

&

Present



# Techn<sup>owl</sup>thon

the international school championship  
.....Inspiring Young minds!



## Junior Squad

Duration: 2hours 30 min

Maximum Marks: 181

## TEAM DETAILS

Name of Participants:

1. \_\_\_\_\_

2. \_\_\_\_\_

Roll Number: \_\_\_\_\_

School Name: \_\_\_\_\_

### General Instructions

1. Fill in the Team Details in the space provided, before starting to attempt the paper.
2. Verify that the question paper contains 20 pages and 17+8+5 questions (objective, subjective and think outside the box respectively).
3. All answers must be written in the OMR provided separately which has to be submitted at the end of the examination. The Question Paper can be taken back home.
4. All answers must be clear and legible. In case of any ambiguity, the decision of evaluation is final.
5. All the questions are correct and no queries will be entertained during the examination.
6. The medium for answering this Paper is English. Answers in any other Language will not be accepted.
7. Blank papers, clipboards, log tables, slide rulers, calculators, cellular phones, pagers and any other electronic gadgets are not allowed. No additional sheets will be provided for the rough work.

### Selection Criteria and Result

1. Top 1500 teams will be shortlisted on the basis of the objective section marks.
2. Top 250 teams will be selected from these 1500 teams on the basis of their Subjective+Objective (excluding Strategia) section marks.
3. Strategia section would be evaluated, only for these top 250.
4. The final ranking will be based on the total marks obtained in all the sections.
5. The result will be declared on or before 2nd week of August 2013 on our website: [technothlon.techniche.org](http://technothlon.techniche.org). To access it, please preserve your hall ticket.
6. Top 50 teams will be invited to IIT Guwahati for Mains and will receive Gold certificates. The next 200 teams will receive Silver certificates.

### OMR Instructions

1. DO NOT TAMPER WITH THE OMR.
2. Darken the bubbles properly by **BLACK** ball point pen only.
3. Fill all the details given in the OMR sheet properly.
4. In case the students feel any question wrong or short of information, then answer it 9999 or '1', whichever is applicable to the respective question.
5. Follow the correct method to fill in the OMR Sheet.
6. Interpret options A,B,C,D as 1,2,3,4 respectively.

Wrong Methods				
1	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
3	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
4	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Correct Method				
1	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

### Think Outside the Box Example



Answer: Reading between the lines

### **DISCLAIMER**

*In any case of any discrepancy, the decision of the Organizers will be deemed final and no further correspondence will be entertained.*

### Question Paper Format

1. The first 12 questions are SINGLE answer type objective. You need to bubble the correct options in the OMR.
2. Question number 13 to 17 are integer type. Write the answer in the space provided in the OMR and bubble the correct options. ( Answer should be of four digits: xxxx)
3. Rest of the questions are subjective type. Write the corresponding answers in the space provided for the respective question in the OMR. (Same applies for Think Outside The Box.)

### Marking Schemes

#### 1. *Mystery Scheme – Try your Luck*

The possible marks for this scheme are also a mystery.  
If you solve the  $i^{\text{th}}$  question correctly, then you will be awarded ( $i \times$  option of correct answer) marks for that question, else you neither gain nor lose.

#### 2. *Climb and Fall Scheme*

You start with a base score of 1. If you answer the question correctly, your base score increases by 1 (i.e. to 2) for the next question. With every correct answer, your base score for the next question increases by 1. But if you break the sequence, you fall back to the base of 1, and will have to start climbing again.

#### 3. *Collatz Conjecture Scheme*

Collatz Conjecture defines a sequence (Starting with  $p$ ) as follows:

if  $i^{\text{th}}$  term of the sequence,  $x$  is odd then  $(i+1)^{\text{th}}$  term is:  $3x+1$ , else it is:  $x/2$

Let's make a convention:

$C \rightarrow$  number of correct answers     $W \rightarrow$  number of wrongly answered     $N \rightarrow$  left un-attempted

The marks you get are given by twice the sum of the first  $C-W$  (if  $>0$ ) terms of the sequence ( $p=4$ ).

#### 4. *Let the Ends Meet - for Think outside the box.*

It teaches you a lesson of life: how to achieve maximum possible with least problems.  
In a section of  $N$  questions, every question has been pre-allotted base marks, 3. You get an additional bonus of 3, if you correctly solve the  $i^{\text{th}}$  and the  $(N-i+1)^{\text{th}}$  question correctly.

#### 5. *Heap Scheme*

This scheme guarantees more marks for more correct answers! Marks obtained are equal to  $2^{n+1}$ , where  $n$  is the number of correctly answered questions in that section.

