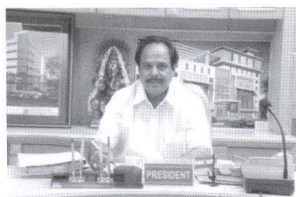


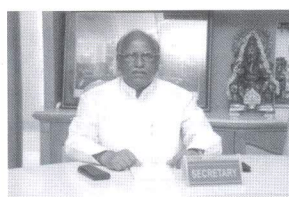


# EMANATION



President speaks...



"We are proud to present the first newsletter of the new EMANATION project. The newsletter will provide you with information about the progress, recent achievements, and important forthcoming activities. In addition to highlighting the biggest news of the week and giving you our take, the newsletters will keep you in the loop about all upcoming events that EMANATION is hosting, as well as events that we just think you should know about"



Secretary Speaks...

"I am delighted to introduce the first edition of the "EMANATION" newsletter. We intend to make it a regular publication to keep in touch with news and developments which relate to Mechanical Engineering and its implementation. "EMANATION" shall be covering all the updates related to Mechanical Engineering."

## CO-ORDINATORS

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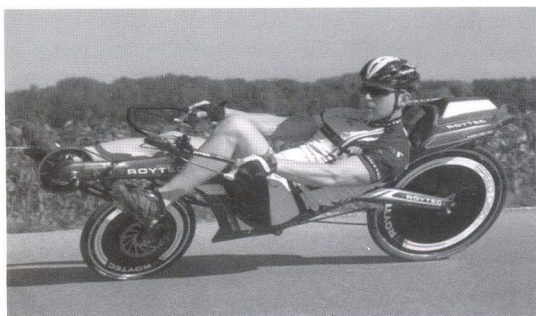
### 4th sen

- Tejaswini Nagesh
- Vinayak Sharma
- Shreyas.H.S

### 2nd sen

- Abhijith Magal
- Piyush Verma
- Akash.A.C
- Nishanth Patil

## THE BICYCLE REINVENTED!!



With the petrol prices reaching the skies, one of the best known invention of man, the bicycle is back in action. While more or less the basic design of the bicycle happens to remain the same for decades, a German based company named TroyTec has a new milestone in this area. The company recently unveiled its new "Revolution Modular Bike" and it is a pure work of wonderful engineering. The backbone for the Revolution Bikes is a carbon frame which allows the bike to have 4 basic configurations. The user is given the option to select between high and low ride while also allowing them the option of rigid or semi-rigid suspension. All this is made possible by employing the robust carbon fiber frame. Other main components such as drivetrain and seats etc. are also replaceable and can be swapped from one bike to another. 20" Front wheels accompany LR-FS and LR modifications while the front wheels on HR and HR-FS are 26". The rear wheels for all configurations can either be 26" or 28". Maximum wheel thickness that can be catered for is 35mm and the bike can

make use of different tyre types depending on user's preference. Although, the company gives the user only 4 general configurations to choose from, the user is actually capable of creating 12 unique bikes owing to the flexible frame and myriad of wheel sizes and tire styles that are available. The bike weighs only 8 kg thanks to the carbon frame while being highly durable. Due to the combination of the drop-outs you can also influence the driving characteristics, such as last runnings and back angle. The handle bar angle can be adapted to the angle of attack, height and length. Hence, you have a lot of possibilities fitting the bike perfectly to your own needs. Even mounting elements for a carrier or saddlebags are prepared.

Due to its unique design, TroyTec claims a 25% reduction in wind resistance as compared to a regular racing bike. This results in a speed of 27 mph using a pedaling power of 250 watts. This bike can be disassembled and packed in about 10 minutes which makes it very convenient to transport. However, changing the bike's mode is a tedious process and takes about 3 hours to complete because the cables for brakes and gear-shifting mechanism need to be rerouted. For better weight distribution, the user technically lies on an angle of 24 degrees on the frame. The price tag is \$7,275 for this bike which is quite an amount but considering the fact that it is made of carbon fiber and can be modified in so many ways, we would say that such a high price tag is justified. Overall, a great bicycle with a very unique design.



Faith is taking the first step even when you don't see the whole staircase.



### Principal Speaks...

"I am proud to put on record; the department of mechanical engineering is bringing out the premier newsletter for academic year 2013-14. Department had a very smooth start up and is well into the co curricular activities linking to teaching and learning process. Department newsletter is to meet, the goal set in the area of Innovation and research. All activities and upcoming events of the department will be addressed through this newsletter to enhance the learning environment. I wish all the staff and students of the department to keep up the meaningful intention in introducing this newsletter."



### Head Of Department Speaks...

"I feel great pride and honor in penning down my travails of The News Letter, from the department of MECHANICAL ENGINEERING providing the latest technical developments and information, career guidance and views of the Alumni's. It also gives the experience of the recently placed students facing the interviews. It provides a platform for students to present the technical reports and their innovative ideas."



### "EXPERIENCE OF THE PLACED"

The following students Venkatesh Prateek, Bharath Deshmukh, Kiran.P, Suhas, Sunil B.S, Sai Charan and Akshay Nag of VIII semester, Mechanical department were interviewed about their placement experience. They are placed in companies like L & T Infotech, Tech Mahindra, Kirloskar Toyota Textiles and HP. Here is a summary of their journey which included clearing many rounds such as Aptitude, Group discussion and HR interview.

The first hurdle was the aptitude test. While quite a few attempted the test, only about one third of the candidates were able to clear it. On being asked about their preparation, books like R.S Aggarwal, GRE and GATE tutors were recommended. When time management seemed to be a life saver to some, a strong foundation in basic mathematics and English played a key factor to others.

Group discussions involve abstract questions such as "Which is better, a square or a triangle?", "Good guys finish last." and - whether a higher budget for defence is required. We were told that in a group discussion confidence and precise opinions favoured chances of being selected.

Interviews were of both technical and non-technical. Core companies focussed on technical knowledge of the candidates, the IT firms on the other hand asked personal questions. The interviewer made the candidates comfortable while facing the interview.

All of them found the placement training especially the company specific training given by the college to be extremely helpful and boosted their confidence and advised us juniors to take it seriously.

- It is important to be humble and modest
- When the topic in a group discussion is beyond your comprehension it is better to listen to others opinions and then have a say in the matter.
- Confidence is a trump card in cracking an interview.
- Presence of mind plays a vital role at all phases.
- Having a strong fundamental knowledge in subjects like material science, mechanics of materials, thermodynamics and mathematics is a must for core companies.

- It is also important to know the background and history of the company before facing the interview.

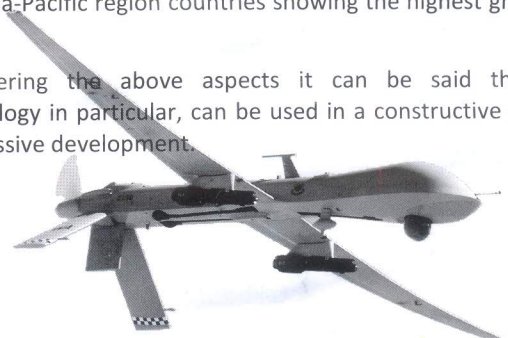
We hope the experiences shared and the advice given by our seniors will be of great help!

