



DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

ELEKTOR

S V ENGINEERING COLLEGE FOR WOMEN

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Dr. JAKEER HUSSAIN
Mr. P. VINOD KUMAR

DESIGN DEPARTMENT

SUJANA
BALAMURALI
LAVANYA
SADVIKA

Vision of the Department

To prepare the learners globally competent, dynamic and multi talented young leaders with skill set & knowledge in Electrical and Electronics Engineering field with a focus on higher education, professional practice, research and technical consultancy competence ethical concern.

Mission of the Department

- ◆ To prepare the learners professionally deft and intellectually adept in the field of Electrical and Electronics Engineering with an excellent infrastructure, core values and qualified & experienced teaching faculty.
- ◆ To inculcate skill, knowledge and behavior to cater the dynamic requirements in the field of Electrical and Electronics Engineering.
- ◆ To motivate and prepare the learners for career guidance, placements and higher education with a focus on MoUs with premier institutes and industries.

About the Department

The Electrical & Electronics Engineering department was started with UG programme in 2007 with an intake of 60. The department has well talented, qualified, experienced & dynamic faculty along with skilled technical supporting staff who spearhead the process of achieving the vision of the department. The department has well equipped labs & infrastructure. It is continuously striving to impart quality education and competitive spirit among students for academic excellence.

Strengths of the Department

1. In every semester Department of EEE conducts minimum of two workshops and there guest lecturers in the recent trends in Electrical Engineering to bridge the gap between Academics & Industries, and the students will be guided to do their Major & Minor projects on the same topics.
2. Every faculty member of the department attends a minimum of one faculty development program in every academic year. And most of the faculty members register for NPTEL online courses.
3. Department publishes a newsletter in every six months, which includes the activities that were done in the past two months; fortnight wall magazines based on recent advancements in the field of electrical engineering prepared by students

Message from Principal

“The mind is not a vessel to be filled, but a fire to be kindled.” Said Plutarch.

I congratulate the staff and students of all faculties who used various mediums of expression to present their ideas. As long as our ideas are expressed and thoughts kindled we can be sure of learning, as everything begins with an idea. I appreciate every student who shared the joy of participation in co-curricular and extracurricular activities along with their commitment to curriculum. That little extra we do, is the icing on the cake.

Do more than care – help

Do more than dream – work.’

Do more than forgive – forget

Do more than be fair – be kind

Do more than believe – practice

‘Do more than belong – participate

Just as our mother earth gives us more and more, ELEKTOR will enable our learners to give and get a little more of learning.

Happy Reading!

Dr. N. Sudhakar Reddy, Principal

Message from HOD

It gives me immense pleasure to pen a few words as prologue to the technical magazine ELEKTOR of the EEE department. This issue is designed to present the write-ups regarding topics related to electrical engineering, self development and the scientists introduction etc which makes the issue resourceful and informative. I congratulate all the contributors all the contributors and also the editorials board for bringing out such a nice issue.

Happy Reading.

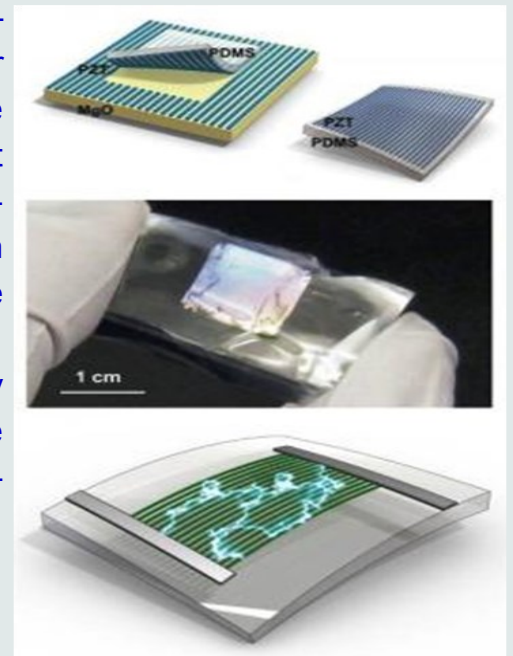
Dr. K. Sudheer, HoD, Dept. of EEE

RUBBER SHEETS THAT GENERATE ELECTRICITY TO POWER CELL PHONES

The latest invention of engineers at Princeton University represents special rubber films that are able to produce electricity. Using these films it would be possible to power different portable devices such as players and cell phones by simply making body movements like walking or breathing.

The latest invention features ceramic nanoribbons fixed onto silicon rubber sheets. Energy is produced when the new material is flexed. It can easily convert mechanical energy into electrical one. For example, these rubber sheets can be fixed on shoes, thus the wearer of such shoes will be able to power gadgets while walking or running. If placed against the lungs, the sheets take advantage of breathing motions to generate energy. It is worth mentioning that scientists from Princeton University are the first who managed to successfully mix silicone and nanoribbons of lead zirconate titanate (PZT).

The latter is a ceramic material able to produce energy whenever pressure is applied to it. The PZT is considered to be the most efficient among all known piezoelectric materials. It can convert about 80 percent of the mechanical power into electricity



GREEN NOISE - NOISE TO ELECTRICITY

Some of the noisiest places on the planet are the airport runways. But designer Hung-Wei Jou decided to make use of noise pollution to turn it into electricity. He designed a gadget dubbed Green Noise that is able to identify, trap and transform sound energy into power that can be used to power runway lights.