#### 6. *Kinetic Scheme*

Remember the great Newton! We have modified his formula:

$$v^2 = u^2 + 2as$$

Where:  $v^2$  are the marks you will score for a particular question.

$$u^2 = 0$$

$s = 1 + \text{number of Questions in the section} - \text{Order of the question in the section } (1, 2, 3, \dots)$

$a = 1$  for the first question of the section

If you answer a question correctly, 'a' increases by 1. If incorrectly then 'a' decreases by 1, upto zero, else it remains unchanged.

#### 7. *Relative Scheme – for Strategia*

The strategies will be awarded points relatively : 25, 24.9, 24.8 ...

This score will be added to the score of other sections to rank the top 250 teams.

(Note:  $i^{\text{th}}$  question means that the order of the question in that section (1, 2, 3, ...) is: 'i'.)

# JUMBLED

Mystery marking scheme

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Richa has been challenged by her friend Naveen, to solve the following Jumbled Set of questions. The rules are simple:

(i) No three of these four questions have the same option as their answers.

(ii) Q.4 must be answered just after Q.2

She has promised you a treat, if you could help her.

Give it a try!!

## Question 1:

Which question's answer will you get at last?

- 1) 1                      2) 4                      3) 2                      4) 3

## Question 2:

How many questions that have (3) as correct option?

- 1) 2                      2) 0                      3) 1                      4) None of the above

## Question 3:

Which one basic question that you must answer first, to be able to answer the other 3 questions?

- 1) 1                      2) 3                      3) 2                      4) 4

## Question 4:

What is your answer to question 2?

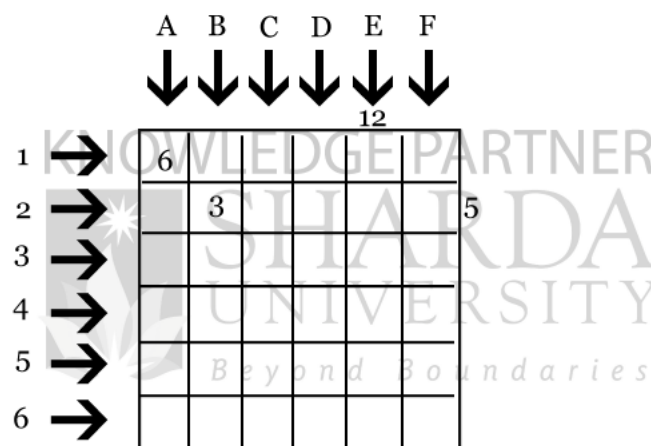
- 1) 4                      2) 3                      3) 2                      4) 1

# THE DROWNING CITY

Heap Marking scheme

The city of skyscrapers consists of buildings of heights ranging from one to nine arranged in a 6x6 grid. The number of people living in each building is equal to its height. Rows 1,2,3 are similar to the rows 4,5,6 respectively and column A is similar to column D, columns B and C are reverse of columns E and F respectively. Around any building there is no building of the same height. Also there is no building with a height difference of 1 to the right, left, up and down of a building.

It is the rainy season of 2013. the city is flooded and a rescue team headed by Uttej roams (outside the grid) with a boat and a flashlight, on top of column F, moving anticlockwise, and ending at right of the first row. They light the flash along the row or the column corresponding to their position. All the people of a building are rescued if that building can be seen, that is, if there is no building of greater or equal height between it and the flash. The numbers written at top of some rows or beside some columns represents the number of people rescued when flash is lighted from that position.



## Question 5:

How many people will enter the ship when the flash is lighted from the bottom of column B?

- 1) 4                      2) 11                      3) 12                      4) 20

## Question 6:

How many people died in the flood?

- 1) 18                      2) 26                      3) 25                      4) 24

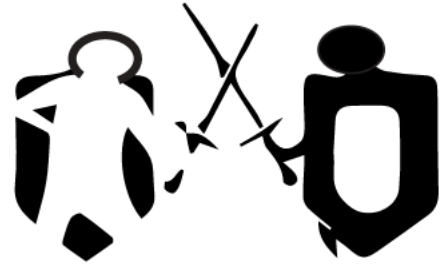
## Question 7:

How many more people would have been saved if the flash were lighted along the diagonals as well?

- 1) 9                      2) 10                      3) 11                      4) 12



# CODE WARS



## Mystery Marking scheme

Secret codes are often used, by spies and military, to carry out operations. In one such case, the CBI Coders, Ashima, Roshan and Himanshu, intercepted a mail in which they picked out two patterns, which they suspected could be the key. The rest of the code has been deciphered and conveys information about the camps of a terrorist group. Only the cities where these camps are located now are to be found. You have been asked to decipher and answer before it's too late!

All you have is the piece of information provided below:

(Hint: You can have multiple codes for an alphabet, but only one way to decipher it back.)