### DRONES AND THEIR ISSUES IN PROGRESSIVE DEVELOPMENT

Right from the ascent of heavier than air flight since in 1903, there has been a pursuit of unmanned aerial flights by different innovators. Up to the late 1990's and early 2000's the technology of unmanned aerial vehicles (drones as they are also popularly known) has grown by leaps and bounds. These remotely powered aircrafts capable of carrying weapons and gathering intelligence, operate on the same rules of engagement as that of the manned aircraft. More relevantly these drones have been used in war off late, especially in the Asian countries. This has highlighted some of the points (moral, ethical and legal) by those concerned regarding the development and use of drones. Also in question is the violation of the territorial sovereignty of the nation under attack of drones.

Again and again, time after time, technology as a double edge sword has been debated regarding the misuse of scientific innovations. It can be said that the same in the case of drones. Not to forget the positives of UAV's, especially the use of blimps (pressure airship) and zeppelins (rigid or semi rigid airships) in case of natural disasters, humanitarian relief, cargo transport, precision agriculture, weather and storm tracking, advertisement and other military applications. **More recently amazon.com (an online shopping portal) is considering the delivery of shipments through smaller capacity drones.** This UAV market is expected to grow to \$5.9 billion in 2016 with up to 48% of total worldwide defence spending (United Nations) and Asia-Pacific region countries showing the highest growth in UAVs.

Considering the above aspects it can be said that any technology in particular, can be used in a constructive way for progressive development.



What happens is not as important as how you react to what happens



# AURA...

## A HUMBLE START TO A GLORIOUS JOURNEY

### Christian Von Koenigsegg

Born in 1972 at Stockholm. At the age of 5 Christian goes with his Father to the movies and watches a Norwegian stop-motion movie - Pinchcliffe Grand Prix - and decides that he would



build his own cars when he grows up. Christian drives a go-kart for the first time at the age of 6, he clearly remembers that as one of the best days of his life. In 1988 Christian get his first summer job, selling and cleaning cars at a Suzuki

dealership outside Stockholm. In his spare time, he was known as the best "moped tuner" in the area. By that time Christian considered the automotive world to be his passion, his calling, and he sets about drawing cars on a daily basis.

The Koenigsegg project was launched in 1994, aimed at developing a world class supercar. The parameters for this supercar are established quickly: a two-seater of mid-engined construction with a detachable and stowable hardtop, all based on state-of-the-art "Formula One" technology. A network is developed, made up of skilled designers and engineers with connections both to the Swedish car industry and associated institutions.

Koenigsegg moves into new premises in Olofström, southern Sweden. Development and production of the first prototype is initiated. A fully operational prototype is ready in just 18 months.

Since nearly every key part of the Koenigsegg CC was specially designed and unique, highly qualified composite engineers and CAD/CAM engineers were employed. Modellers with experience from SAAB, Bentley and Bugatti created the final body.

The Koenigsegg CC, silver production prototype made its debut in late 2000 at the Paris motor show. The CC receives several design awards, among them the prestigious German Red Dot Award and a prize for Swedish design. Modifications to the suspension system were made in cooperation with Mr. Loris Biccchi, a world-renowned test driver with experience at Lamborghini, Pagani and Bugatti.

Production was halted in 2003 due to a fire, starting in the company's kitchen area, due to what is believed to be a short circuit in a dishwasher. Many of the Koenigsegg personnel lived close by and were able to alert the fire brigade, who came quickly to the site. All cars then under construction were saved, as well as most of the vital equipment used to build them. The office, however, and most of the factory itself, were both destroyed.

At first there are plans to rebuild the factory on the same site and in the same quaint, but high tech style that it used to be. Given the time this would take, however, these plans were abandoned and Koenigsegg moved into new premises at the F10 Air Force Base, only 10 minutes from the original factory. Koenigsegg was thereby able to retain use of the former military runway, which has turned

out to be a very suitable proving ground. After some heavy modifications, the air force base and its hangars become a very suitable place for Koenigsegg to build its cars and conduct business.

The Guinness World Record was held by the McLaren F1 for seven years until the mighty CCR improved on the record by a slim margin in 2005. The CCR also proves itself on the famously challenging Nürburgring racetrack. The CCR breaks several speed records and almost beats the outright lap record for production cars, even though the temperature was a chilling -3 degrees Celsius.

Koenigsegg presented the new CCX in 2006, their first ever 'world car'. The CCX is the third generation for Koenigsegg. The performance of the car was staggering, as shown on the famous BBC program Top Gear, when the CCX takes the lap record ahead of more famous supercar competitors such as the Ferrari Enzo, the Maserati MC12, the Porsche Carrera GT and the Pagani Zonda F. In 2008 the CCX broke the 0-300-0 km/h record, taking just 29 seconds.

In 2010 Koenigsegg celebrated 15 years of creating supercars by presenting the Agera, a new breed of Koenigsegg. Agera maximizes the driving experience with exceptional cornering speed, braking and adaptability. Koenigsegg introduced the production version of the Koenigsegg Agera at the Geneva Motor show 2011 along with the extremely powerful and technically sophisticated Agera R.

The Agera R was awarded the prestigious "Top Gear Hyper Car of the year 2011 - India Award". Koenigsegg ended 2011 as "Officially Amazing". This came after breaking into the Guinness Book of World Records once again. The award is based on the Koenigsegg world record in the 0-300-0 km/h category. The recorded time is just 21.19 seconds, nearly 8 seconds faster than the time recorded in a CCX just 3 years earlier. The Agera R has an incredible top speed of approximately 440 km/h (273mph).



## PARODY...

**Facebook Debugged-While Mark Zuckerberg has become the Guinea pig for all hackers, Arul Kumar, a 21-year old engineering graduate, helped the world's largest social media network to spot a bug that allowed anyone to delete any photo hosted on the social networking website. In the process Arul netted a \$12,500 bounty from Facebook. With this Arul has made it known to the entire world that we Indians are good at finding other's faults.**

**Child pilot from China-A five-year old Chinese boy created history and curiosity when he flew a light aircraft for 35 minutes over a Beijing Wildlife Park. It has drawn worldwide attention because in China most five-year old boys are working like slaves in sweatshops making iPads and this boy has done something different. But most of the parents are happy. They have found out one more avenue for employing child labour. Even in India some pilots are no better than five-year old kids. If you don't agree, travel by Air India.**

Leadership has a harder job to do than just choose sides. It must bring sides together

K.S.I.T MECHANICAL DEPT.

## NATURE IS SMARTER!

From aeroplanes to Velcro every invention made has in some way or another been inspired by nature. ***Humans may take credit for being smart but we fail to understand that nature is leagues ahead of us.*** Despite all our cleverness, the products of evolution can still outdo us – sometimes by millions of years!

