

TECHNOTHLON

Question paper for **Junior Squad** (classes 9th-10th)

TEAM DETAILS:

Names of Candidates: 1. _____

2. _____

Team Registration No: _____

Name of School: _____

Place: State _____

City _____

INSTRUCTIONS:

1. Candidates must **fill the Team Details** above before starting to attempt the questions.
2. This Question Paper consists of **6 parts** and carries a total of **100 Marks**.
3. **NO Question** contains negative marking.
4. Each section contains details on **how to attempt the question** of that section and the **marks that they carry**.
5. ALL ANSWERS must be written in the **answer space provided at the end of this booklet**. No extra space will be provided.
6. ALL ANSWERS must be **clear and legible**. In case of any ambiguity, the decision of the evaluator is final.
7. In case an answer has to be changed, **neatly cross out the initial answer** before writing the next one.

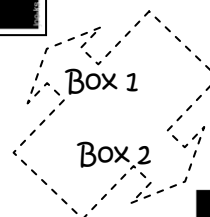
Comprehension

Instructions: Read the passage and answer the questions that follow:

An absent minded professor was trying his hand at construction work. After completing his first building, he realized he forgot to put up staircases. That's when he found some very lightweight ladders. Starting from the ground floor, the professor could put up a ladder and climb up that ladder. Upon reaching the top of the ladder, he could put another ladder on that floor and climb up or down the second ladder and so on. He cannot use the same ladder twice. The ladder cannot reach a height higher than the building because of the roof.

- 1) The ladders are 1 floor, 4 floors, 13 floors and 14 floors high. The building is 27 floors high. Which floors are inaccessible to the professor?
- 2) The professor finds another ladder. What is the minimum height of the ladder such that the professor still can't reach every floor in the building?

F1) Is it legal for a man to marry his widow's sister?



Comprehension

Instructions: Read the passage and answer the questions that follow:

Fast forward to 2020, Earthlings have discovered a new planet, "Planet 2020-I". On landing on this planet, humans learnt that the beings of this planet could not understand our language, but coincidentally, their number system is similar (not same). Their number system contains symbols 0-9 and A-C. After a lot of computer programs used to analyse their numbers, the following has been concluded about the unknown number system: {Subscript 'U' refers to the unknown system, while subscript 'D' refers to decimal system}(example to be given)

The symbols 0 to 9 have the same meaning as in the decimal system.

- $(A + B)_U = (21)_D$
- $(2A+C)_U = (32)_D$
- $(B+ 5C)_U = (71)_D$

Q1. What is 34 in the number system followed by the beings at Planet 2020-I

- a) 34
- b) 23
- c) 28 (answer)
- d) 12

Q2. What is $1A + 25$ (all numbers written in alien numeral system) ?

- a) 12A
- b) 42 (answer)
- c) 3C
- d) 223

F2) Mr and Mrs Rabbit have six children who are boy rabbits. Each boy rabbit has two sisters. How many children are there in all in the Rabbit family?

Q3. Find the next number in the series : -

28, 30, 35, 3A,

- a) 4A
- b) 42 (correct)
- c) 9B
- d) 38

Comprehension

Instructions: Read the passage and answer the questions that follow:

Assume that you have a number of long fuses, of which you only know that they burn for exactly one hour after you lighted them at one end. However, you don't know whether they burn with constant speed, so the first half of the fuse can be burnt in only ten minutes while the rest takes the other fifty minutes to burn completely. Also assume that you have a lighter.

- 1) What is the smallest time you can measure using this 2 of these fuses?
 - a) 30 minutes
 - b) 20 minutes
 - c) 15 minutes
 - d) None of these
- 2) What is the minimum number of fuses you should use to measure 7.5 minutes?
 - a) 2
 - b) 3
 - c) 4
 - d) 5
- 3) What is the minimum number of fuses you should use to measure exactly 217.5 minutes?
 - a) 9
 - b) 7
 - c) 5
 - d) 6 (doubtful ans)

F3) Forward I am heavy, but backward I am not. What am I?