DASY VJBYZ YL

CTCIBA

OHYFB

ZKVWNBIBE

### Question 8:

The first line of the code when deciphered comes out to be "GIFT DEATH TO".

Given below are the possible deciphered texts of the encircled code.

Kanpur = 1	Nagpur = 2	Mumbai = 3	Delhi = 4
Patna = 5	Ahmedabad = 6	Bengaluru = 7	Hyderabad = 8

Add up the numbers corresponding to the correct deciphered possibilities.

1) 12                      2) 13                      3) 14                      4) 16

### Question 9:

Which of the following given possibilities can under no condition, be ciphered using the code logic of the previous question?

Kanpur = 1	Chennai = 2	Ahmedabad = 3	Kolkata = 4
Hyderabad = 5	Srinagar = 6	Varanasi = 7	Jaipur = 8

Add up the numbers corresponding to these possibilities.

1) 26                      2) 27                      3) 28                      4) 29

### Question 10:

In how many ways the word "EUROPE" can be ciphered according to the code logic used in the first question?

1) 4                      2) 12                      3) 0                      4) 8



Collatz Conjecture scheme

### Question 11:

In the botanical garden owned by Vijay, there are three type of plants; ones which bear red flowers (I), ones which bear pink flowers (II), and rest bear both (III). Currently, the garden accommodates equal number of flowers from each category. As an effect of fertilizers, the red ones have lost their ability to reproduce and the rest two have equal chance to reproduce any of the three types, but one plant can reproduce only one plant at a time. The moment type-III plant is produced; the mother plant is treated so as to stop reproducing. If this continues for a long time, what would be the average number of child plants, that a mother plant ( type II and III) would have?

- 1) 1                      2) 3                      3) 2                      4) 6

### Question 12:

Kanheiya has joined the summer camp, where he gets to solve some interesting problems to sharpen his brain. He has been given 2 cubes, using which he has to represent all the months and dates. Each face of a cube bears different digits (from 0-9), but the digits on the two cubes can be the same. He does that first assuming that '5' will be represented as '5' and not '05'. He then repeats the same for the the case where '5' is represented as '05'. What's the minimum number of common faces the two cubes can have, with first cube faces adding up to give the least sum, in the two cases.

- 1) 2,2                      2) 2,3                      3) 3,3                      4) 3,2

### Question 13:

Megha has been selected as the Event Organizer for the upcoming Rangoli Competition in your society and has to buy 100 colour packets, using only the society fund of Rs. 100. She decides to spend all the fund for buying colours only. A red colour packet costs Rs. 6 each, a yellow one Rs. 3 and Green one for Rs 0.10. How many colour packets will she have?

(How to answer? If Megha bought 15 Red packets, 50 Yellow packets, and 35 Green packets then your answer should be: 5035 i.e. first two digits will be the number of yellow packets and the last two digits will be the number of green packets)

**Question 14:**

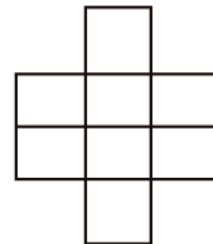
Sanny is trying to label two wires with their capacity, which is the maximum weight it can handle. He knows that the capacity of both the wires is the same and is between 1 and 100 kg. He has 100 weights: 1kg, 2kg, 3kg, ..., 100kg, to test the capacity. What is the least number of trials required by Sanny for knowing the capacity?

( **How to answer?** If he takes 123 trials, then answer 0123 )

**Question 15:**

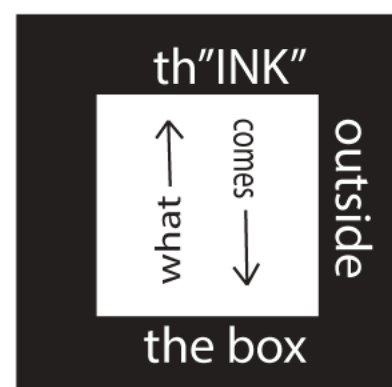
Eight shopkeepers, who used to quarrel a lot among themselves, were given slotnumbers by a fair owner as 1 to 8, such that the shopkeeper with a particular number will have his quarreling mates as his nearest numbers. The shops are separated by the roads as shown below. Now it's the time to arrange their shops for the fair on the map such that no one will encounter his quarreling mate just next, in a row or a column or diagonally.

Sayantan, the owner has done it, can you?