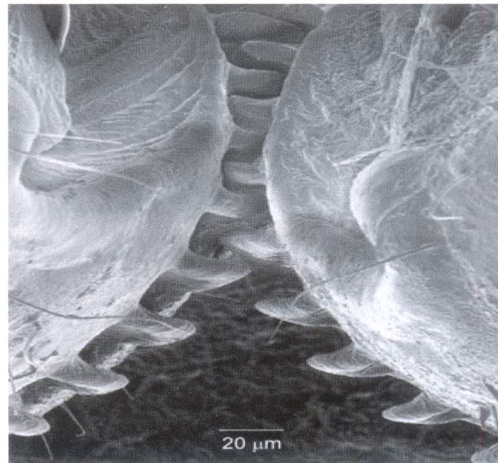
In a recent issue of *Science*, Malcolm Burrows and Gregory Sutton of the University of Cambridge reported that the nymphs of *Issus coleoptratus*, a common species of planthoppers (a type of true bug), have the first known case of an evolved working gear mechanism. These young planthoppers can reach up to 3 feet (about a meter) in a single jump. They employ gear wheels complete with teeth that interlock with grooves to coordinate their hind legs during high-speed jumps. Without the gear wheels on their hind legs to tightly coordinate their movements, these nymphs could find themselves spinning through the air if one of their hind limbs moved before the other.

However these gears are meant for coordination and not speed. Each gear tooth is rounded at the corners similar to a shock absorbing mechanism found in bicycle gears which prevents the shearing of the teeth. Each gear strip in juvenile *Issus* was around 400 micrometres long and had between 10 to 12 teeth, with both sides of the gear in each leg containing the same number, giving a gearing ratio of 1:1. Such a precise synchronization could not have been achieved by the nervous system. The gear mechanism ensures almost complete synchronicity in leg movement – the legs always move within 30 ‘microseconds’ of each other!

Strangely, the *Issus* loses its gears on reaching adulthood.

Scientists believe that when one of the gear teeth breaks the whole mechanism loses its ability to synchronise and since the adults don't moult (shedding of the exoskeleton) the damage cannot be repaired. It may also be due to the larger size of adults. The bigger adult trochantera (the insect equivalent of the femur or thigh bones) might allow them to create enough friction to power the enormous leaps from leaf to leaf without the need for intermeshing gear teeth to drive it, say the scientists.

Although gear mechanisms were found in nature none were functional like the interlocking gear mechanism in the juvenile *Issus*. Such amazing discoveries leaves us dumbfounded and makes us wonder whether man has truly “invented” anything at all? And what else nature might behold (and maybe unfold!)?



**A scanning electron micrograph of the gear**

## REACHING SECOND POSITION ON WORLD SCALE AT MARKET LEVEL **GOOGLE** ARE UP WITH **CHROMECAST!!**

Google has thrown an original product in the mix in the Digital TV market with Chrome cast. It is a small dongle that looks like a USB thumb drive, except that it connects to an HDMI port. Once connected to the TV and on WIFI, users are able to play content on their handheld device (Android, iPhone, iPad etc.) and it can be “casted” to the device with the Chrome cast device connected. As more companies battle for the large screens that sit in our living rooms, it shouldn't be surprising that Google came up with a viable, unique and competitively priced option with Chromecast.

As the day goes on technology has come up so much that we doubt the ability of creativity! Every day there is something new into the world as every morning it's a new sunshine to humankind as well as the technology. We are growing up with technology, but at the same time we are compromising with the own capabilities of brainpower! Who to blame??? Human created Technology or Human himself?? The answer lies within you!!!!!!

## DID YOU KNOW?

- **Steve Jobs's Mercedes SL55 AMG had a blank license plate. He could afford to do so because Californian state law allowed a new car to go without a registration number for up to six months. All Jobs had to do was replace his SL55 AMG with a new one before the six months was over .**
- **Hydrophobic window-What if the little rain drops patter on the window? KIA Cadenza 2014 has the answer by using hydrophobic window. Cadenza side windows have been conditioned to repel water and condensation. KIA makes hydrophobic window package with adaptive cruise control and blind-spot, lane-departure warning and systems.**



To Climb steep hills require slow pace at first.



## WORLD MOBILE CONGRESS 2014

### A PLACE WHERE TECHNOLOGY TAKES

Mobile is a catalyst for change and innovation. Mobile is creating the next connected device that can transform communication, advancing the next payment system that alters commerce. Launching the next must-have app that changes how we interact. *Mobile World Congress* is the blueprint for the **NEXT** big innovation. Whatever is NEXT will likely be born at Mobile World Congress, either announced on stage during the Conference program or showcased in the award-winning Exhibition, or conceived during thousands of meetings. WMC 2014 is the Centre of the Mobile Apps Universe, where the mobile app community gathers to learn, network and engage with innovators. It was BARCELONA's turn to host this trade event and it had a great response. The WMC 2014 had a cutting-edge product and technology Exhibition featuring 1,700 exhibitors which was the world's best venue for seeking industrial opportunities, creating deals and Networking.

Having already sold 200 million galaxy S phones, Samsung is out with another freaking awesome mobile phone, *Samsung Galaxy S5* with a hand gear v.2.00.

With the new version of *android kit-Kat v.4.4* ready for release NOKIA adopted android for their built-in windows software calling it *Win-Droid*.

*Sony Xperia Z2* is fighting hard to establish itself with its new and much better technology to withstand water, dust and mechanical shocks. Although it has the same apps, Z2 has a gorilla glass protection and a better display and speaker's effect.

The HTC retains its name for being the best android set by its *new HTC M8*. Its strikingly similar to HTC1 but the most powerful of HTC yet. With a 4.5 inch HD display and two rear sensor cameras and on screen buttons M8 was said to be the BEST ANDROID phone.

Sony PS4 review that PlayStation 4 is a fantastic next-gen console lacking a must-have game.

### EXCITEMENT OR CONCERNS..

For a sector that is in deep trouble, the show that the automobile industry put up at the 12<sup>th</sup> AUTO EXPO that ended in New Delhi, was a grand one indeed.

With a whelming 70 new vehicles being unveiled across the spectrum, it had all kinds ranging from two wheeler to four wheeler and to MUVs. Presence of all the big players in the global auto industry and milling crowds, added to the occasion. The intent of gaining grounds in the market while others are looking to hold their positions, was evident. Road ahead seems tough but interesting. It is hard to believe that this is an industry in recession, yet the truth is that, the sales of commercial vehicles have been falling for the last two years with sales of passenger cars hitting their worst ever in a decade, having fallen to around 9.34 percent in 3<sup>rd</sup> and 4<sup>th</sup> quarter. Accounting for high costs of financing, falling rupee and adverse sentiments, only the brave can predict a quick turn around. A glimpse of hope has arisen like a silver lining to the industry as the Finance minister, in his vote on account on interim budget, announced a 4 percent cut on excise duty for the automobile sector (6 percent on SUVs). The beleaguered industry which was keenly looking for any sector of fillip to boost flagging sales over several questions, has welcomed the favour.

