presents

Techn thlon

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

JUNIORS SQUAD

Team Details

Time: 2hrs 30min
Maximum Marks : 114
Minimum Marks : -66

Name of the participants:

1._____

2._____

Roll Number: _____

School Name:_____

Please read the instructions carefully

General Instructions

1. Fill the Team Details in the space provided, before starting to attempt the paper.
2. Verify that the question paper contains 27 pages and 27 Questions (22 in Technothlon + 5 in TechnoFin).
3. All the answers must be written in the OMR provided separately which has to be submitted at the end of 2hr 15 min from the start of examination. The next 15min must be spent in attempting TechnoFin. Instructions for TechnoFin are given later in this booklet.
4. The question paper can be taken back home.
5. All answers must be clear and legible. In case of any ambiguity, the decision of evaluator is final.
6. No queries regarding the correctness of the questions shall be entertained.
7. Blank papers, clipboards, log tables, slide rulers, calculators, cellular phones, pagers and any other electronic gadgets are not allowed.
8. No additional sheets will be provided for rough work.

Selection Criteria and Result

1. The ranking will be based on the total marks obtained in all the sections (excluding TechnoFin).
2. The result will be declared on or before August 11, 2015 on our website
   technothlon.techniche.org
   To check your result, login with roll number and password provided in your admit card.
3. The top 50 teams will be invited to IIT Guwahati for the Mains and will be awarded Gold certificates. The next 200 will be awarded Silver certificates.

OMR Instructions

1. DO NOT TAMPER WITH THE OMR.
2. Darken the bubbles properly with **BLACK** ball point pen only.
3. Fill all the details in the OMR sheet properly.
4. Follow the correct method as shown in the figure to fill in the OMR Sheet.

Please read the instructions carefully

Question Paper Format (Only for Technothlon and not Technofin)

1. There are 18 single answer type objective questions. You need to bubble the correct option in the OMR.
2. There are 4 integer type questions where you need to bubble the correct integer in the OMR.

MARKING SCHEME

You will begin your exam with 100 marks (coins). In every section you can either save your marks or gain some more marks.

Full or Nil (for first section) : Unless and until you answer all the questions of the section correctly, you cannot save your 20 coins i.e., if you solve all questions in section 1 correctly then, you wont lose or gain anything. Else you will lose 20 marks.

From the second section one of these marking schemes is used:

1. Pay for help : If you are unable to solve any challenge that you face on your journey, you must take the help of the residents of that place in order to solve it and go further on your journey. This will cost you some marks(coins).
   In every section or part of the section where this kind of marking scheme is used, the number of marks you would lose is $(2^{a+1} + 2^{b+2} - 6)$, where 'a' is the number of unattempted questions and 'b' is the number of wrongly answered questions of that particular section or part of section.

2. Reward : You can also increase the marks(coins) you have. In questions with this marking scheme, your confidence factor is tested and so you have to choose between two of the following marking schemes:

   (C) Confident : You start with base marks(per question) of 4 and with every correct answer your base marks increase by 2. If at any point you break the sequence (by not attempting/ wrongly answering) then 6 marks will be deducted and your base marks fall back to 4.
   (N) Not confident : You start with base marks(per question) of 3 and with every correct answer your base marks increase by 1. If at any point you break the sequence then 3 marks will be deducted and your base marks fall back to 3.

In the OMR, bubble 'Y' if you want to choose Confident else bubble 'N' for Not Confident at the start of every section that includes this marking scheme.

Note: Solve the paper in ascending order, starting from Section 1. If the number of coins you have falls below 20 at any stage, you will be disqualified and further marks will not be added. Your journey will remain incomplete.

Your friend loves history. He loves reading stories about life in the ancient era, especially Greek civilization. You and your friend plan to go on a trip to Greece after your grandfather gifted you 100 historic gold coins on your last birthday.

While making preparations for the trip, you come across a contest, whose prize would be two free tickets to the heart of the Greek civilization, Athens! You and your friend decide to participate in order to save your money. You face the following 3 questions in the contest:
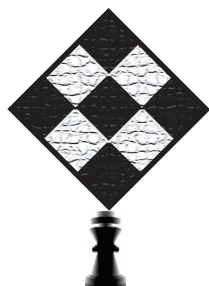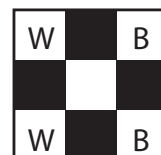
Chess Quizzer

[Marking Scheme: Full or Nil]

Question 1:

The picture demonstrates a 3*3 box with 4 knights denoted by the letters. W stands for a white knight and B for a black one. As in a standard game of chess, the knight can move only two steps in the horizontal or vertical direction and then one step in the other direction for one move.

The objective of the game is to interchange the position of both the black and white knights. What is the minimum number of moves required to complete the game?

W		B
W		B

(A) 8   (B) 12   (C) 16   (D)18

Question 2:

You have one knight, one king, one queen, one rook and one pawn each of the same colour. Arrange all five of these pieces on the chessboard shown such that the following conditions are satisfied:

(i)   The no. of pieces attacking a square(with a number on it) should be equal to the number written on it.
(ii) There should not be any piece on a square which has a number written on it.

|	A	B	C	D	E	F	G	H
8	0							
7	0	0						
6		0	0					
5			0	0				
4				0	0			
3					0	0		
2		2				0	0	
1							0	0

[Note: A king can only attack its adjacent squares, a pawn attacks its diagonally adjacent squares, a rook on its horizontal and vertical lines, a queen on its horizontal, vertical and diagonal lines and a knight as explained in question 1. Lastly, rook and queen cannot attack a square if there is a some other piece in the path of attack.]

What should be the position of the Queen?