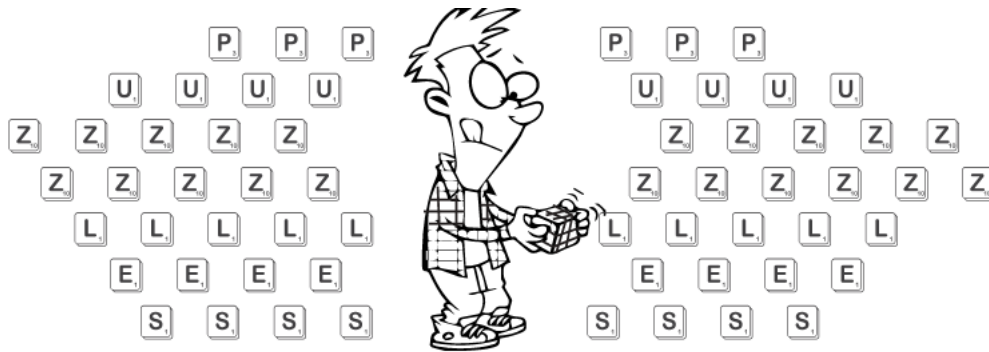


( **How to answer?** Give the unit's digit of all the three columns in the increasing order. Eg: if the three sums (left to right) are: 99,98,97 (which surely can't be!) then the answer is: 0789 )

KNOWLEDGE PARTNER  
SHARDA  
UNIVERSITY  
*Beyond Boundaries*

**Box 1****Box 2**



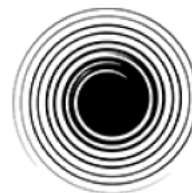


Kinetic Marking Scheme (Ques.: 16-19)

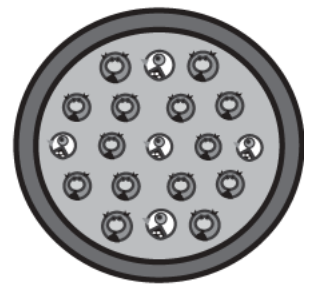
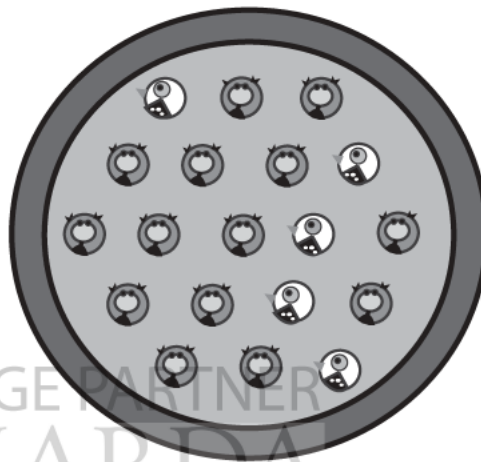
### Question 16:

Frogs of the Blobland, each occupying a leaf in their auspicious pond, have to arrange themselves for an holy ceremony. Full of mischief, rather than jumping directly to their correct positions, they start playing a game. They fix a frog and then the six frogs encircling it, will jump to their in-circle-neighbour's leaf in an anticlockwise fashion (count as 1 move). Then they will choose a new frog at random, and repeat till they are arranged. The frog being chosen as the center must have exactly six neighbors encircling him. Can you be a good instructor, and help them finish the game in least possible moves?

**(How to answer?** If it takes a total of 123 moves then answer it as 0123 )



Going in  
Circles



Desired  
Arrangement

Box 3



# Collapsing TOWERS

A township, owned by Kushal resembles a 10 X 10 grid with each block containing towers, which need to be collapsed. His civil engineer, Yogesh has developed a device which when placed in any of the blocks, and triggered, collapses all the towers in the horizontal and vertical direction, but its effect cannot pass through the barriers marked in the grid. It must be ensured that it doesn't destroy another device, already placed in the grid.

Numbered barriers indicate the quantity of devices that could be placed in the horizontally or vertically adjacent blocks. For a crossed barrier, you can put any number of devices beside it. The devices can also be placed in a block that is not adjacent to a barrier.

## Question 17:

Vinay has created 34 devices, for the plot-1.  
How many of these devices will not come in use?

				3			1		
			X						
				1	1			X	X
1									0
		1	0	X	0				
	X			1					
X			1			1			0
	1	0			2			X	
								1	

Plot 2

2					X	X	X		
		X		2		X	X		2
							X		
1							0		
								1	
		2				1			X
	X				X	X		0	
X		2							

Plot 1

## Question 18:

To use the remaining devices, they have contracted with another builder, Dhruv owning plot-2. Please help them place the devices on that grid.  
(Represent the position of device by shading that particular square in the particular square.)