If you can dream it, you



HONDA

## DID YOU KNOW?

- The world's fastest bike the Dodge Tomahawk and can reach 350 mph!

There have been only two six-wheeled supercars, the bizarre Panther Six, and the 440bhp Covini C6W.

"THE INDUSTRY OF INDUSTRIES" as quoted by prominent management writer Peter F Drucker, it has been contributing significantly to the GDP and generating employment directly or indirectly and has a task cut out in the near future facing numerous challenges. The government has notified fuel efficiency norms that will kick in from 2017, based on average fleet weight for passenger laws, while it brings smiles on the end users. The environmentalists will however ache manufacturers in the industry, to re-look their strategies for developing fuel efficient engines and associated technologies.

This, as well opens doors for young aspirants, willing to think out of the box and looking forward to opportunities in the sector for innovation and improvisation.

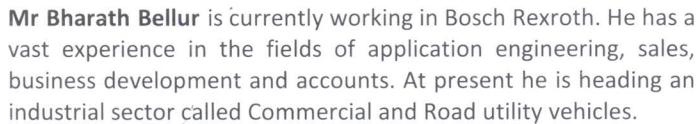


With India increasing its strides and becoming a strong hub for the industry, it is now the 6<sup>th</sup> largest exporter of automobiles in the world and standing 4<sup>th</sup> in Asia, it will have a significant role to play in the global market. Major automobile companies are sourcing products from Indian auto component manufactures. The Indian auto component manufactures have made their presence

felt in all product categories. India is estimated to have the potential to become one of the top five auto component economies by 2025 with 120, 185 and 250 major manufacturing units in Chennai-Bangalore, Mumbai-Pune, and Delhi-NCR region respectively. With more than 60 percent of exports to USA and EUROPE, which constitute AQL (Accepted Quality Level) countries. With the domestic firms setting up their own R&D centers, it showcases their willingness to be independent and run the show. Although they face stiff competition with the global giants, which have already eyed India as their potential market. These global firms, which have set up their units here include Volkswagen, Skoda, Audi, M-Benz, Royal Enfield, Honda and KTM for both domestic sale as well as exports. This comes as an opportunity to the Engineers to work in a core company. Adding to it, is the fact, that the IT sector experiencing stagnation, students can now look up to work in such firms. Even though the tone sounds exciting, the very own fact that companies are not willing to have their benches filled and the retrograde growth, may deprive smile on the young. Hoping for policy shifts and more dynamic leadership in the near future, India's automotive sector as few may feel, might become one of the major player in the global market. But this shall remain a fantasy, if the Parliament is hung this time.



## -AN INTERVIEW WITH THE ALUMNUS



He was always fascinated by big machines which drove him to take up mechanical engineering and further pursue a career in the same. The *EMANATION team* had the opportunity to interview him and is grateful for sparing his valuable time. Although absorbed in his work, had a perennial smile throughout the interview.

It was excellent; we had an extremely good faculty who were really concerned about students and their work. I was very reserved during my engineering days but now it is exactly the opposite of what I was. The rapport that we developed with our faculty was the most wonderful moment. On lighter note it was an extension of my schooling.

Every step in your life is a phase; you went through schooling, now you are in university and then you would start working. It is important to have fun and rejoice every phase of life. In industry all that matters is what you do, how you do and how you prove yourself. For a successful engineer his scores and college does not matter. At the end of the day he is accountable to his progress.

After successfully completing the project at Bosch, I got recruited in the same company. I was a new kid on the block who was put into a team which had experienced professionals. As such there was big gap in terms of both technical abilities and culture but gradually I got accustomed to the corporate world. At times it was difficult but I think you will surely learn to swim if you are thrown into water.

There is a freeze in recruitments as of now, but we do see the growth on a positive side. The world has to progre engineers will have jobs. I think it is just a phase in a business cycle. We are a developing economy and India is seen as an important market in the long run, which is the reason ev NC is investing in India. This will definitely create jobs. (He is important to emphasize on gender diversity as it

**Q: There is always a gap between students understanding and corporate expectations, how to get updated?**

The best way to get updated is having a strong alumni focus as we have seen both sides. So it is very important to have a strong network with us, it can be through social media or having us come to college and have a talk regarding market demands which helps the current students to get an idea about their job and aspire accordingly. Industries must be involved not in terms of recruitments alone but have to be involved in activities like technical seminars, guest lectures where you can get a proper understanding. If this is done students will have a better idea about corporate requirement.

Be there and enjoy; one has to be passionate about what he does, if I was not passionate enough I would have not stayed for 8 years in this company. Accepting the challenge and living up to it is important.

Have fun, be responsible, know our limits. Be passionate about what you are doing and enjoy. This is one of the phases of your life and it is important that you make the most of it. GO WITH THE WIND.

**During Shakespeare's time, mattresses were secured on bed frames by ropes. In order to make the bed firmer, one had to pull the ropes to tighten the mattress.**

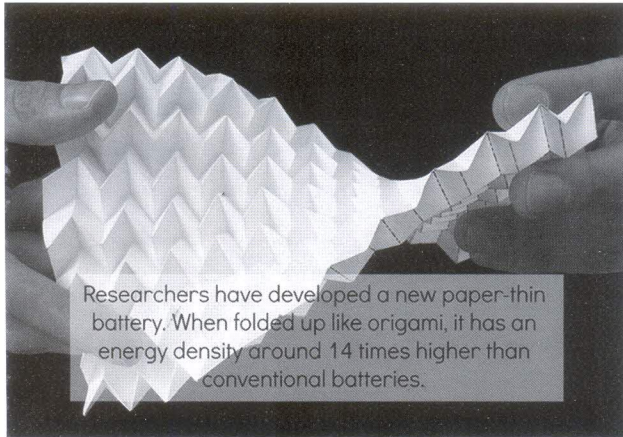
This saying originated because of a law. If someone butchered an animal that didn't belong to him, he had to be caught with the animal's blood on his hands to be convicted. Being caught with freshly cut meat did not make the person guilty.

**World War II** Fighter pilots received a 9-yard chain of ammunition. Therefore, when a pilot used all of his ammunition on one target, he gave it "the whole 9 yards."

You're Happiest **where** you're making the greatest contribution.