(A) B1   (B) B2   (C) A1   (D) A2

Question 3:

What is the minimum number of moves required to move from the situation in the left to that in the right if the valid moves for bishop, rook, knight, king and pawn are shown below?
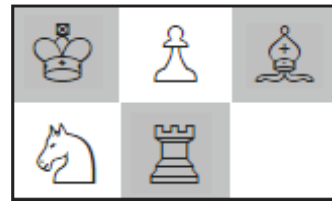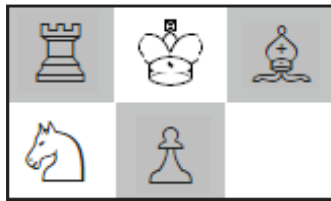
Valid moves of:

Bishop   Rook   Knight   King   Pawn
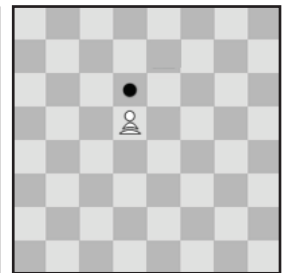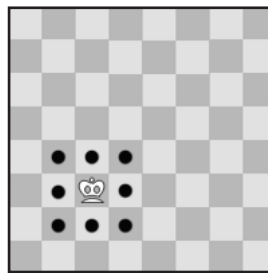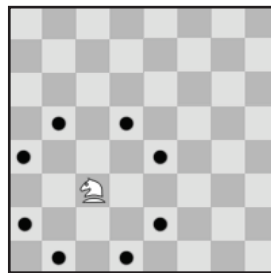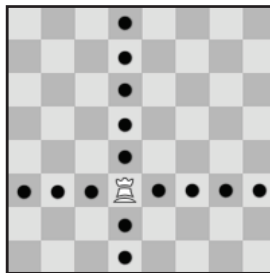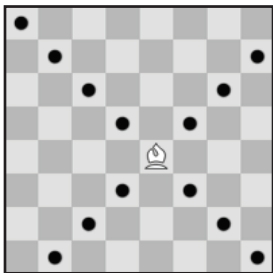
(A) 9
(B) 18
(C) 16
(D) 8

You and your friend save as much money as possible by participating in the contest and fly to Athens. Exploring Athens you and all other teams come to Parthenon, the temple of Athena, who is the goddess of wisdom and intelligence. You also see many images of an owl. You learn from the guide that it is the "Athena Noctua", also called the Minerva owl or the little owl. The guide also mentions some interesting stories of Athena's wisdom and cleverness.

Trouble With Flowers

The tourist guide at Parthenon takes you to an abandoned tunnel. And here you find an inscribed stone and a bowl of colored flowers. Suddenly you hear a deep and ancient gong ringing as you start reading the Stone Of Instructions. The instructions read as follows:

Every person entering the Temple of Athena will be given a bowl with 15 red flowers and 12 yellow flowers. Each time the Gong of Time rings, he/she must do one of two things:
1. Exchange: If he has at least 3 red flowers in his bowl, then he may exchange 3 red flowers for 2 yellow flowers.
2. Swap: He may replace each yellow flower in his bowl with a red flower and replace each red flower in his bowl with a yellow flower. That is, if he starts with i red flowers and j yellow flowers, then after he performs this operation, he will have j red flowers and i yellow flowers.

[You can leave the tunnel only when you make all the combinations (no. of red, no. of yellow) of flowers that are possible].

Question 4:
After how many operations will you have 5 each of red and yellow flowers?
(A) 5
(B) 10
(C) 15
(D) None of the above

Question 5:
What is the number of combinations you need to make to leave the tunnel?
(A) 27
(B) 52
(C) 54
(D) None of the above

The next day, on your way back from Parthenon, you see an owl injured under a large, old tree. You decide to save the owl and fix its wing, so you take it along with you. Later you get to know that owl needs to reach IIT Guwahati, India as soon as possible. Realizing how dangerous it could be for the owl to travel to India, you decide to help the owl reach its destination.

Parthenon

CRACK THE CODE

Question 6:

You now reach Turkey. Tired by your journey, you decide to go sightseeing in the town of Istanbul. Inside the Hagia Sophia, while you are walking, you find a key-ring which has two keys on it, with a keychain as shown below.
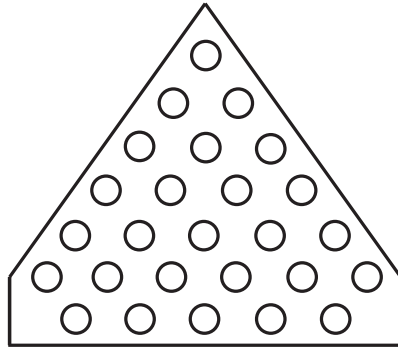
En route outside the castle, you find out that the escape is through a channel, which has two doors one behind another. Above the first door, it is written

"Alphabet starts with 'a'"

"Look down to up, and you'll see something interesting that satisfies me".

So you plug one of the keys into the door. A sentence appears on it, along with a keyboard.
"Alohomora".
You decode what the sentence means and type in "eszrzxzbe".
The gate opened, sucking in the key plugged in and exposing another gate, with another sentence written "Incendio".
Suddenly the owl faints due to very less oxygen and you are left to decode the code.
What do you type in to open the gate?

(A)syimylsz
(B)sylmyisz
(C)sflmfisz
(D)sfimflsz

Turkey

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SAFE PATHS

Question 7:

On your way to IIT Guwahati, you and your friends have to cross Aleppo. There are some safe one-way paths such that you can move only in east or south direction. Below is the map of those safe paths. You start at 'H' and need to reach 'O'. The arrows show the direction you must follow on the way.
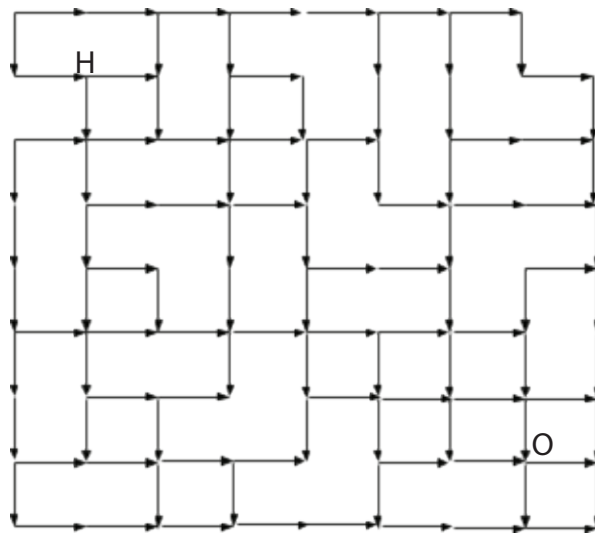
Find the number of different routes that your group can take to cross the desert.
(A) 440
(B) 86400
(C) 75
(D) 42

