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Genius Junior

Round 2

Time: 2 hours **Max. Marks: 166**

Grade: 10th std

ANSWER KEY

Note : This Answer Key contains only one of the many correct answers to each question. Any suitable logically accurate answer is acceptable and marked correct.

MINDSPARK

SECTION 1: THE 5TH ELIXIR!

*There will be **negative marking** in this section. Each **incorrect** answer will cost you one mark. However, there's a golden chance **to remove all the negativity** in your life with the help of "**The 5th Elixir**" Try your luck!*

Section score: 14

1) On the Planet Fantasia, different countries have different currencies, just as they do on Planet Earth. **[3]**

The present rate of exchange is as follows:

6 zeds= 40 rambams;
50 rambams= 186 fobs;
54 fobs= 10 lentis;
24 lentis= 270 grobs.

Can you calculate how many grobs there are to 1 zed?

Answer: 51.66

2) Paul has a box of 50 sweets and three friends - Amy, Sally and Eddie - with whom he has to share those sweets. He is so generous that he decides only to take one sweet for himself each time he has given out 10. **[3]**

Paul starts to hand them out one at a time, starting with Amy, next Sally, and then Eddie; but every fourth sweet he hands out is also accompanied by an extra one for that particular friend.

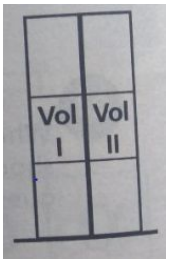
How many sweets does each finally receive?

Answer: Paul:4 Amy:15 Sally:16 Eddie: 15

3) There are two books, volumes I and II of a series, side by side on a shelf placed vertically and with their spines facing us. There is no space between the books. Each of these has covers are 10mm thick, and the total thickness of the pages in each is 60mm.

How far will a bookworm travel if it stats from the first page in the first volume and travels to the last page in the second volume? **[2]**

Answer: 20mm



4) Find the angle between the hour hand and the minute hand of the clock when the time is half past nine. **[2]**

Answer: 105 degrees

5) The 5th Elixir - **[4]**

The integers 1,2,....,40 are written on a blackboard. The following operation is then repeated 39 times:
In each repetition, any two numbers, say a and b, currently on the blackboard are erased and a new number a+b-1 is written. What will be the number left on the board at the end?

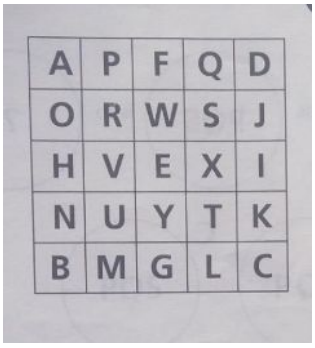
Answer: 781

SECTION 2: Power Of 2!

Section score: 14

The 3 questions in this section have marks in an increasing order of powers of 2 starting from 21.

6) Which letter is above the letter, three places to the left of the letter, which is two places below the letter to the right of **X**? **[2]**



A	P	F	Q	D
O	R	W	S	J
H	V	E	X	I
N	U	Y	T	K
B	M	G	L	C

Answer: U

7) Two trains are traveling towards each other on the same track, each at 60 miles per hour. When they are exactly 120 miles apart, a fly takes off from the front of one of the trains, flying towards the other train at a constant rate of 100 miles per hour. When the fly reaches the other train, it instantly changes directions and starts flying toward the other train, still at 100 miles per hour. It keeps doing this back and forth until the trains finally collide.

If you add up all the distances back and forth that the fly has travelled, how much total distance has the fly travelled when the trains finally collide? **[4]**

Answer: 100 miles/hr

8) One evening there was a murder in a family. The family consists of a father, a mother, a son and a daughter. One of these four people murdered one of the others. One of the members of the family witnessed the crime. **[8]**

The other one helped the murderer.
These are the things we know for sure:
The witness and the one who helped the murderer were not of the same gender.
The oldest person and the witness were not of the same gender.
The youngest person and the victim were not of the same gender.
The one who helped the murderer was older than the victim.
The father was the oldest member of the family.

Complete the table given below: -

Sr.No.	Person	Role	Age
1.	Father	HELPER	OLDEST
2.	Mother	MURDERER	SECOND OLDEST
3.	Son	VICTIM	THIRD OLDEST
4.	Daughter	WITNESS	YOUNGEST

SECTION 3: IN A ROW/STRIKE IT ALL

Section score: 11

*The **total marks** obtained in this section after answering all 4 questions will be multiplied by the **number of consecutive correct answers** obtained in that section.*

9) A man sitting opposite you has four cards in his hand facing him: 2, 3, 4 and 5 [but not in that order]. He wants them placed in ascending order from his left to his right. To do this, he takes the leftmost card [from your perspective] and puts it last. He then takes the third card from the right [your right] and puts it in last place. What was the previous order of the cards? **[3]**

Answer: **3 - 5 - 4 - 2**
OR
2 - 4 - 5 - 3

10)There are 100 ants arranged randomly on a board that is 1 meter long, each facing either left or right and continuously walking at a pace of 1 meter per minute.
The board is so narrow that the ants cannot pass each other; when two ants walk into each other, they each instantly turn around and continue walking in the opposite direction. When an ant reaches the end of the board, it falls off the edge. From the moment the ants start walking, what is the longest amount of time that could pass before all the ants have fallen off the plank? You can assume that each ant has infinitely small length.
Note: The answer does not depend on the location of the ants. **[3]**

Answer: **1 minute**

11) There are 21 juice bottles out of which 7 bottles are full, 7 are half-full and the remaining 7 are empty to be divided amongst 3 friends equally. You don't have any measuring device. How will you divide them [both bottles and juice] equally? **[3]**

Answer: **Any Answer with correct logical explanation is accepted.**
One of the answer: Empty 2 half filled bottles into one empty bottle. Again empty 2 half filled bottles into one empty bottle. So now you get 9 bottles which are completely filled with juice, 3 half filled bottles and 9 empty bottles. Now you can easily divide it amongst three friends.