## FOLDING FOR A BETTER STRUCTURE

Origami is an art of folding paper to make different structures or models. It is a traditional Japanese art which started in the 17<sup>th</sup> century and became popular in the mid-20<sup>th</sup> century. In this art a flat piece of paper is transformed into a finished sculpture through folding without cutting or gluing the paper. What might a traditional Japanese art be of any importance to us? Here's the catch... origami has many engineering applications from deployable solar panels designed by NASA to foldable antennas and self-folding



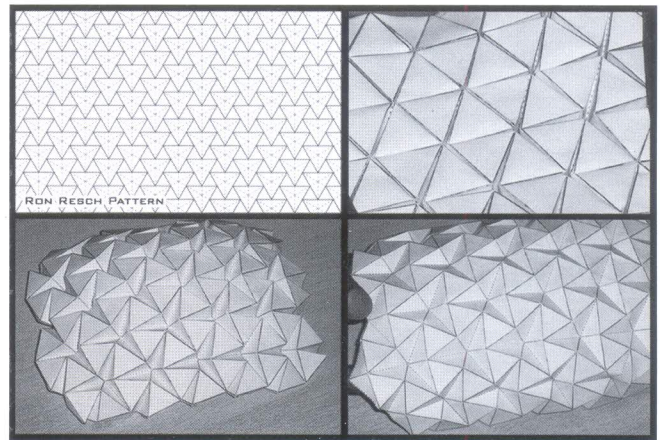
Researchers have developed a new paper-thin battery. When folded up like origami, it has an energy density around 14 times higher than conventional batteries.

structures and nanorobots.

Origami can be used both for the flexibility and the stiffness that it provides. The Origami folding patterns enable the sheets to deform easily into some deformation modes, whilst remaining stiff in others. This can have applications in morphing structures; these types of structures are capable of changing their shape to accommodate new requirements, whilst maintaining a continuous external surface. Textured sheets inspired by origami is made by introducing local textures on the paper like folds, creases dimples etc. to modify the overall mechanical properties of the sheet. The sheets' most intriguing property, however, relates to their Poisson's ratio (When a material is compressed in one direction, it usually tends to expand in the other two directions perpendicular to the direction of compression. This phenomenon is called the Poisson effect. Poisson's ratio  $\nu$  is a measure of this effect). These sheets have a single in-plane mechanism whereby the facets do not bend and the folds behave as hinges. These sheets have a negative Poisson's ratio i.e. in these sheets due to uniquely oriented hinged folds, in order for these folds to stretch in the longitudinal direction, the hinges must 'open' in the transverse direction, effectively exhibiting a positive strain. In simple words the sheet does not wrinkle on stretching, since they can undergo large global deformations as a result of the opening and closing of the folds. Furthermore, these folds provide flexibility in certain deformation modes, whilst still providing an increased bending stiffness. The partially folded sheet acts as a pin-jointed bar framework, enables a nice transition from a purely kinematic to a stiffness matrix approach, and provides insight into the salient behaviour without the expense of a full Finite Element analysis. It captures the important behaviour of the sheets, and the mechanical properties are a result of the geometry rather than the exact mechanical properties.

This combination of flexibility and rigidity is of interest in morphing structures, such as the skin of morphing aircraft wings. This is also of interest in architectural applications, where it may be used as cladding material for doubly-curved surfaces, or, at a larger scale, as flexible facades. For example an egg box/carton is a carton designed for carrying and transporting whole eggs.

These cartons have a dimpled form in which each dimple accommodates an individual egg and isolates that egg from eggs in adjacent dimples. This structure having the same kind of folding technique helps protect eggs against stresses exerted during transportation and storage by absorbing a lot of shock and limiting the incidents of fracture to the fragile egg shells. Another example for this type of folding is the Miura fold. The Miura fold invented by Japanese astrophysicist Koryo Miura is a rigid fold that has been used to simulate large solar panel arrays for space satellites in the Japanese 1995 Space Flight Unit.



- **5 Star Shine:** This is a unique paint protection system that keeps your car clean for five years. It has been tested and has managed to survive 150 washings. This paint protection system increases the exterior life span of the car.
- **Smart Pedal Technology:** The brake override or Smart pedal technology is a system which is built into the car to prevent fatal accidents. The computer system known as the smart pedal tells the engine to disregard the accelerator if the brake and the gas pedal are pushed at the same time. Companies like Mercedes and BMW have been using this technology for quite some time now and soon General Motors are introducing the smart pedal in India as well.
- **The tallest wind turbine in the world has rotor tips that reach over 200 meters (656 feet) above the ground**
- **Smart Big lights:** Driving at night has its own problems, not only because of road conditions but also the weather conditions. Refractive when light rain can reduce visibility. Carnegie Mellon University inventor developed a large lamp combining with a camera, projector, and processor intel base to eliminate that effect.

**A lump of pure gold the size of a Matchbox can be flattened into a sheet the size of a Tennis court.**

**A Ball of glass will apparently bounce higher than a ball of rubber from a certain height.**

The journey of a thousand miles begins with one step.

## **COMBINED DEFENCE SERVICES (CDS)**

If you are young, courageous and patriotic and wish to dedicate your services to defending the nation and its people then Combined Defense Service (CDS) is the path for you. The CDS exam can help you join the nation's defense forces. Union Public Services Commission (UPSC). Preparation for the CDSE exam calls for concentrated practice and prolonged preparation. There are instances when people start preparing for the exam right from the school days. For the NDA, choice of subjects starts after the 10th grade. The choice of subjects opted for +2 is crucial as math and science students would have an edge in the CDS written exam. Candidates between 19-24 years of age at the time of examination can apply. The candidate's English language ability, general knowledge, science and mathematics are tested for admission to the IMA, AFA and Naval Academy. Though English is the preferred language in which the written examination and interviews are conducted in success trends of do's & don'ts suggest that English speaking urban candidates are at any advantage over their rural counterparts. What you speak is more important than how you speak, and that carries you through.

### **ELIGIBILITY AND QUALIFICATIONS REQUIRED:-**

The Combined Defense Services Examination (CDS) is conducted twice a year by the Union Public Service Commission for recruitment into the Indian Military Academy, Officers Training Academy, Indian Naval Academy and Indian Air Force Academy. The Notification for the examination is usually released in the months of October and June, and the examinations are conducted in February and November respectively. Only unmarried graduates are eligible to sit for the exam. Successful candidates are admitted into the respective Academies after an interview conducted by the Services Selection Board (SSB).

**Indian Military Academy** Unmarried male candidates born not earlier than 2nd January, 1991 and not later than 1st January, 1996 only are eligible. For Indian Military Academy and Officer's Training Academy Degree of a recognized university or equivalent.

**Naval Academy** Unmarried male candidates born not earlier than 2nd January, 1991 and not later than 1st January, 1996 only are eligible. For Naval Academy B.Sc. (with Physics & Mathematics) or Bachelor of Engineering.

**Air Force Academy** Unmarried male candidates born not earlier than 2nd January, 1992 and not later than 1st January, 1996 only are eligible. For Air Force Academy Degree of a recognized University (with Physics & Mathematics at 10+ level) or Bachelor of Engineering.

Candidates who are studying in final year Degree Course and have yet to pass final year degree examination or equivalent examination can also apply for examination, but they will be required to submit proof of passing by the specified dates published in Commission's Notice for Examination.