Fragments

While travelling through the Syrian Desert, you are in desperate need of water. The owl, still bursting with energy(God knows how) comes flying back to you to tell you that she has located a water faucet nearby. Hearing this, you rush to it, to find a real water cooler. But the problem is, it has seven pieces lying on the ground which have to be fitted to form a rectangle in order to have the faucet working.
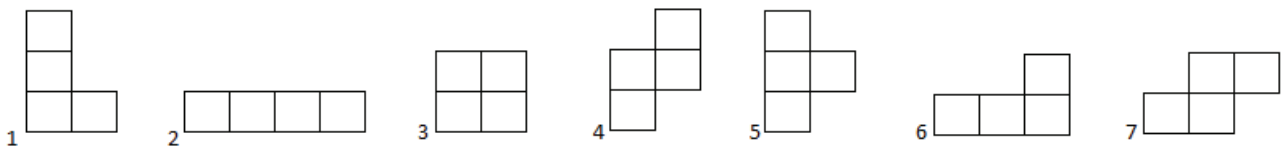
Question 8:
Which of the following statements are correct about the rectangle formed?
(A) The corner four pieces are 1,3,5,7
(B) The corner four pieces are 1,2,5,6
(C) The corner four pieces are 2,4,5,7
(D) Rectangle cannot be formed

Suddenly, the Desert God emerges out of the faucet. He says, "I am pleased with your hard-work, and will reward you with food if you pass my challenge." He gives you infinite number pieces of five different types as shown below with numbers etched on them. He then tells you to use a maximum of 30 of these pieces to make a rectangle such that the sum of the numbers on all of the small squares is maximum. Also, each type should be used at least once.
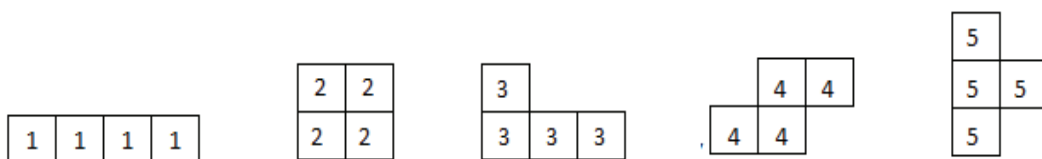
Question 9:
What is maximum sum of all the numbers that is possible?
(A) 137
(B) 136
(C) 127
(D) Rectangle cannot be formed
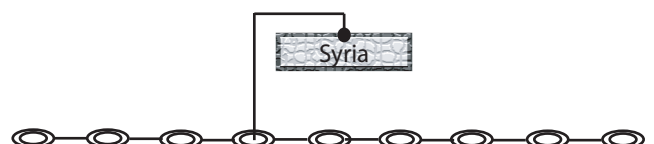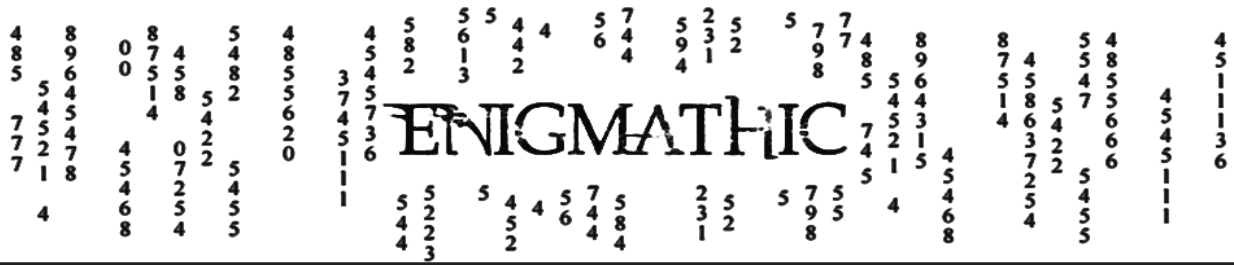
[Marking Scheme: Reward (for 10,11) and Pay for Help (for 12,13)]

As you reach Iraq, you see 49 people fighting among themselves to split their prize money. Many don't want to divide it into 49 equal parts as they worked harder than the others.

To resolve the issue, the Owl suggests a way: "If 50% or more people in the group agree on splitting equally, then they will split equally. If not, the person with the least contribution loses his claim, and is out of the group. The voting continues till a solution is reached".(ex : Suppose there are 10 people left. If 5 or more agree to divide the prize money equally, each would get an equal share. If not, the 10th ranked person is out of the group, and voting continues with the 9 people left).

Question 10:

In short, among how many people should the prize money be divided equally if every person is self-centred and every time he/she votes, tries to get maximum benefit?

After your suggestion, the people of Iraq pay you a little as a reward for your help. Later, on your way to a hotel you find some people debating on an issue. Help them resolve it and earn some more money in return for your favour.

Question 11:

The issue is:

The government of Iraq wants to issue 'd' denominations of coins (in whole numbers of dinars(Iraqi currency)) so that by using no more than 3 coins, citizens can pay any amount from 1 dinar to 36 dinar. Find the value of 'd' and all the 'd' denominations and give the sum of all these 'd' denominations?

(Ex: if d=3 and 3 denominations are {4,5,3}, answer= 4+5+3= 12.)

Question 12:

After resolving the issue, you stop at the hotel to take rest for the night. Unfortunately, the hotel is owned by Poseidon. Poseidon is Athena's greatest enemy. Poseidon, on knowing that you are coming from Parthenon(Temple of Athena), decides to make life awful for all of you. There are 32 rooms in the hotel and there are 32 identical looking keys. He gives them all and says that the second heaviest key is the one which opens your room. He also says that there is a balance (it compares two keys at a time) which can be used only N times ,where N is the minimum number of comparisons required to find the second heaviest key. What is the value of N?

Question 13:

Next, just to make your life even more difficult, he says that while you are checking out of the hotel, you should pay him any amount(in integer value of dinars) exactly that he asks (the maximum that he can ask is 302 dinars). So, you decide to divide 302 dinars into 'N' different pouches such that you can pay him any amount from 1 to 302 dinars by giving certain number of pouches. What is the minimum value of 'N'?