12) In a group of 200 people, everybody has a non-burning candle. On person has a match alights at some moment his candle. With this candle he walks to somebody else and lights a new candle. Then everybody with a burning candle will look for somebody without at burning candle, and if found they will light it. This will continue until all candles are lit. Suppose that from the moment a candle is lit it takes exactly 30 seconds to find a person with a non-burning candle and light that candle. From the moment the first candle is lit, how long does it take before all candles are lit? **[2]**

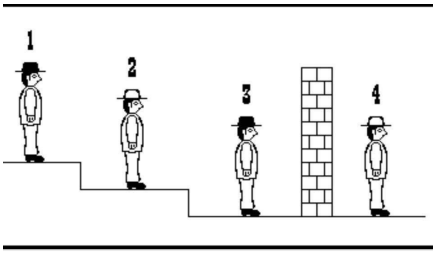
Answer: **4 minutes OR 240 sec**

SECTION 4: SIMPLETON

Nothing fancy here!

Section score: 11

13) 4 prisoners are all going to be shot in 60 seconds unless one of them correctly calls out the colour of his own hat. If he's right everyone is free, but everyone gets shot if he's wrong. They are standing in the below configuration. They know how they are positioned and they know there are 2 black hats and 2 white hats. But they don't know the configuration of the hats. They can't communicate, they can't turn around and they can't see the colour of their own hat. So, prisoner 1 can see 2 and 3. Prisoner 2 can see 3. Prisoner 4 is behind a wall so nobody can see him or be seen by him. No shadows, reflections, etc. After 45 seconds, someone calls out the correct colour of his hat. Who is it and how does he know he is right? **[4]**



Answer: Prisoner 2. If Prisoner 2 and Prisoner 3 had the same hat color, Prisoner would know that his hat color(opposite to the hat color of Prisoner 2 and Prisoner 3). Since Prisoner 1 does not call out his hat colour, Prisoner 2 would know that he and Prisoner have different hat colours. Since he can see that Prisoner 3 has a black hat. He would conclude that he has a white hat.

14) How many ways can you put 10 sweets into 3 bags so that each bag contains an odd number of sweets? **[2]**

Answers: 0 (Zero)

15) Binary numbers are base 2 numbers and have only two values – 0 and 1. There is no 2,3,4,5,6, 7, 8 or 9 in Binary. In Decimal representation there is no symbol to represent the number after 9, so we start back at 0 again, but add 1 on the left to get 10. Similarly, in binary there is no symbol to represent numbers after 1 so we start back at 0 again but add 1 on the left. So, 2 in decimal is represented as 10 in binary.

E.g.: 10110 is a binary number. Its decimal equivalent can be found as:

1*2^4 + **0***2^3 + **1***2^2 + **1***2^1 + **0***2^0
Find the value of 2^5 - 1:
[Hint: Find value of 2^3 -1 = 7 and 2^2 - 1 = 4 to get a pattern] **[4]**

Answer: 11111

16) A bag of potatoes weighs, 50 kgs divided by half of its weight. How much does the bag of potatoes weigh? **[1]**

Answer: 10 kg

TRICK OR TREAT'17

[SATRA PE KHATRA]

Are you ready to play the gamble?
*Getting this question **right** will **double** your test score!*
*However, getting this question **wrong** will **halve** your test score!*
This question will be evaluated only on attempting at least 3 questions in all the 4 sections.

17) KHATRA

You have 25 horses. When they race, each horse runs at a different, constant pace. A horse will always run at the same pace no matter how many times it races.

You want to figure out which are your 3 fastest horses. You are allowed to race at most 5 horses against each other at a time. You don't have a stopwatch so all you can learn from each race is which order the horses finish in.

What is the least number of races you can conduct to figure out which 3 horses are fastest?

Answer:

7 races.

Race the 25 horses in groups of 5 each. Race the winners of these races. The winner of this race is obviously, the fastest horse(Say A1). Now you observe that the horses D1, D2, D3, D4, D5 and E1, E2, E3, E4, E5 are not among the top three horses(As D1 is slower than C1 and D1 is faster than D2, D3…). Also C2 is not among the top 3 as A1, B1 and C1 are faster than it. Similarly B3 and A4 are also not among the top 3 horses. So you can eliminate C2, C3, C4, C5, B3, B4, B5, A4, A5. This leaves us with six horses (A1, A2, A3, B1, B2, C1). But since you know that A1 is the fastest you can race A2, A3, B1, B2, C1 to know the top 3 horses.

A1	B1	C1	D1	E1
A2	B2	C2	D2	E2
A3	B3	C3	D3	E3
A4	B4	C4	D4	E4
A5	B5	C5	D5	E5