### **PREPARING FOR CDS:-**

**Situation Reaction Test (SRT):** Sixty situation questions will be provided and the candidate is required to solve them within 30 minutes.

**Thematic Appreciation Test (TAT): Word Association** Sixty words will be given and the candidate will have to make a sentence in 15 seconds for each word.

**Group Test:** This is conducted among 8-10 candidates. The test consists of group planning, group discussion, outdoor group tasks and debates.

**Physical Standards:** Medical officers of the SSB will hold a medical test to determine physical fitness. A candidate who has stated Air Force as his first choice but fails to qualify the interview will be tested for other choices and recommended accordingly. The CDS exam is held in one day i.e. starting from 9 a.m. to 11 a.m., 12 p.m. to 2 p.m. and 3 p.m. to 5 p.m. You must get used to sitting on a chair all day through and concentrate as well. Therefore, train to enforce self-discipline and be physically and psychologically fit to take on the exam. Select a suitable coaching center which has 6-7 hours of teaching, if necessary. Be thorough with the layout of the exam. Multiple-choice questions with negative marking is the current trend. Candidate should attempt those questions first which he is sure of and thereafter start with those where some doubts exist about the correct choice. Where not sure, it is better to leave the question unanswered. The candidates will get about a minute to answer each question. It would be advisable to practice old question papers to pick up speed and correctness. The first paper is on *General Knowledge*, comprising 120 questions on History, Geography, Indian Polity, Current Affairs and General Science etc. *English* the second paper where your knowledge of Basic English grammar is tested. *The Math's* paper is set at the 9th or 10th level with 100 questions. A number of students who did not have math at +2 level are wary of this paper and generally opt out. So work hard now if you intend to party harder later.

### **The interview rounds (post written tests):-**

PABT (Pilot Aptitude Battery Test)

Group Discussions

WAT (Word Association Test)

Group tasking and Group events

TAT (Thematic Appreciation Test)

Interview (group, face to face and pressure)

General Aptitude Tests.

Successful candidates are trained at the Indian Military Academy (IMA), Dehradun, Air Force Academy (AFA), Begum Pet, Hyderabad, Naval Academy (NA), Goa and Officers Training Academy (OTA), Chennai.

The life in as a defense personal is a HONOUR and name to glory serving the mother nation. But it needs dedication, passion, courage, self-discipline, and a mindset of LIVE-LOVE-DO-DIE for the country. At the end of the day all that matters is just about yourself!!

**PROUD TO BE AN INDIAN**

— WE WILL BE COVERING DIFFERENT CAREER  
OPTIONS IN UPCOMING ISSUES . . .

Blessed is the Person who is too busy to worry in the daytime and too sleepy to worry at night.

## FORMULA ONE- AN INSIGHT INTO THE SPORT!

As it may appear on the surface, Formula One is a race around a circuit where the one who goes past the chequered flag first wins. But there is more to it than just a driver and a car. It is a concoction of engineering and hi tech mechanisms, yet it does not fail to keep up the glory of motor racing of the past. Nothing can be as exciting as an F1 race which keeps you thrilled, excited and pumps your adrenaline. Also, looking deeper into the sport makes it more enjoyable. Here are two mechanisms namely DRS-Drag Reduction System and KERS-Kinetic Energy Recovery System which play a significant part of the race. They increase the speed of the car and give it a boost. Here is how they function.

The introduction of KERS and DRS has enabled chasing cars to deliver an instantaneous acceleration boost.

KERS, which was first introduced in 2009, converts energy that would be wasted as heat in a traditional braking system, into electrical energy. It centers on an electric generator, which is spun up under braking to charge up set of ion-lithium batteries. When the driver requires additional boost, he can use the energy stored in the batteries to power an electric motor and provide extra drive to the rear wheels. It's all managed by a recovery system control unit linked directly to the car's central electronics hub. But its use is restricted to produce a limited amount of power (60kW) and can only release a certain amount of energy (400kJ) in each individual lap.

That basically equates to an additional 80 horsepower - an extra 10 percent of normal engine power – for a maximum of just less than seven seconds per lap.

The system adds weight to the car and its bulk affects the ideal packaging and weight distribution – but the acceleration boost gives drivers the chance to plan their moves and use the extra horsepower to overtake.

The sport also introduced a second 'push-to-pass' opportunity in 2011 with the arrival of DRS, which came after McLaren's innovative f-duct opened up the idea of stalling the rear wing to help overtaking.

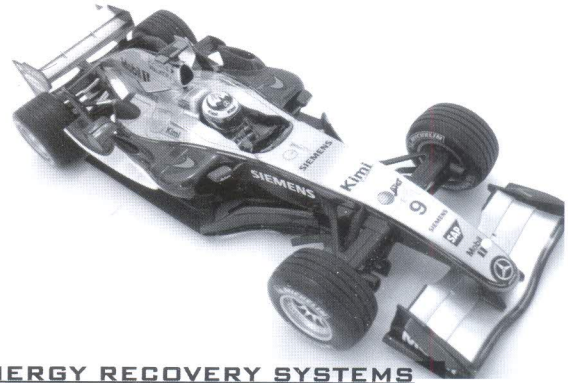
The rear wing consists of a main section and an upper flap, and DRS allows the position the latter to be altered to affect the airflow and therefore the down force and drag produced.

In normal conditions, the leading edge is down so the flap sits at a steep angle and works with the main section of the wing to produce down force, which also results in the production of significant **amounts of drag**. When the driver pulls a lever or presses a button in the cockpit, the flap's leading edge is raised and the flap becomes more horizontal, reducing the down force but crucially reducing the drag – and resulting in an increase in straight-line speed of around 10-12 km/h.

Unlike KERS, which can be used throughout the lap, DRS is only useable in one or two pre-specified zones and only if a driver is within one second of the car in front. But it, too, gives a significant benefit and can open up vital overtaking opportunities.

The federation also changes the rules and regulations often which are discussed to no end by F1 enthusiasts. Several factors like safety, cost effectiveness will be considered for the change in rules. For an F1 fan, all data is easily accessible on the internet on the official Formula One website. Hence a novice F1 enthusiast has no difficulty in understanding the rules or technicality behind the sport. F1 is no longer a sport meant only for the affluent, but can be enjoyed by anyone

Success is getting what you want; happiness is wanting what you get.



## ENERGY RECOVERY SYSTEMS

Long-time of Formula one racing will be familiar with concept of a Kinetic Energy Recovery Systems( KERS), technology that was introduced to the sport in 2009 and was a mainstay from 2011. KERS worked by harnessing waste energy created under braking and transforming it into electrical energy, providing an additional 60kW (approximately 80bhp) of power for up to 6.67 seconds per lap. The Energy Recovery Systems (ERS) which form an integral part of an F1 car's power unit from 2014 take the concept of KERS to another level, combining twice the power with a performance effect around ten times greater.

ERS comprise two energy systems Motor Generator Unit- Kinetic [MGU-K] and Motor Generator Unit- Heat [MGU-H], plus Energy Store (ES) and control electronics.