[Note: The above 4 questions are 2-digit integer type i.e., the answer can be any integer from 00 to 99].
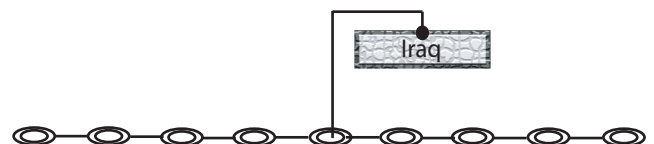
COALESCE

As you travel from Iraq towards IIT Guwahati, after a long time you find yourselves on a mountain trail in Tehran, Iran. The mountain trail is difficult and slippery. You suddenly get caught in a landslide and fall into a deep hole. Then the stones of 2 kg weight start falling onto you from above.

The hole is a 4x4 grid i.e., it is divided into 16 squares. Each square can accommodate only one stone (of any weight). To survive, you need at least one empty square. Owl notices your trouble and gives you the magical power to meld together stones, but only those of the same mass can be mould together. Since the stones are falling very fast, you are only able to push the stones in straight lines (horizontally/vertically).

For example, when the arrangement of one of the rows in figure 1 when pushed horizontally to left transforms as shown:

2	2	2	2

4	4		

After 1st push

8			

After 2nd push
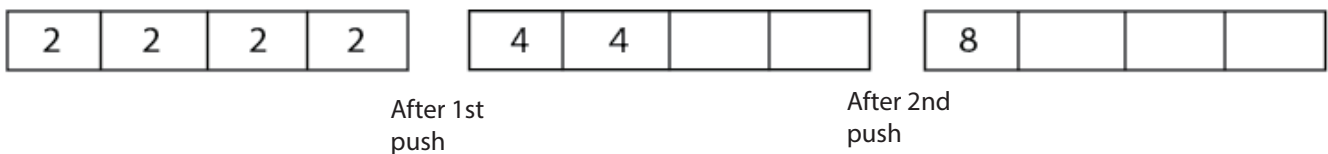
Question 14:
If one stone falls every second, what is the maximum time for which you can survive i.e., when no square is empty and all stones become immovable?
(A) (2^16) -1
(B) (2^17) -1
(C) (2^17) - 2
(D) 2^16

Question 15:
What is the largest stone that you can make if every second, either 2kg stone or 4 kg stones fall?
(A) 2^17
(B) 2^16
(C) (2^16) -1
(D) (2^17)-2

Tehran

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11
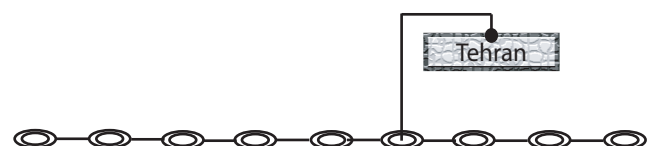
ON THE BANKS OF HARI

After a day filled with adventures in Tehran, you now reach the bank of Hari river. There you find a box that contains the key to the boat which can help you cross the river quickly. The box can be opened only if the correct password is entered. On the top part of the box there is a number carved.

"101111830140311"

The box you have got can be opened by deciphering the code number given on the top of the box which would provide you the password. The password consists only English alphabets (capital). Each alphabet is coded by a three digit number in which the ones-place is given by the number of curved lines in that alphabet and the tens- place is given by the number of straight lines in the alphabet. To find the hundredths-place digit first place all the alphabets with the same last two digits together in their alphabetical order and interchange the first half with the second half. Now number them 1 onwards and thus the corresponding number will take the hundredths-place.

Example: Let these letters (of some unknown alphabet) be the ones having one curved line and one straight line in ascending order then they will be coded as-

$$\theta\Phi\Psi\in\mathsf{Y} \longleftrightarrow \quad \in \quad \mathsf{Y} \quad \Psi \quad \theta \quad \Phi$$
$$ 111 \quad 211 \quad 311 \quad 411 \quad 511$$

(Consider "B" to have 2 curves and 1 straight line whereas "U" to have only a curved line. Also consider these letter as shown here: G I J Q R Y)

Question 16:

What is the correct password?

(A)SQYWD   (B)SPIWD   (C)SQIMJ   (D)UPYMJ

As soon as you cross the river, you find a Kabuliwala. You ask him for help to reach Kabul as soon as possible. He says that he will show you the way to Kabul if you help him with the answer of a question. First he explains you the game of CROSS- ZERO.

"This game is played on a matrix of 3x3. In this game, the players try to get three circles or three crosses in a row (horizontal, vertical, or diagonal). A player always tries to win, i.e., if a player can place his own symbol (X or O) in a row that already contains two of his own symbols, he will do so. A player always tries to avoid that his opponent wins, i.e., if a player can place his own symbol (X or O) in a row that already contains two of the symbols of his opponent, he will do so."

The question he asks is that Khaled and Shahzia play a game of Cross-Zero. Khaled plays with crosses (X) and Shahzia plays with circles (O); however we don't know who started the game. The players are intelligent enough and maintain the rules. After six turns into the game the matrix looks like-

Question 17:

So who will win the game?

(a)Any one can win depending on the initial move

(b)Khaled

(c)Shahzia

(d)The game will result in a draw.

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12
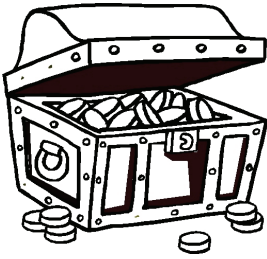
Treasure of Kabul

You then head towards Kabul. After reaching there, you come to know that the King's descendant found an ancient-Treasure Box. One of the men of the ancient court discovered that that to open the treasure-box one has to fold the square papers with special magnetic ink in a 'Heart' like shaped region(as shown below) such that the ultimate shape we get is the shape with magnetic ink on the paper, so that this paper can be inserted in the keyhole of the treasure-box and open it. Help the descendant and get 10% of the treasure as reward.
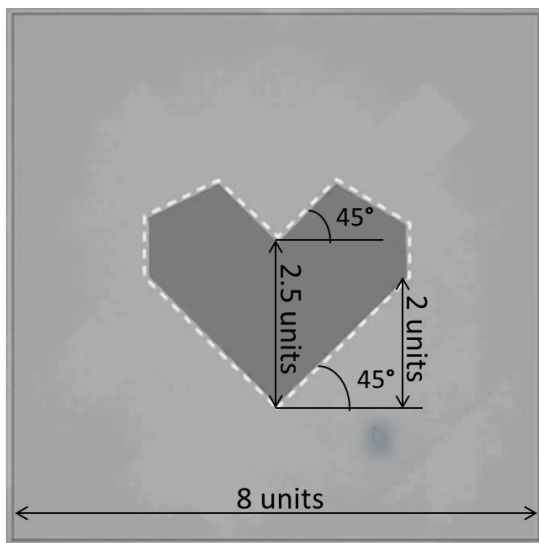
(Similar paper is given at the end of all the question i.e., page no:17).