Comprehension

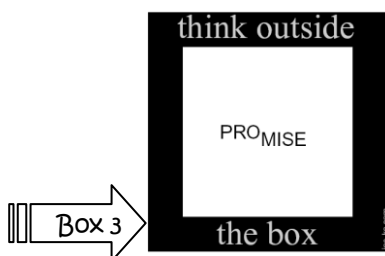
Instructions: Read the passage and answer the questions that follow:

Consider yourself the head of a research team. You want to find out from how far people can hear clearly.

Two of the members of your team do the following experiments and give you their results:

- Member A played a song on his computer and told people to walk away from the computer until they can no longer recognize the song.
- Member B played a song on his computer and told people to walk towards the computer until they can recognize the song.

1. Which Member has more accurate results?
 - a. Member A has more accurate results
 - b. Member B has more accurate results
 - c. Both members' results are equally accurate



2. Which members' results show that that people have a better sense of hearing?
 - a. Member A
 - b. Member B
 - c. No noticeable difference

- Member C does the experiment in the same way that member D does it but they do it in their own houses (both live in multi-storeyed apartments).

3. How does the accuracy of the results change with their floor number?
- More accurate on higher floors
 - Less accurate on higher floors
 - Does not change
4. Member C has his computer's speakers on the side of the monitor. Member D has his speakers just in front of the monitor. Which members' results show that that people have a better sense of hearing?
- Member C
 - Member D
 - No noticeable difference.

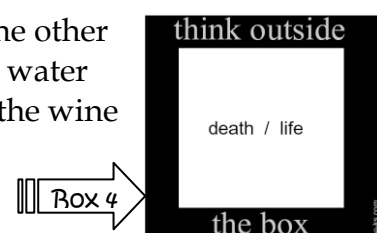
Play with Numbers

- 1) Prince Xan Chi went to fight a 3-headed, 3-tailed dragon. He has a magic sword that can, in one stroke, chop off either one head, two heads, one tail, or two tails. This dragon is of a type related to the hydra (some Greek connections as well!); if one head is chopped off, a new one grows. In place of one tail, two new tails grow; in place of two tails, one new head grows; if two heads are chopped off, nothing grows (phew...). Of course the legendary prince can fight for eternity, but others can't wait, so the prince wants to know what is the smallest number of strokes required to chop off all the dragon's heads and tails, thus killing it?
- 2) I bought a car with a peculiar 5 digit numbered license plate which on reversing (i.e., on rotating it by 180 degrees) could still be read. On reversing value is increased by 78633. What is the original number if all the digits are different?

F4) A child playing on a beach has 6 sand piles in one place and 3 in another. If he puts them all together, how many sand piles will he have?

- 3) There is a critical height (which is a whole number of floors above ground level), such that an egg dropped from that height (or higher) will break, but if dropped from a lower height (no matter how many times), it will not break. You are given two eggs and told that the critical height is between 1 floor and 37 floors (inclusive). What is the minimum number of times you must drop an egg in order to GUARANTEE the successful determination of the critical height?

- 4) So, you have a two equal sized buckets. One contains water and the other contains the same amount of wine. You transfer a cup of wine to the water bucket and mix it in. Next you transfer a cup of the mixture back to the wine bucket. Is there more wine in the water, or water in the wine?



5) A train was approaching a tunnel with certain velocity. A dog was sitting inside the tunnel at a distance of $2L/5$ from the start of the tunnel, where L is the length of the tunnel. Unfortunately dog can't escape from the tunnel safely. If it starts running towards the direction of train, it will be killed at the opening of the tunnel and if it starts running to the other end then the death will follow him. From the given conditions in the example calculate the ratio of velocities of the train and the dog.

CRYPTOGRAPHY

Instructions: These are a series of inter-connected questions. The answer of each question is a clue to the next question.

1) Answer the following questions to decode the message.

For example,

What is $1+1=?$ (YRE)

The answer is TWO.

It means that $Y \leftrightarrow T$, $R \leftrightarrow W$ and $E \leftrightarrow O$.

- It is important to note that shifting the letters is different from rearrangement
- Example of Shifting: if a is shifted to b implies that b is shifted to c, c to d and so on. Shifting can be done by more than one letter.