# A Starry Night

## Question 19:

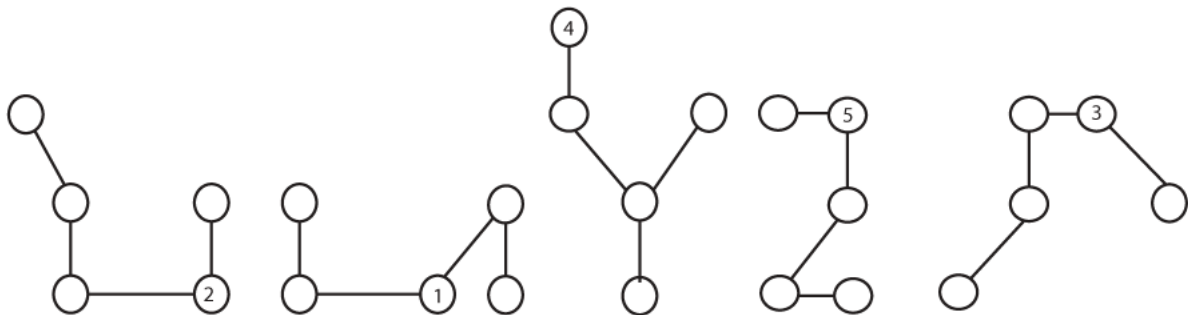
One summer night, little Vishal was lying on the roof waiting for sleep. He suddenly captures a group of 25 stars which were arranged in a  $5 \times 5$  grid, which sounds weird, but that's how it was, at least as per what he remembers.

With a close observation, he found that there were five brightness levels (1-5) of the stars and that no 2 stars of the same row or the same column had the same brightness level.

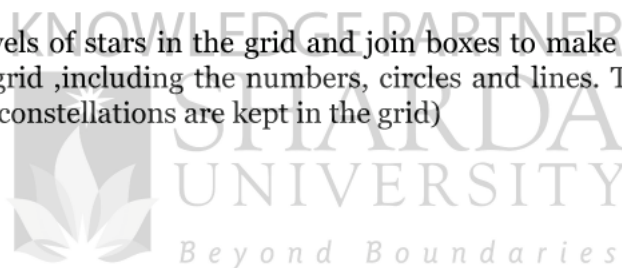
He was much more amazed to recognise 5 special constellations in the group, each containing 5 stars, one of each brightness level. Each star belongs to only one of these 5 constellations.

Next morning, he wanted to share his 'starry' experience with his friends; Zilani, Pavan and Manikanta, but unfortunately he could recall only a little bit of it, and he penned down only those details, for which he was certain.

Help him complete the 'starry' grid.



(Put the brightness levels of stars in the grid and join boxes to make the constellations. Arrange the constellations in the grid, including the numbers, circles and lines. The lines joining the stars may cross each other when constellations are kept in the grid)



# Decrypt Decrypt

Climb and Fall Marking scheme

Vinay in search of the ultimate mantra for success goes to the saint, Anirudh, living in the Himalayas. The Saint wants to test the determination Vinay has, to achieve his goal, and shows him a passage. On unlocking its door he can find the hidden code of life. But the door only opens with a magical keyword, which is hidden in the Saint's words.

**“Sky there, humbly blesses, Ajanta caves:  
‘asamba kimba amar... asamba kimba amar!!’ ”**

To help him, the saint has also given him a clue:  
**“Wait for a second, think carefully , repeat, you will get it.”**

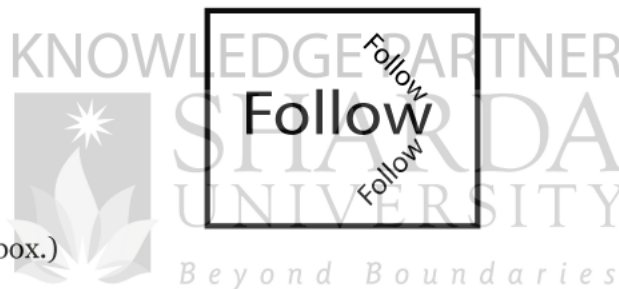
He also tells him,” Everything you see beyond this door, will have a relation to what you see next.”

## Question 20:

Say the magical word to open the door for Vinay.