The motor generator units convert mechanical and heat energy to electrical energy and vice versa. MGU-K works like an updated version of KERS, converting kinetic energy generated under braking into electricity (rather than it escaping as heat). It also acts as a motor under acceleration, returning up to 120kW (approximately 160bhp) power to the drive train from the Energy Store. MGU-H is an energy recovery system connected to the turbocharger of the engine and converts heat energy from exhaust gases into electrical energy. The energy can then be used to power the MGU-K (and thus the drive train) or be retained in the ES for subsequent use. Unlike the MGU-K which is limited to recovering 2MJ of energy per lap, the MGU-H is unlimited. MGU-H also controls the speed of the turbo, speeding it up (to prevent turbo lag) or slowing it down in place of a more traditional waste gate.

A maximum of 4MJ per lap can be returned to the MGU-K and from there to the drive train- that's ten times more than with 2013's KERS. That means drivers should have an additional 160bhp or so for approximately 33 seconds per lap.



1. What are the next three numbers in this series!

4, 6, 12, 18, 30, 42, 60, 72, 102, 108?

2. This riddle must be done in your head only -- do NOT write it down.

Take 1000 and add: 40; 1000; 30; 1000; 20; 1000; and 10.

What is the new total?

A doctor gives you three pills telling you to take one every half hour. How long would the pills last?



### SPORTSDAY 2014 - A PROUD MOMENT !!



K.S.Group Of Institutions conducted Annual Sports Meet 2014 at SAI grounds on 14th February in which Mechanical Dept. actively took part in all the events and won several prizes for which we were awarded Overall Championship.

### CULTURAL EVENTS

Bharatha yatra Kendra held an inter collegiate drama competition at Ravindra Kalakshetra in the month of october . Our college students of Mechanical 3rd year batch performed on a play "SHANTI PARK".



4. A man is trapped in a room. The room has only two possible exits: two doors. Through the first door there is a room constructed from magnifying glass. The blazing hot sun instantly fries anything or anyone that enters. Through the second door there is a fire-breathing dragon. How does the man escape?

5. One snowy night, Sherlock Holmes was in his house sitting by a fire. All of a sudden a snowball came crashing through his window, breaking it. Holmes got up and looked out the window just in time to see three neighborhood kids who were brothers run around a corner. Their names were John Crimson, Mark Crimson and Paul Crimson. The next day Holmes got a note on his door that read ' ? Crimson. He broke your window.' Which of the three Crimson brothers should Sherlock Holmes question about the incident?

### UPCOMING EVENTS....

#### GUEST LECTURE

"Magnetic Bearings" by Soumendu Jana, Scientist Propulsion division, NAL on 22<sup>nd</sup> March.

#### SAE COLLEGIATE CLUB

We would like to bring to your notice that KSIT Mech Dept. has taken the initiative of forming SAE Club from 2014. We request all the student members to actively take part in the upcoming club activities.

### Read This Brainteaser ... bet you CAN!

The phaonmneel pweor of the hmuan mnre is at blveiee taht I cluod aulacly uesdnatnrd waht I was ragnieg. Aoccdrnig to a rscheearcr at Cmagbride Uinervtisy, it deosn't mttaer in waht oredr the ltteers of a wrod are, the only iprmoatn tihng is taht the frist and lsat ltteer be in the rghit pclae.

The rset can be a taotl mses and you can sitll raed it wouthit a porbelm. Tihs is bcuseae the huamn mnid deos not raed ervey lteter by istlef, but the wrod as a wlohe. Amzanig huh?

## USING BRAIN WAVES TO CONTROL MACHINES

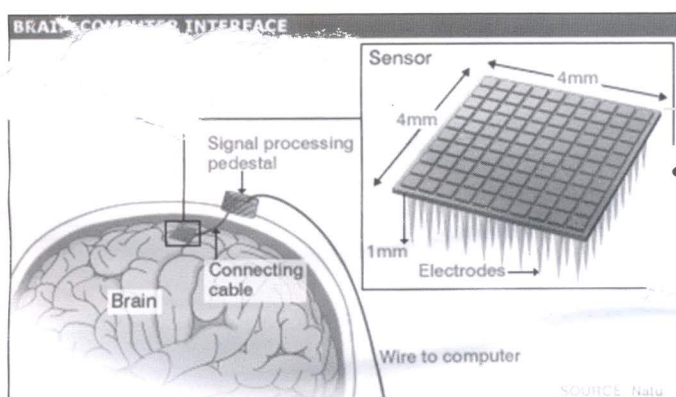
### AND COMPUTERS

Humans have traditionally interacted with computers or machines by using their hands to manipulate computer components. This kind of human-computer interaction (HCI), however, considerably limits the human's freedom to communicate with machines. Recent advances in cognitive neuroscience and neuroimaging technologies in particular have allowed for the establishment of direct communication between the human brain and machines. This ability is made possible through invasive and noninvasive sensors that can monitor physiological processes reflected in brain waves, which are translated online into control signals for external devices or machines. Which in the prospects may not require for an operator to work physically on the machines.

BCIs provide a direct communication method to convey brain messages to an external device independent from the brain's motor output. They are often directed at assisting, augmenting, or repairing human cognitive or sensory-motor functions. In BCIs, users explicitly manipulate their brain activity instead of using motor movements in order to produce brain waves that can be used to control computers or machines. This is particularly important for those who suffer from devastating neuromuscular injuries and neurodegenerative diseases which may lead to paralysis and the inability to communicate through speech or gesture.

In a BCI system, brain activity is usually recorded using a noninvasive neuroimaging technology, such as electroencephalography (EEG), magneto-encephalography (MEG), functional magnetic resonance imaging (fMRI), or near-infrared spectroscopy (NIRS). In the majority of BCI systems, scalp EEG data are recorded. Type of BCI systems are categorized based on the measure of brain activity used for BCI control. Each system has its own shortcomings and disadvantages. For instance, the information transfer rates of currently available noninvasive BCI systems are still very limited and do not allow for versatile control and interaction with assistive machines.

Beyond medical applications, BCI has also a great potential for gaming, a domain where users are open to novelty and eager to face new challenges. E. Maby et al. present a BCI version of the famous game "Connect Four." Target selection was based on brain event-related responses measured with nine EEG sensors. Experimental evaluation on two competing healthy subjects yielded an average accuracy of 82% demonstrating that the BCI "Connect Four" can effectively be controlled.



## IRON "MEN" IN REAL LIFE?



The U.S. Army has commissioned an Iron Man-like suit, called the Tactical Assault Light Operator Suit (TALOS) that will be strong enough to withstand a barrage of bullets.

The first prototypes of a high-tech suit of armor to give soldiers superhuman abilities could be ready to test this summer. The suits, which have drawn comparisons to the one worn by Marvel Comics superhero "Iron Man," could be delivered to special operations forces as early as June.