Question 18:
What is the minimum number of folds required to complete the task?
(A) 8
(B) 9
(C) 10
(D) 11

THE FINAL HUNT

Without any trouble you are safely travelling towards your desination. It is just then that you come across a cave, in Nepal. The owl says that the cave is a short-cut, but the journey would be difficult, with many obstacles along the way. Brilliant as you all are, you decide to take the challenge.

The cave is dark. One of you switches a flashlight on, and leads the way. Soon, you encounter a room with many book shelves. A door is on the other end of the room. As you observe the books, you notice that one book is very old, but the others are new. You realize that the old book may have the key for the door! You open the book and look through the pages. In the middle of the book, you see an odd figure, like the one below.

You think of a theory, and start solving the puzzle.
The lines originating from the centre, divide each pentagon into 10 equal parts or wedges.
The part between two immediate pentagons is a ring.

Remaining letters must be filled in such that:
1. Each ring must contain all the letters of the word "TOUCHLINES"
2. Every two adjacent wedges together must contain all letters of the word "TOUCHLINES".
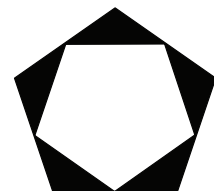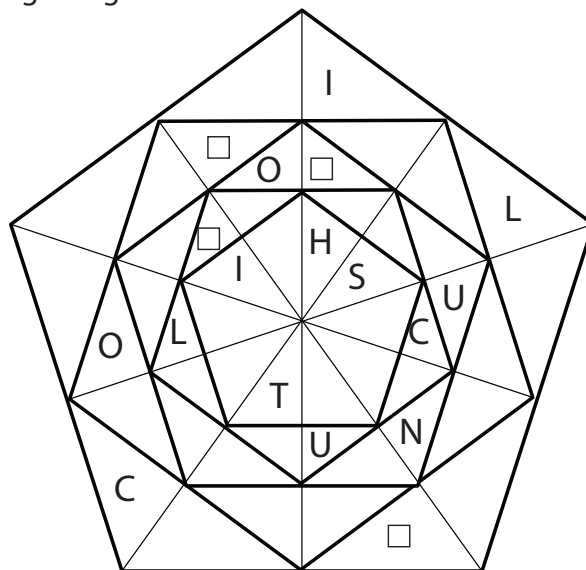
Ring
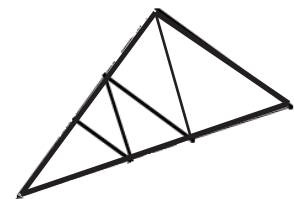
Wedge

 The above puzzle has four boxes. Starting from the outermost ring and going inwards, note the letters and compare with the options given below.

Question 19:
Which of the following is the correct answer?
(A)NEST   (B) SHIN   (C) ETCH   (D) SLIT

Nepal

You say the code word, and the door opens. You walk in, and look around the empty room. It is a dead end, but you see a poem on the wall. It reads:

<div align="center">

As you dance each _____ around,
though once, once only,
Me, when you shall have found,
Do not hide your glee!

</div>

One of you notices that the code word fits in the blank of the poem. As you think about the poem, you see an arrow which directs your eyes downward. To your amazement, you find the whole floor filled with letters and symbols!
You realize that you need to use the poem to find a solution to the puzzle under them.
The floor looked like this:

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

Rearrange the clues from the puzzle above, using the poem, to find a question and then answer it to get out of the cave.

Question 20:
What is the answer which can take you out of the cave?

(A) 07   (B) 70   (C) 18   (D) 81

Nepal

Technothlon
the international school championship
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Techniche
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3rd - 6th September 2015

You are running out of time but have no idea about the route from Nepal to IIT Guwahati. The various cut-out parts of the map that can help you reach IIT Guwahati are hidden in the houses shown in the figure below. You will get the parts of the map only on delivering the right article(one per house) to all the houses.

(i)   An 'X' coloured ARTICLE should be delivered to an 'X' coloured HOUSE only by using an 'X' coloured TRUCK.

(ii) A truck can also carry other coloured articles so that it can place them at any of the CHECKPOINTS from where other truck can later carry it to the destination.

(iii) Trucks can carry any number of articles at a time.

(iv) The main objective is to start all the trucks at the same time, with same speed and deliver the articles without collision of trucks. Also, a truck picks up every article that comes on its way.