## Question 21:

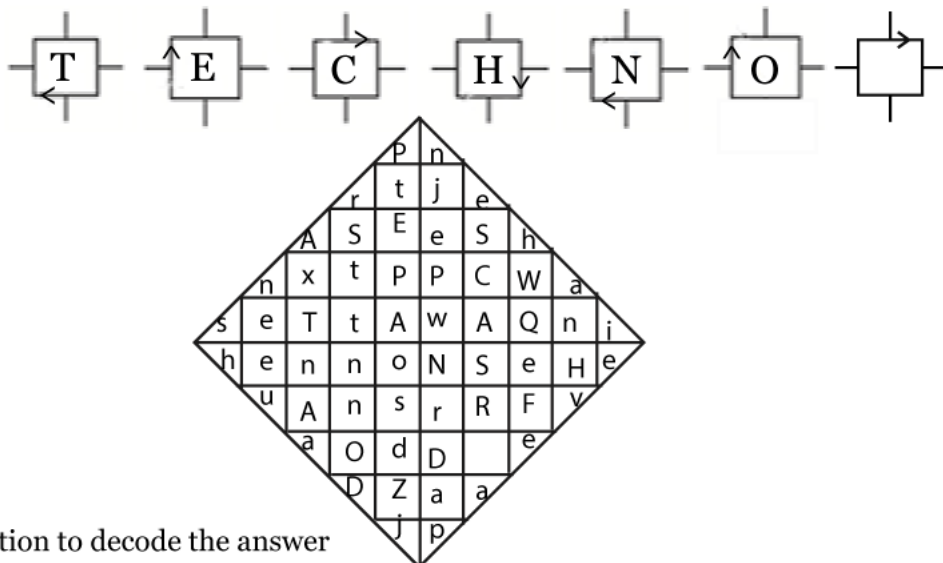
The door opens, and Vinay finds that a series of challenges await him. First up, is a sign board that looks like this:



(Hint: Think **inside** the box.)

## Question 22:

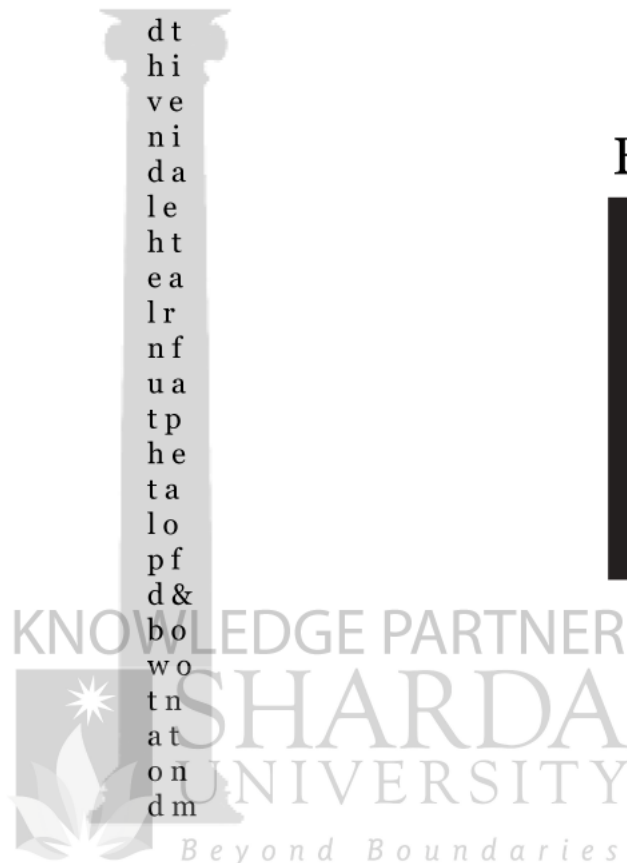
Then he encounters an ancient scroll, that has the following inscriptions:



(Use the inscription to decode the answer from the diamond)

**Question 23:**

In a dark corner, is a pillar with inscriptions all over it, here's what it looks like



**Box 4**



**Question 24:**

An unsuccessful hunter, has written on the walls

SLAETNI THEADD ATTRRRAGETNNS

(**Hint:** Divide and rule)

**Question 25:**

You are just a step away from success, echoes a voice

ees\_h\_bdlk\_\_ihzadbwt\_yhi\_\_twaei\_caetervr

("\_" represent spaces)

**Question 26:**

Finally, unravel the mystery of success.

rwvzgv mfigfiv prmwov

(**Hint :** Techniche speaks)





Relative Marking scheme

A Nuclear activation key has been stolen by terrorists. It is kept under heavy surveillance with guards patrolling around the area and a sniper overlooking the entire site. The terrorists have taken the key and hidden it in their camp somewhere in Assam, which is filled with Forests and is near a mountainous area. The site is next to the Brahmaputra river which has high and fast currents.

#### Constraints of the mission:

- \*Patrolling paths are shown by dotted lines and guards cover to and fro, with a speed of 1 minute per block, 50 seconds after the alarm is triggered.
- \*Agent Vinod's speed - 2 Minutes per block and 30 secs per block after collecting the key.
- \*Sniper reacts to uneven sound or actions takes 4 minutes to set his Magnum Sniper and 'shoot'.
- \*Collecting the key triggers an alarm.
- \*Points of interest are marked on map for e.g.. M,H,I,G.
- \*Patrolling starts at the given - X - Mark of the Dotted line.
- \*Entrance to the site is given in the question.
- \*The flammable substance takes 12-14 minutes to blast, once lit.

