zero at A and G.

21. Consider a disc of mass 'm' and radius 'R' free to rotate about its axle of length 2R, rotating with angular velocity . The axle of the disc is connected to a light inextensible string and at the other end a block of mass 'M' is attached as shown. The system is set free. Mark the correct options (Multiple correct) **-(3M)**



A) $|L|$ of the spinning disc is conserved (L - angular momentum)
B) tension in the string is $(m+M)g$
C) tension in the string is $(m+4M)g$
D) acceleration of the system is $\frac{g(m+2M)^2}{(m+4M)(m+M)}$ downward at t=0.

Answer Key

1. Common Question. Evaluated in the interview.
2. (B) 5 degrees
3. (B) 6
4. (B) 19
5. (A) 20.11km/h
6. (C) 5 (Partial marking for 5.06)
7. (C) 1.618 ; Golden ratio
8. (A) 3(1-y)2
9. (C) 79
10. (B) PSWT
11. (B) Alternating Current
12. Start both the hourglasses together. Flip the 3-minute hourglass twice and once the 7-minute hourglass is emptied, flip the 3-minute hourglass again to measure 1 minute.
    Th/erefore, 7+1 = 8 minutes.
13. (C)
14. (A) 20492226
15. (A) 2173
16. 93.75 Rs
17. (B) AB+A’B’
18. 7.81 Hours
19. 0 degrees
20. (D)
21. A and B