(v)   Last and the most importantly, the PATHS of the trucks should not overlap at any point other than junctions. At junctions, the paths can though cross each other (but both trucks should not reach that junction at same time which leads to collision). The trucks can move only forward.
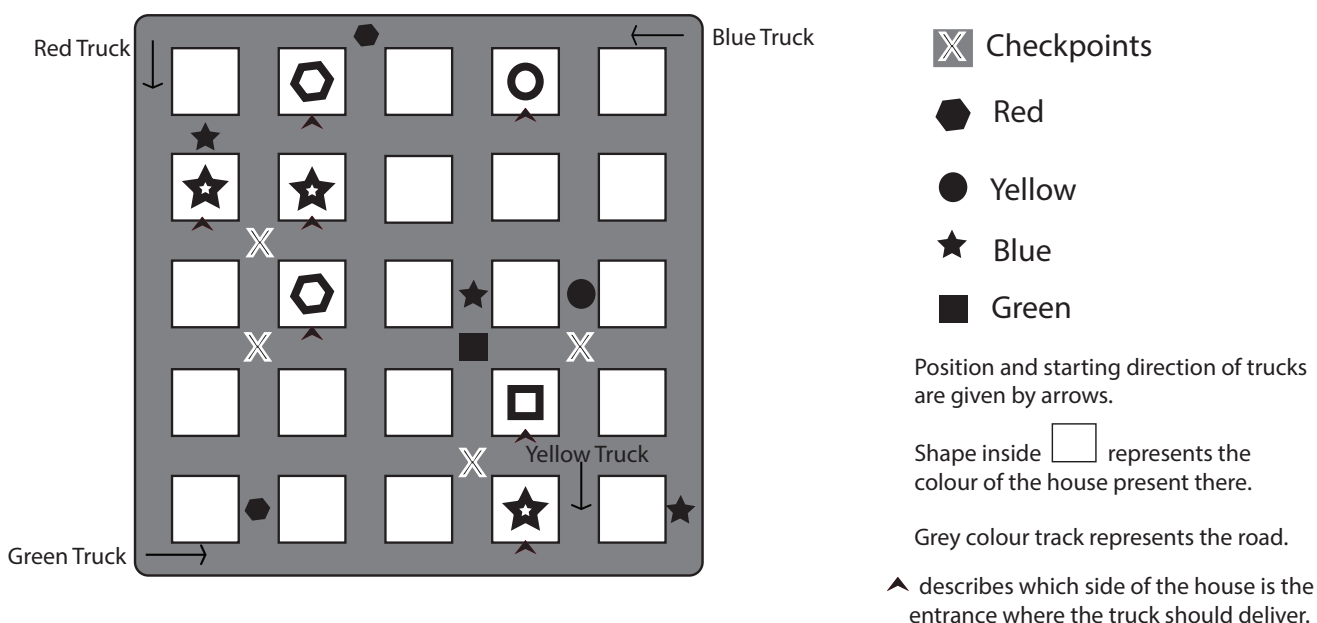
Question 21:

Draw the final path of all the trucks and give the number of turns taken by the blue truck.

(A) 8   (B) 7   (C) 6   (D) None of the above

Question 22:

Give the total number of articles carried by the red truck on it's way.

(A) 1   (B) 2   (C) 3   (D) 4
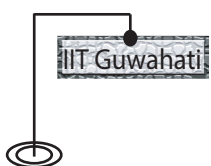
You come to the end of the journey and the owl in your arms flutters its wings and flies above your head to face you. A light glow fills the air around it as it speaks:
"Athena Noctua I am called. Sent by the goddess of Wisdom herself to help you on this and select the best members on the earth to fulfill the ancient prophecy of Athena. The good you've collected on your way will decide your fate. Till we meet again! " and the owl you held so dear to you for so long flies off leaving you waiting for the results.

The following is the drawing scaled to size that is useful for Question no:18. You can tear the following page to use it.

Cut Here
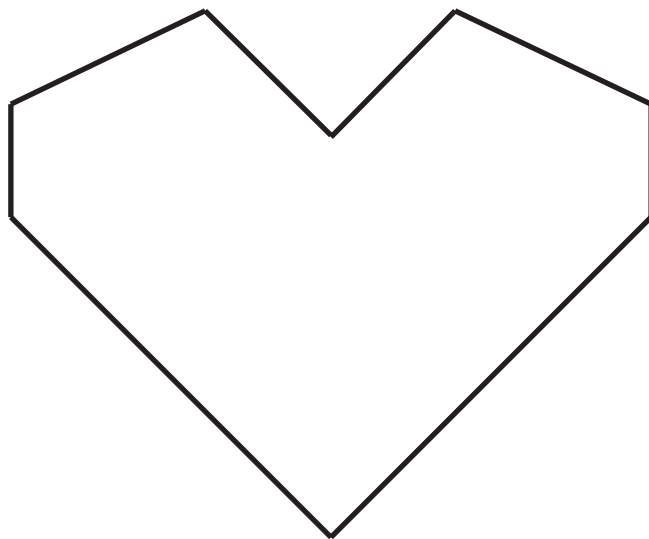
Congratulations!

You just attempted a paper which has been argued as one of the most competitive examinations conducted for the school students in India and abroad. As you sat behind your desks, scratching your pens and brains, spending your last two and half hours attempting the paper in front of you, along with lakhs of your peers all over the globe, hundreds of thoughts might have crossed your minds. We too while making this paper had our own set of apprehensions and doubts. Often during the course of preparation of the paper, we did ask ourselves a few questions: "Is the paper too tough? Will the students find it interesting to solve the paper? Are the questions too arbitrary?"

However, finally when the question paper reached into its final stage as is before you, all our anxieties got wiped off. The paper has been so designed that you along with your partner can solve all the questions within the stipulated time. Also, you do not need to be the alter ego of Albert Einstein to solve the paper. Our motto is to inspire all the young minds who write the paper and with that sole intention do we frame the questions so that we can select the best and the brightest buddies of our nation. Having a long experience of inspiring young minds worldwide, this twelfth edition of Technothlon prelims comes close to testing the mental prowess that a student requires to become a world leader and in turn inspire as many young minds as he/she can.

Making it through the preliminary round definitely adds another feather to your hat. However, don't lose hope if you somehow don't manage to make it to the top notch because one sheet of paper cannot decide your future. As has been aptly quoted by Conrad Hilton, "Success seems to be connected with action. Successful people keep moving. They make mistakes, but they don't quit". We do hope that you will positively take up this challenge, again come back next year and clear one of the most competitive exam.

This paper which lies in front of you is the fruit of the countless number of hours of effort put in by our team members. Technothlon team members have worked so diligently day and night and put in their heart and soul to make the question paper right from scratch to its present form. As you might see, they have done a commendable task! We do hope that you will enjoy solving the paper as much as we did while preparing it!

Good luck for your future ahead!