#### Your objective:

Infiltrate(gain access to) the location , Collect key and escape .( No weapons, or Armour )

#### Personal Profile:

Name : Agent Vinod  
Age : 23 Yr  
Skills : Stealthy Agent  
Habits : Addicted to Technology, weapons for and adventure.

#### Enemy Profile :

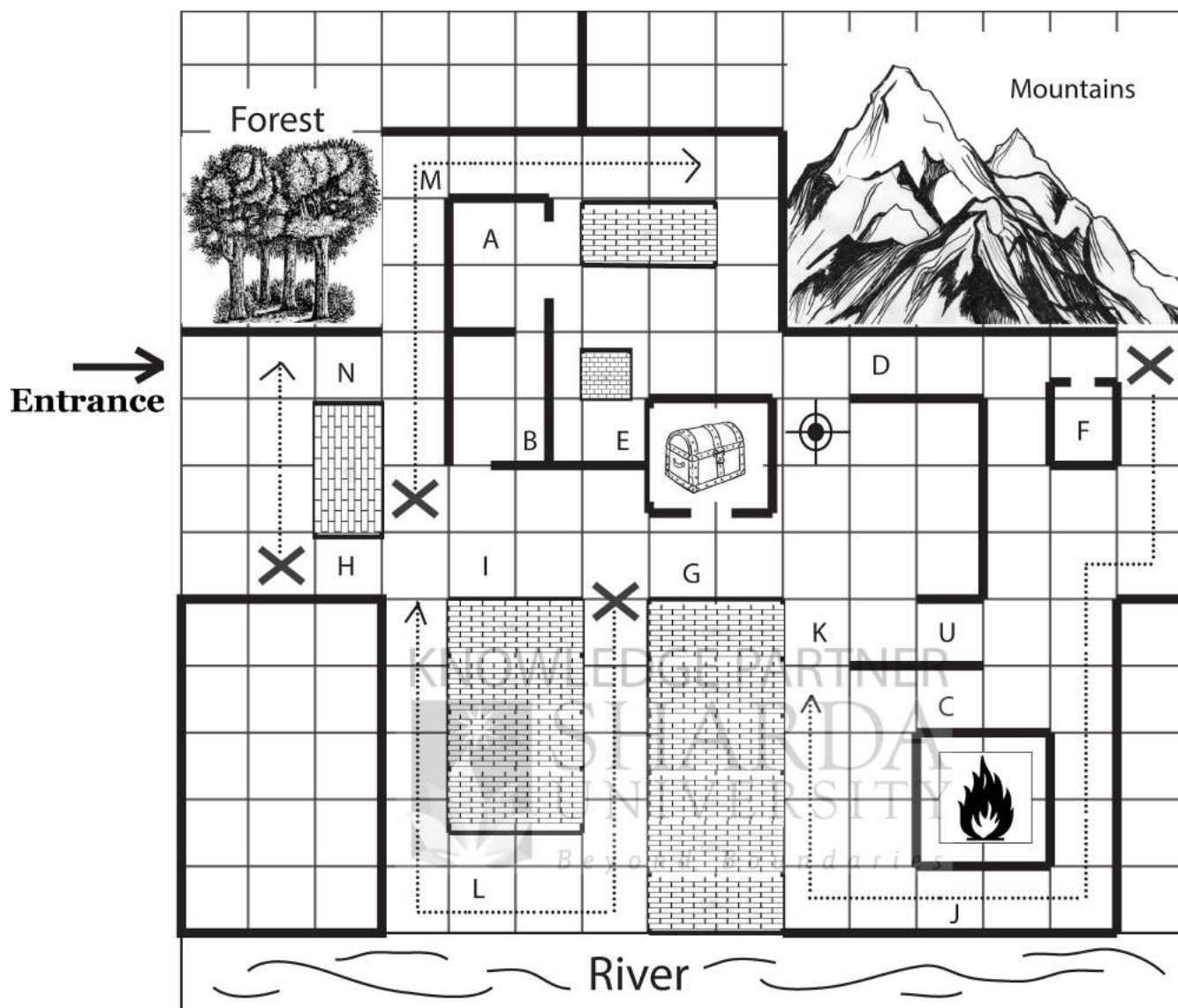
Name : Rahul, Rajesh, Bhavin, Suwardhan  
Age : Unknown  
Skills : Bandits  
Habits : Evil Persons and have an utter thirst blood.

#### Question 27:

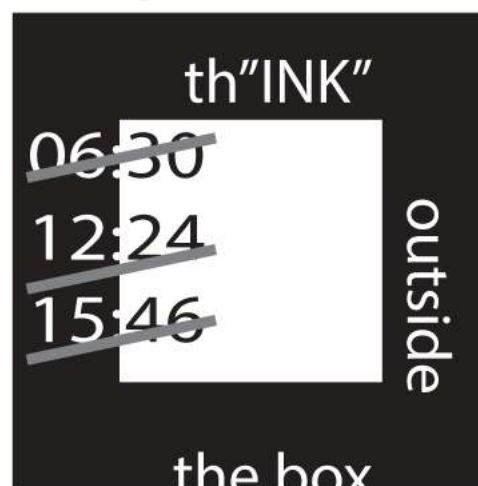
Share your wise strategy with us.

