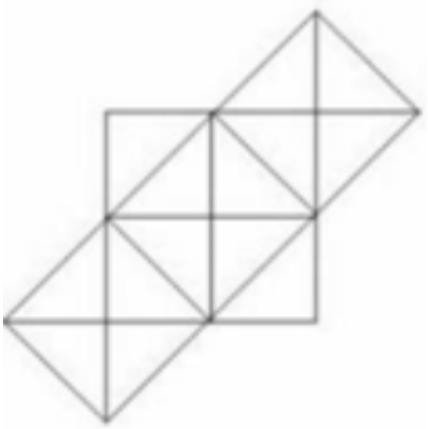
Questions (Set-2)

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. The number of squares and rectangles in the following figure is- **-(1M)**
   A) 12 B) 15 C) 17 D) 18



3. A man wants to row to a place 308km along a stream from where he is right now. He uses a kayak with a speed of 18km/h in a lake while the speed of the stream in which he wants to row is 4km/h. How much time will he take to row to his destination and return back to where he was? **-(3M)**
   A) 32 hours
   B) 34 hours
   C) 36 hours
   D) 38 hours

4. Three circles are drawn with centres as the vertices of an equilateral triangle where each circle touches the adjacent circles. The area of the remaining part of the triangle left inside is 32.25 sq. cm, find the radius of the circles (in cm): **-(3M)**
   A) 28
   B) 12
   C) 14
   D) 24

5. A beaker has 111 litres of solution X in it. It was in the process of being diluted. So 9 litres of X is taken out and replaced by water. This process was repeated a further 6 times. How much X is there in the container at the end of this process. **-(5M)**
   A) 61.83 litres
   B) 61.41 litres
   C) 66.66 litres
   D) 66.11 litres

6. A railway train travels a distance of 20km in 30mins, and it passes a traffic signal post in 4 seconds, what is the length of the wagon (in m): **(3M)**
   A) 16.6
   B) 44.4
   C) 66.6
   D) 111.1

7. You have a 3*3 Rubik's cube. How many more of those will you need to make a 12*12 Rubik's cube? **-(1M)**
   A) 63
   B) 15
   C) 11
   D) 64

8. A huge tank has two inlet pipes and one outlet pipe. Inlet pipe A fills the tank in 80 minutes while inlet pipe B fills the tank in 90 minutes. If all the three pipes are opened, the tank fills in 60 minutes. How much time will the outlet pipe take to empty the tank? **-(5M)**
   A) 144 min
   B) 134 min
   C) 124 min
   D) 154 min

9. In a two-digit number, the digit in the unit's place is more than twice the digit in ten's place by 1. If the digits in the unit's place and the ten's place are interchanged, the difference between the newly formed number and the original number is less than the original number by 4. What is the original number? **-(3M)**
   A) 25
   B) 37
   C) 49
   D) 13

10. A census officer knocks on the door and asks the lady "How many children do you have?" she replies "Three." Upon asking their ages, she denies giving him the information because he looks suspicious. On his insistence she decides to give him a hint. The hint is as follows: "If you multiply their ages you get 36."
    After thinking for a while, he asks for another hint, she says "the sum of their ages is equal to the number next door". He walks to see the number next door and returns. He asks for another hint and all the lady says is "My eldest son is sleeping upstairs, I must return" and leaves.
    Provided that the minimum number of hints required have been provided, determine the ages of the three children. **-(5M)**

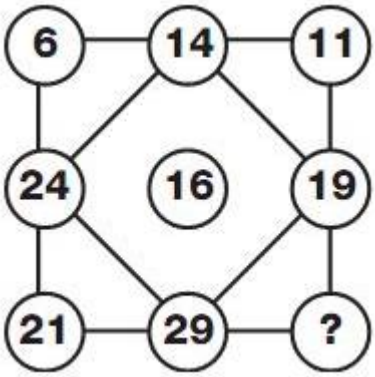
11. Revati wants to bake a cake in the oven for her mother's birthday. She has two-hour glasses to measure the time. With a 7-minute hourglass and a 3-minute hourglass, can you explain the quickest way to measure time for baking a cake for 8 minutes by Revati. **-(3M)**

12. If 21st August is Monday, 19th November comes on which day of the week? **-(1M)**
    A) Monday B) Sunday C) Friday D) Wednesday

13. How much time does it take for the hour hand to move 40 degrees? **-(1M)**

14. Patrick, Mark and Peter had spent the week decorating their elderly neighbour's house for which they had earned $500 between them. When it came to dividing the money, Patrick claimed he had worked 3 times harder than Mark, and Peter had worked twice as hard as Patrick. If the money was to be divided fairly, how much money did each of them get? **-(3M)**