Use the answers to decode the next question.

a) If Rome is the city in the constellation And(rome)da ; what is a vegetable in a weapon?

[HKVZI]

(Clue: the vegetable = an English alphabet)

b) You are playing a game of tic tac toe /x's and zeroes with your friend. In which position would you place the next zero if you want to lose? (Given that your friend is smart enough).

[ULFI]

x	5	4
9	o	9
4	5	x

c) What is the thing which has keys that opens no locks, with space but no room, and allows entering but not going in.

[PVBYLZIW]

d) The answer to this question is question itself. What is the answer??[JFVHGRLM]

e) Which version of Tata nano would be called sodium nitrate?

[GSRIW]

f) The cipher which is used in this question is [ZGYZHS] cipher.

2) Using the above code find out the coded message which is a clue to the next question.

Coded message: FHV Z ULFI YB ULFI HJFZIV.

3) This question can be easily solved if you use the above clue properly.

STL EH TER IHT SF ET9.

4) ZKJ ALJK GIFGVI JGRTZEX.

F5) Which eleven letter word is spelled incorrectly by some of the most brilliant people in the world?

5) The sentence you got from the previous question is an anagram. (an anagram is a rearrangement of the letters. For example: the anagram for "the eyes" is "they see". It is not necessary that they should be related).

Numbers:

(ans. The sentence is "Oh, doubt a man? Touching!")

6) The sentence you got from the previous question is an anagram. (an anagram is a rearrangement of the letters. For example: the anagram for "the eyes" is "they see". It is not necessary that they should be related).

The clue: eraepsekahs fo krow suomaf yrev a fo margana si siht.

ARBIT+FUN

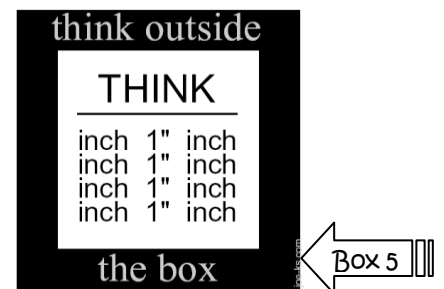
1) There is a circular ring in which there are 12 black mice and one white mouse. A cat walks circularly in the ring and eats every 12th mouse. Where should the cat start so that the white mouse is the last one to be eaten by cat?

2) In the month of October in a year has exactly four Mondays and four Fridays, find what day of week will be on the 20th of November of that year.

3) Can you tell what we are: Half of us in Four are Two of us, Twice of us in Two are Six of us, Twice of us in Eight are Ten of us, and Twice of us in Five are Eight of us?

4) A man has a metal pole which is 1.05 meters long and he wants to get on a bus, but it is the rule of the bus that passengers are not allowed to carry any items more than 1 meter in length, breadth or height on the bus. He runs into a store and comes out with a package containing the pole. The bus driver allows him on the bus. Why?

5) Somewhere near Guwahati, a railroad track runs through a tunnel on a hillside. The tunnel is only big enough for one train. However, one day, two trains entered the tunnel from opposite directions at exactly eight 'o' clock. In spite of this, no accident took place. How?



6) In an aeroplane crash, every single person died, but two people survived. How is this possible?

7) It takes 4 hours for a plane to fly from Mumbai to Guwahati. One plane leaves Mumbai for Guwahati at 4 pm, and another leaves Guwahati for Mumbai at 6 pm. Which plane is closer to Mumbai when they cross each other?

8) As part of a rather odd driving challenge you are required to complete two laps of a racetrack at an overall average speed of 80mph. At the instant you finish the first lap; you are informed that your average speed over that first lap was only 40mph. How fast do you need to travel over the second lap to get your overall average speed up to the target value of 80mph?

9) Imagine that you live on the moon. One day you see a number 14 bus. What is the most likely number of bus routes on the moon?

10) A rope ladder is hanging over the side of a ship. The ladder is 12 feet long; each rung is one foot apart. The tide rises at the rate of four inches per hour. How long will it take for the first 4 rungs to be underwater?