Pattern to be followed:

- Points you visit in sequence;
- Time you wait at each point;
- LIKE      A      1m [ Wait at A for 1 minute ] , B      2s [ Wait at B for 2 seconds ]



## Box 5



# 10 Years of Inspiring Young Minds

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## A word from the Organizers of Technothon 2013

### The Question Paper

As our team sat together to prepare the question paper that you attempted during the course of the last two hours, a few thoughts often crossed our minds:

‘Is the paper too tough? Will the students be able to enjoy it? Should we make it easier?’

Well, we contemplated long and hard on this, and the answer we came up with was:

The paper has been designed such that you've got to be awesome to solve all of the questions within the stipulated time. We stressed on this fact during our team's meetings. Our intention was to select the best and the brightest minds from across the country, through a paper that would uniformly inspire all young minds that wrote it.

The preliminary round of Technothon 2013, in our opinion, comes close to testing the mental prowess that a student requires to become a world leader. Most definitely, it is wonderful to clear the preliminary round. However - don't be disheartened if you don't manage to clear it! “Success is not final, and failure is not fatal. It's the courage to continue that counts.”, as Winston Churchill famously put it. We hope that you will positively take up the challenge of returning here next year and attempt to clear what is arguably, one of the most competitive examinations conducted for school students in India.

On a side note, you might have noticed that the question paper was prepared with names of various people. We would like to point out that these are the names of members of Team Technothon who were involved with the preparation of the Question paper. They've spent long hours in building from scratch a question paper that students all over the nation could solve, and as you might probably agree, they have done a pretty good job! We really do hope that you had as good a time solving the questions as we did while preparing them!

# Flashback

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## Indian Institute of Technology Guwahati

Presenting the body that brought Technothon 2013 to you – IIT Guwahati!

Established in 1994 as the sixth member of the IIT Fraternity, IIT Guwahati is one of the premier institutions for engineering, science and technology in the country. IIT Guwahati functions completely in a state-of-the-art and generously endowed campus both in infrastructure and natural beauty. Spread across 700 acres with the majestic Brahmaputra on one side, and hillocks and lakes on the other, this campus with its natural beauty provides an ideal setting for learning and innovation. We, as IITians, strive for excellence in all walks of life. Because, excellence and innovation are two words that aptly define the 3000-odd students who live on this campus.

## Techniche

Techniche is the Annual Techno-Management Festival of IIT Guwahati. Every year, the IIT-G student community organises Techniche which draws an immense participation from around the world. Techniche is conducted with a vision to foster the spirit of science and technology among the youth of India and has successfully completed 14 editions. Eminent personalities, Nobel laureates, and world leaders have graced the stage during Techniche in its past editions. With '**Ideate nurture Kindle**' as the tag line for the coming-up 2013 edition of Techniche, you just know that the techno-management extravaganza is going to get much bigger. Technothon – The International School Championship is the module of Techniche devoted exclusively to school students across India!



*Ideate.*



*Nurture.*



*Kindle.*

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## An open invitation for a lifelong association with Technothlon

Before you feel like you have reached the end of a sensation, we should remind you that this is merely the beginning! The Technothlon community has been growing at a phenomenal rate, and we invite YOU, the future leaders of the country, to be a part of it. Regardless of whether you make it through to the final round or not, we cherish the opportunity to interact with every one of you. Facebook is our means of reaching out to the student community.

*Be connected, stay updated!*

We are eager to help through counseling of any kind required in any sphere by utilizing the experienced pool of IITians and highly qualified faculty of IIT Guwahati.

And finally, we would be glad to receive any constructive feedback about the question-paper or any general issue that you would like to discuss with us. After all, your feedback is what Technothlon thrives on for improvement. :)

### Chief Organising Team

Pranshu Anand  
Vijay Sai

Neha Singh  
Krtin Kumar  
Om Prakash Reddy

Durvank Yewle  
Arpit Jain

**Contact us at**  
[www.techniche.org/technothlon/](http://www.techniche.org/technothlon/)





"Technothon is glad to associate with Sharda University as its Knowledge Partner. Sharda University will be offering scholarship to top 30 students of XII standard who get selected in Technothon 2013."



[www.sSparsha.com](http://www.sSparsha.com)

"You can grab Technothon Merchandise @ [store.esparsha.com](http://store.esparsha.com)"

# Scribble Here

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