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 counselling 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 Organizng Team

Abhishek Chatterjee
Ajay Narasimha
Aneesh Dash
B. Vasavi Madhurima
Piyush Rai
Revanth Chetluru

Contact us at:

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Like a picturesque canvas has the most precise blend of colours, patterns and brush strokes, Techniche year after year promises to be a perfect blend of ideas, innovation and enthrallment. It has stayed true to its vision of motivating the youth of our nation to think out of the box, expand their horizons and reach the zenith of success in all techno-management spheres. Techniche brings forth a kaleidoscope of events, be it the astounding keynotes delivered by globally admired personalities in The Lecture Series or the opportunity to interact with eminent industrialists in The Industrial Conclave. Rediscover your inclination towards the literary aspect of life challenging Literary Events and a chance to perfect your art of diplomacy through IIT Guwahati's Model United Nations. From thrilling Robotic competitions to the enriching Workshops, every bit promises to be a fulfilling experience. With innovative ideas like Technothlon - The International School Championship, The Guwahati Half Marathon as well as other life inspiring initiatives, Techniche has left no stone unturned and now takes pride in being one of the premiere techno-management festivals of the nation.

LECTURE SERIES

The Lecture Series serves as a platform to inspire and motivate thousands of young minds across the world by connecting them with the pioneers in various fields. Students and professors, participants and school children alike, all clamour into the auditorium to interact with illustrious figures from all walks of life who come under one roof and share their experiences and ideas. It brings you an opportunity to interact with such personalities who are at the helm of changing our world today. Previous speakers who have graced the lecture series include the likes of John C. Mather (The 2006 Physics Nobel Laureate), Lyn Evans (Project Leader, Large Hadron Collider, CERN), Pranav Mistry (The Inventor of 6th Sense Technology), Stephen P. Morse (Chief Architect, Intel 8086 Microprocessor), Richard Stallman (Founder, Free Software Movement), Walter Bender (Ex-Director, MIT Media Labs), etc. Having gained immense popularity over the past few years, it is widely recognized as the biggest and the best lecture series in the entire nation.

INDUSTRIAL CONCLAVE

Industrial Conclave, has been, and forges ahead as an ideal interface between the industry and the students to inspire, motivate and train them for the battle for success in life. In this 3 day long, high profile event, eminent personalities from various spheres share their invaluable experiences which helps the young minds understand the internal dynamics of the ever growing industry.The past editions saw the likes of Mr. Marten Pieters (MD and CEO, Vodafone India), Ms. Vinita Bali (Former CEO and MD, Britannia Industries Ltd), Mr. Arun Iyer (National Creative Director, Lowe Lintas India) among others, the Conclave has ceaselessly grown bigger and better, every year. So, ladies and gentlemen, register now, and witness all the action, here at the Industrial Conclave 2015.

MODEL UNITED NATIONS

Born with the aim to bring out the best in every individual, the concept of IITG MUN is guided by a set of values and goals that seeks to provide every individual "hands down" idea of the intricacies of the decision making process at international level, in an effort to provide holistic development of society as a unit.

ROBOTICS

The Robotics module of Techniche 2015 provides you a platform to bring forth new ideas and produce novel technologies in the quest to build the perfect machine. So, put your thinking caps on and let the creative juices flow. From autonomous to manual robotics, there is going to be something for everybody.

And much more....

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AVANTI LEARNING CENTRES

Avanti Learning Centres (Avanti) is an award-winning, fast-growing venture backed education company started by **IIT and Harvard University alumni**. Our investors include **Pearson**, the world's largest education company. **Ashoka, Echoing Green, the Draper Richards Kaplan Foundation** and the **PanIIT Alumni** Organization have recognized our work.

Avanti provides students a world-class science and mathematics education to students in Class XI and XII. We work with over **1,200 students across 5 public school systems, 8 independent learning centres and 3 private schools across India.**

Avanti currently partners with Father Agnels School in Vashi, Mumbai, Lotus Valley International School in Gurgaon, Haryana and CMR National Public School and PU College in Bengaluru to run in-school programs. Additionally, we have centres in government school systems such as the Jawahar Navodaya Vidyalayas, Chennai Corporation, Haryana Government and Tibetan Government Schools.

OUR RESULTS

Avanti has a strong track record of success at the IIT JEE and board exams. In 2013 and 2014, 48% of our JEE batch qualified for admission to the IITs. More than 50% of our students scored over 90% in PCM. Over 90% of our class qualified for admission to top Engineering schools by clearing the JEE Mains. In addition to exam preparation, our program aims to provide students a fun and enriching learning environment to study math and science through our unique pedagogy.

PROGRAM DESCRIPTION: HOW ARE WE DIFFERENT?

Avanti follows a Peer Learning pedagogy designed by Prof. Eric Mazur, Dean of Applied Physics at Harvard University - focused on increasing **student self-reliance, collaboration** and **conceptual understanding**. Peer Learning is a lot more engaging than conventional lecturing and develops skills that are critical to success in college and in careers in science and technology. Students research each topic at home and reinforce their understanding in class through discussions and debates.

Avanti's program has 3 key elements:
Typical time spent on each topic covered by Avanti is given in the below schematic.
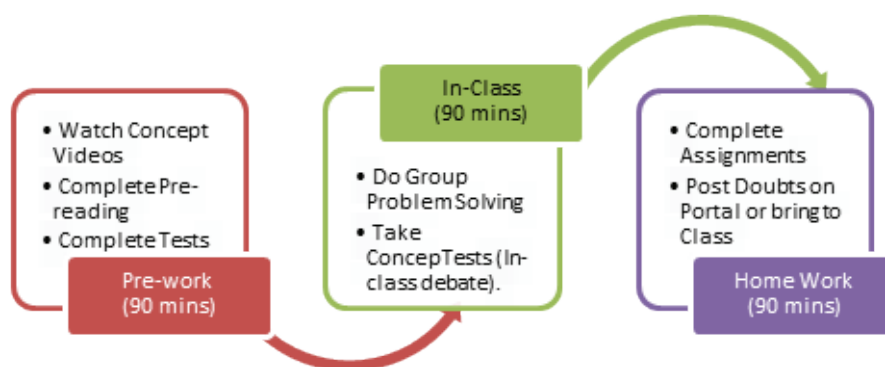
FEES

What's more fascinating is that we are able to do that at approx. one fourth the standard coaching rate. We provide high quality, proven, result driven education at affordable cost.

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SCRAP SHEET

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SCRAP SHEET

Techn₹ofin

a financial literacy initiative

Perturbed by the inadequate and below par financial literacy among school students in our nation, The Finance and Economics Club, IIT Guwahati introduces its initiative, TechnoFin in association with Technothlon to foster the financial literacy.