15. What is the missing number? **-(3M)**



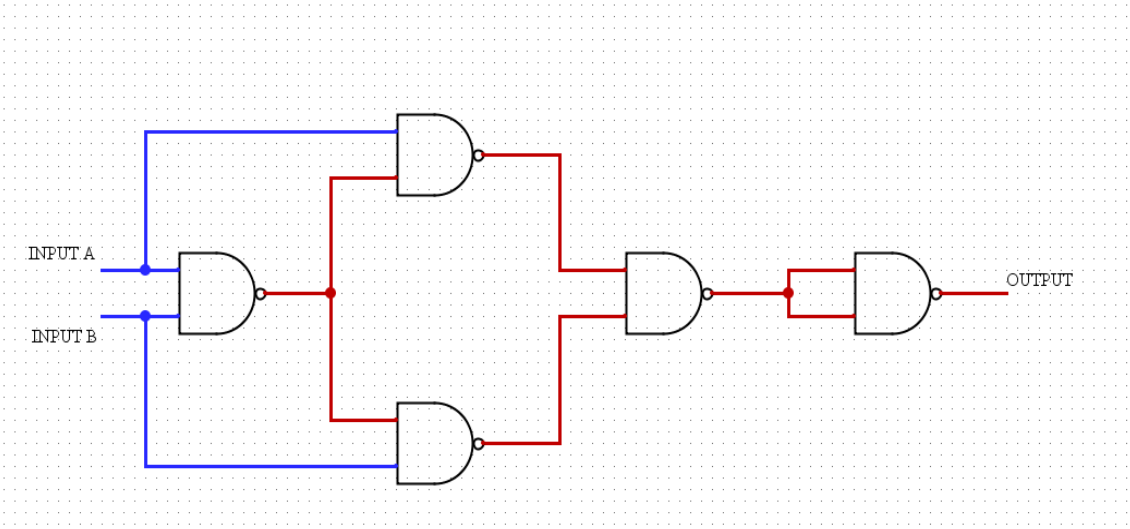
16. What comes next in the series ? **-(3M)**

0 16 16 40 64

17. A car is moving at a speed of 20 m/s. Brakes are applied when it is at a distance of 550m from a pole and decelerates at a constant value of 0.4 m/s^2. The distance of the car from the pole after a minute is? **-(1M)**

A) 70 m
B) 60 m
C) 50 m
D) 40 m

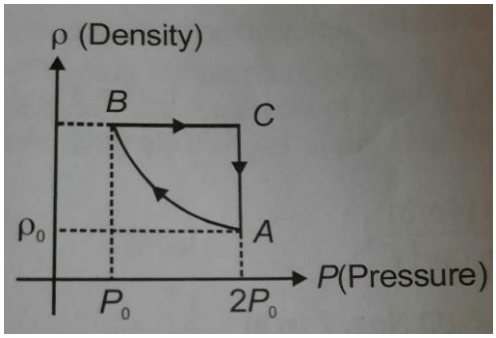
18. What is the output expression for the above circuit? **-(2M)**



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

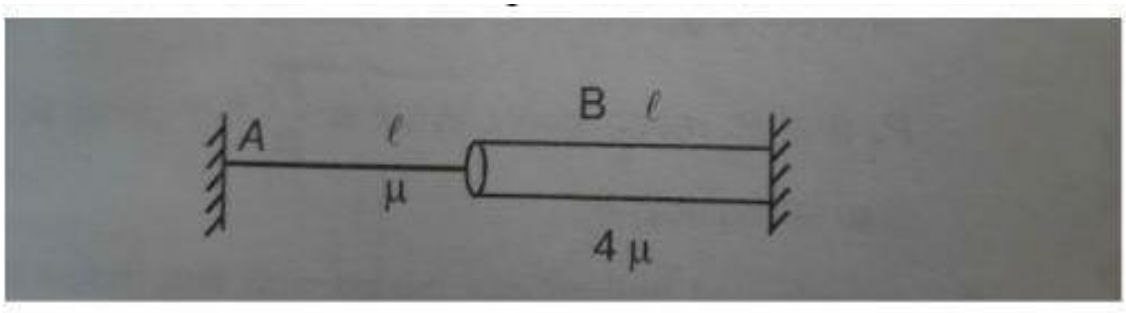
19. Given that the orbit is circular, calculate the time period (in hours) of a satellite orbiting the Earth which is at a height of 20000 km. Given the mass of Earth to be 5.98 x 10^24. **-(2M)**

20. The variation of density of one mole of an ideal gas ($\gamma = 1.5$) is plotted against pressure as shown in the diagram. The nature of the curved portion of the diagram representing process AB is a rectangular hyperbola. Taking molar mass to be M, the efficiency of the cyclic process ABCA is - **-(3M)**



A) 1/16
B) 3/19
C) 6/19
D) 7/16

21. Two threads A and B having the same length 'l' and linear mass density 'u' and '4u' respectively are arranged as shown below. A tuning fork creates some disturbance in the threads. If the joint works as a node, then during vibration the ratio of number of harmonics in the wire B and A is - **-(2M)**



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TEAM antariks

Answer Key

1. Common Question. Evaluated in the interview.
2. (B) 15
3. (C) 36 HOURS
4. (C) 14
5. (B) 61.41
6. (B) 44.4m
7. (A) 63
8. (A) 144 min
9. (C) 49
10. 9,2,2
11. 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.
    Therefore, 7+1 = 8 minutes.
12. (B) Sunday
13. 80 min or 1 hour 20 min
14. Mark gets $50, Patrick gets $150 and Peter gets $300.
15. 26 (Partial Marking for 11)
16. 124
17. (A) 70m
18. (B) AB+A'B'
19. 7.81 Hours
20. (A) 1/16
21. 1/2