Prototypes of the suit, which is designed to provide protection from bullets and is equipped with a variety of sensors and cameras, are being assembled. The suit includes features such as 360-degree cameras with built-in night vision capabilities, sensors that can detect injuries and apply wound-sealing foam, and bulletproof armor.

Eventually, the TALOS systems may include full-body exoskeletons complete with screens that display information about a soldier's surroundings. The technology could give American soldiers a huge comparative advantage over enemies and give the warriors the protection they need.

The Tactical Assault Light Operator Suit, or TALOS, is being developed by engineers at MIT; the U.S. Army Research, Development and Engineering Command (RDECOM); and researchers at other businesses and academic institutions. The idea for the armor was first inspired by the work of MIT professor Gareth McKinley, who has been working on the development of liquid armor since 2002.

The liquid armor being developed by McKinley would theoretically be able to transform from liquid form to solid in mere milliseconds when an electric current or magnetic field is applied. The armor would be receptive to skin contact and be able to respond and detect the body's core temperature, heart rate and level of hydration as well as provide basic life support. USSOCOM's TALOS suit may very well make use of McKinley's liquid armor in order to provide ballistic, full-body protection.

This is the first baby step towards a futuristic piece of armor that could possibly make you into a real-life superhero. We can't wait!



• **Scientists are looking to harness the intensely found light from laser beams to fire the cylinders in IC engines. And best of all, they claim laser spark plug will result in better fuel efficiency conventional spark plug. Only fire the fuel near top of the cylinder, resulting in a modest- amount of fuel wasted with each cycle. And blast after, the metal terminal that literary sparks in causing the ignition is slowly worn away.**

## **"CURIOSITY IS NOT WHAT KILLED THE CAT. CURIOSITY IS WHAT MADE THE INTELLECTUAL"**

Alyque Padamsee, a recipient of the Padma Shri, is also a celebrated Indian advertising and theatre personality, motivational speaker and writer. He writes in one of his articles 'For me the only status quo is death. Everything is in flux and is fluid. The key reason why man has progressed intellectually is because of one word-Why has changed into Why Not. As a caveman, man thought, "Why do I feel so cold?" and answer was because he had nothing to warm him. First, he wore leaves, plants and barks of trees, then he eventually realized by accident that rubbing two sticks together causes friction and that causes fire and that is how he could get warm. 200 years ago, Isaac Newton asked why the apple didn't fall up or sideways, but only fall down. And then came the theory of gravity. So it is this Why that separates us from the animal kingdom.

I have sort of built my career as a thinker and an ideator on the question of Why and Why Not. In 1975, I was working with the advertising agency Lowe Lintas. One client, Hindustan Unilever Limited, said they wanted a campaign for a premium soap that would bridge the gap between Lifebouy and Hamam. My research team and I put our thinking caps on and the first question we asked was, "Why is that the only time a housewife gets to herself in a day is when she locks the bathroom door"? And the answer was-because from morning to night, she is working for other people. So those ten minutes alone are precious. She begins to usually hum or sing a popular song. And through that song she sort of enters a fantasy world. Then I remembered, when I was a young boy watching English movies, I used to love the scene in which Tarzan's girlfriend, Jane used to have a bath under a waterfall. Splashing about, carefree because there was no civilization hounding her and this made me wonder about the soap as a means for the Indian middle class housewife to escape it from her chores, to enter her own private sanctuary. In other words, this bath, through Liril, became an escape from harsh reality. And this is all came about because I questioned the status quo. And curiosity plays an essential role. Curiosity is not what killed the cat. Curiosity is what made the intellectual. Imagine if Freud hadn't asked, "Why do I have these fears?" Challenging the status quo is very important. I get up every morning and think what new thing am I going to discover today. For instance, I have discovered that young people don't like be told what to do. They want to make up their own minds. There was a film, which the Mumbai Traffic Police had requested me to produce. They asked me to make a film that would tell youngsters that driving without a helmet is dangerous. They said to say, "Don't drive without your helmet if you have a two wheeler." I told them I would not say that, because if you tell the youth to not do something, they will go ahead and do exactly the opposite. So I made a very simple film. It showed two coconuts on a table, and then a motorcycle helmet is put over one of them. Two huge hammers come smashing down and the one without the helmet splits into two, and nothing happens to the one with the helmet. And then, the film ends with the line, 'It is your decision, after all it is your head'.

For the first time someone did not tell the young people, "Don't !". Instead we asked them to make their own decision.

And that does the trick. It makes them think and thinking leads to questioning.... "Why? Why should I wear a Helmet?"

You can't be creative without asking Why. You cannot possibly invent a new idea or a new way of doing things without asking Why or Why Not? And no amount of questioning can ever be detrimental to growth. It always leads eventually to the truth or so called "PRACTICALITY".

## **WHAT IT TAKES TO BE A MECHANICAL ENGINEERING?**

What it takes to be a Mechanical engineer?

We entered the college with lot of dreams,  
with the first day, came the first shock: NO GIRLS.  
With this we started the great journey.

First half of first year passed getting acquainted;  
getting out of school mentality, exploring the campus;  
Second half entangled in pencils, T-squares, set square, sheets;  
Eventually ended by rewriting the drawing rules.

Third was the SEM of great transformation;  
mastering the art of copying assignments,  
Getting famous for infamous acts;  
No matter lost only few marks.

Then came the fourth SEM,  
that of tech fests, seminars;  
we were the hearth of all the events;  
and were rated best till date.

Fire began from fifth SEM;  
suddenly the class was rated the worst ever,  
and rebels had burned;  
Revolution started, superficially suppressed.

Sixth SEM saw new senses coming up,  
Desire to excel beyond academics grew;  
Explored unexplored areas;  
Ideas succumbed under the campus interviews.

Finally to the last year started,  
Campus interviews came at large,  
quickly we were being absorbed in,  
and the fairy tale had already started.

Eighth SEM: None of us know what it was.  
May we were in ecstasy, or in heaven, only He knows,  
we were the achievers of rare feet: NO GIRL IN WHOLE  
DEPARTMENT (curse turned into blessing)  
we knew it was unfair but we were the dictator. (The whole  
class acted as one thought)  
Disqualification was appreciated over defeat;  
the inter bong was stronger than ever,  
the last week of college saw us becoming different persons.

All good things end, so did quality time.

College gave us spirit, knowledge, friends,  
above all it made us the person whom the world calls  
MECHANICAL ENGINEER.

The word will carry with our name.

These all takes to be a Mechanical Engineer.

## **PROUD TO BE A MECHANICAL ENGINEER!**

### **ANSWER**

1)The series lists numbers that are flanked by two prime numbers. Thus 138 (137 and 139 are prime), 150 (149 and 151 are prime), 180 (179 and 181 are prime).

2)4100

3) 1 hour

4) He waits until night time and then goes through the first door

5)Mark Crimson ("?" = question MARK, so the note on the door reads "Question Mark Crimson. He broke your window.")