With the intention of catalysing the proliferation of financial literacy among indian youth, TechnoFin aims to acquaint the school-going students with basic economic and financial concepts and terminology which, in turn, will hand over to them the required tools to cope up with the complex financial world outside and to manage their personal finances as well.

Please read the instructions carefully

General Instructions:
1. Verify that there are 5 questions under Technofin.
2. Write the answers in the separate OMR given for TechnoFin.
3. Submit the OMR to the invigilator within 15min.
4. The question paper can be taken back home.
5. All answers must be clear and legible. In case of any ambiguity, the decision of evaluator is final.
6. No queries regarding the correctness of the questions shall be entertained.
7. It is not compulsory to attempt Technofin.

NO MARKS AWARDED FOR TECHNOFIN WILL BE INCLUDED IN TECHNOTHLON. EVERY TEAM ATTEMPTING TECHNOFIN WILL GET AN E-CERTIFICATE FROM **THE FINANCE AND ECONOMICS CLUB, IIT GUWAHATI**.

Marking Scheme:
Marks for ith question is the compound interest for the ith year on Rs 10 at 10% per annum.

Credit and debit are one of the most commonly used words in Finance. Our friend, Shankar is a bit confused regarding this concept. But he seems to remember the lines used by his father, 'while a debit card uses your own money deposited in a bank, credit card instead allows you to use the money of the bank with a promise that you will pay back the bank in a few days. You are heavily charged if you don't return money to the bank in a few days.' Also he seems to remember the advice of staying away from credit card. Help him solve the following example

"Aditya and Aakash run a restaurant together. They seem to be performing really well. Now they think they need to open a few more branches across their city. The project seems to cost them Rs. 10 crores. While Aakash has Rs.1 crore with him in bank, Aditya has almost zero savings.

They now have two sources of raising the funds-
1. Aman, a common friend of theirs is willing to lend them money at a interest rate of 10%
2. The bank may give Aditya a loan of maximum 3 crore, it can give Aakash a loan of maximum 2 crores at best. Bank charges 8% of the total sum."

Question 1:
Assuming they choose the best pathway for fund raising, what is their debit and credit just after borrowing the money?
Find debit and credit of Aakash and Aditya.
(A) Aakash debit: 1 crore, credit: 4 crores   Aditya debit:0, credit: 5 crores
(B) Aakash debit: 4 crore, credit: 1 crore   Aditya debit:5 crores, credit:0
(C) Aakash debit: 3 crore, credit: 2 crore   Aditya debit:2 crores, credit: 3 crores
(D) None of the above

Question 2:
While giving loans, banks consider whether a person applying for the loan should be granted one and how much. This is done by seeing a person's credit worthiness. As in the case above of Aditya and Aakash, the amount the bank is willing to pay them is 3 crores and 2 crores respectively. what factors do banks consider when you apply for a loan?
1. Your present and future ability to meet your loan payments
2. The value of your assets and your net worth
3. Your payment history
4. The property or assets that can be placed on the line in case payments are not made

(A) 1, 2 and 3   (B) Only 1   (C) 1, 2 and 4   (D) 1,2,3 and 4

Question 3:
Foreign direct Investment(FDI) simply means foreign companies investing in local businesses actively. This might involve either creation of new factory and new businesses as in the case of ford setting up it's factory in Chennai or buying existing local businesses for the purpose of growing it as in the case of Vodaphone buying Hutch.

Congratulations!!!.. You have taken up office as the Union Finance minister and you are determined to create India as a good investment location for foreign investors. To start with you intend to make the retail industry more open to FDI, so as to create more jobs, infrastructure and to have more foreign cash flow in the country. However you are strongly opposed by the retail shopkeeper's Union. Their leader says- "Bringing in Foreign retail giants is injustice to all the local store owners.. We wont let you steal our bread". Given the situation you have called a press conference to justify your initiative. Which arguments will you put in the press conference.

1. FDI in retails would promote the collaboration of the local shopkeepers and the retail giants thus ultimately help the shopkeepers in the long run.
2. The FDI would help consumers as local businessmen providing bad quality services would need to improve to match up with international counterparts.
3. The FDI would help bring newer technologies and organised business practices to the country.
4. The FDI would help benefit Indian Farmers, as international agricultural retail giants will promote organised supply methods and infrastructure which would help reducing the huge number of crops that perish every year.

(A) 1,2,3   (B) 1,2,4   (C) 1,3,4   (D) 2,3,4

Question 4:

"India's economy is growing and we are soon going to become an Economic superpower"- We hear statements like these every now and then. But what exactly does this growth mean??
GDP or Gross Domestic product is the indicator of a countries financial health. It represents the total monetary value of all goods and services produced over a specific time period - you can think of it as the size of the economy. It is stated as a percentage- 3% GDP growth refers to increase in this total value by 3%.

Being the Finance minister you have to take decisions on financial policy keeping economic parameters in mind- GDP being an important one. Which are the aspects of GDP would you keep in mind while formulating policies?

1. While GDP computations are done there are chances of double counting- which means if product B is used to make Product A. It doesn't make sense to add both their values in the final GDP calculation but the calculation might contain some such cases.
2. In GDP calculation the prices used are that at the market place. However, some goods are not sold in the marketplace, and these do not have market prices.
3. A large part of a country's economic activity which is unrecorded and untaxed by its government (this constitutes the black economy).
4. The higher the GDP growth the better it is for the country.

(A) 1,2,3,4   (B) 1,2,3   (C) 1,3,4   (D) 1,2,3

Question 5:

Consider a car manufacturing company C. It imports seats from a company S, steering wheel from a company W and side doors from a company D. Suppose that the profit margins for the companies S, W and D is 30%, 40% and 40% respectively. Also suppose that the company C makes a profit of around 15% annually. C sells cars worth of 100 crores globally and for this gives orders of 15 crores, 20 crores and 25 crores to companies S, W and D respectively. Suppose Mr. Mathur is the owner of all these 4 companies. What is the net profit of Mr. Mathur?
(A) 37.5 crores
(B) 7.5 crores
(C) -7.5 crores (He's actually having losses)
(D) None of the above