The Green Noise has the shape of a conical speaker, which allows the device to catch sound waves easier. It stands on a tripod base and can work in any weather. Currently there are no specifications on the device.



LIQUID ELECTRICITY- VANADIUM REDOX BATTERY

Vanadium redox battery is a type of rechargeable flow battery that employs vanadium redox couples in both half-cells, thereby eliminating the problem of cross contamination by diffusion of ions across the membrane. The vanadium redox battery exploits the ability of vanadium to exist in solution in four different



oxidation states, and uses this property to make a battery that has just one electro active element instead of two. The main advantages of the vanadium redox battery are that it can offer almost unlimited capacity simply by using larger and larger storage tanks, it can be left completely discharged for long periods with no ill effects, it can be recharged simply by replacing the electrolyte if no power source is available to charge it, and if the electrolytes are accidentally mixed the battery suffers no permanent damage. The main disadvantages with vanadium redox technology are a relatively poor energy-to-volume ratio, and the system complexity in comparison with standard storage batteries.

GREEN CAR POWERED BY WIND AND SOLAR POWER

Being impressed by the shapes of nature, designer Cristian Polaco decided to come up with a rather unusual concept of an eco-friendly vehicle. AERO is the result of his imagination. The car represents a three-



wheeled electric vehicle that has space for two people, the driver and "co-pilot". The green vehicle has its body made of compressed polymers that considerably reduce the weight of the car and which can be easily recycled. Each of the two front wheels of AERO has its own electric motor that is linked to the car's steering wheel via a wireless system. The onboard batteries can be recharged using the power of wind and sun, plus one can plug the car into a 120V source.

TECHNOLOGY THAT TURNS LASERS INTO SOUND

Scientists managed to turn light into sound using their latest invention - a brand new laser technology. A

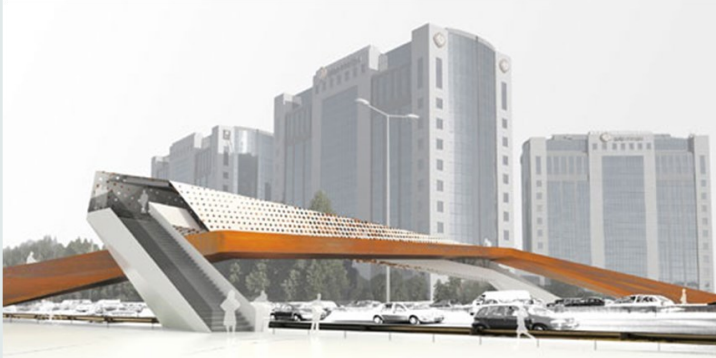


team of researchers at the Naval Research Laboratory developed a technology able to increase and improve underwater acoustic applications. The technology allows compressing laser pulses. It is worth mentioning that different colors of a laser pass through air and water at different speeds. However, in the water the concentration effects prove to be stronger. It is possible for a well-tuned laser to pass several hundreds of meters through the air and then rapidly compress after entering the water, which would help a jet to send messages underwater, reports Live Science. If the colors of a laser are arranged in a particular way, the laser pulse would compress in time while passing through the water, which focuses the light. To be able to transform light into sound, researchers compress a laser pulse so it would ionize a small quantity of water. After giving charge to the molecules of water, the ionized water soaks up the laser energy and then heats up. Finally scientists witness a small explosion of steam that produces a pulse of sound having 220 decibels. It is worth mentioning that this latest invention could be used to improve the use of underwater acoustics for both Naval and commer-

cial purposes such as undersea communications, navigation and acoustic imaging.

BRIDGE HARNESSES WIND ENERGY FROM PASSING CARS

The design of this interesting concept was developed by Tiago Barros and Jorge Pereira. The two thought about creating a bridge that would ex-



loit wind energy, which will be amplified by the vehicles that would pass under it. The length of the Cross-Wind Bridge is 40 meters. It has a system of 2188 built-in rotating panels that rotate as the wind blows to produce electricity. The latter is powers the lighting on the bridge in the evening. It is expected that the vehicles passing under the bridge will boost the speed of the wind by 20 percent, thus increasing the rotation speed of the panels. Both pedestrians and bikers will be able to use the bridge. It would be worth noting that 35 percent of the punctured casing that forms the bridge cladding is created from recycled steel that is taken from auto industry.

SYNTHETIC TREE THAT CONVERTS THE MOVEMENT OF LEAVES INTO POWER

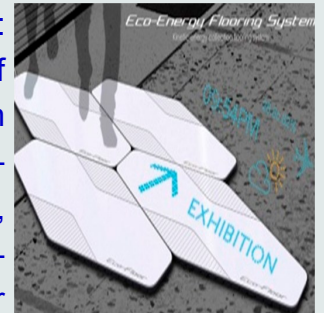


Scientists from the Cornell University managed to create a tree that generates energy by making

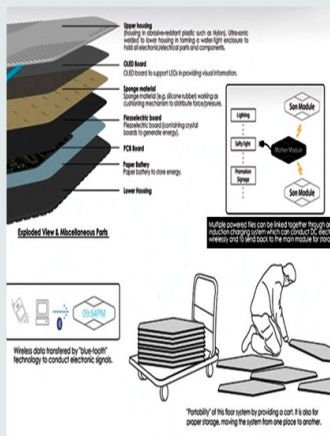
use of fluttering synthetic leaves that are connected to the stem of the tree. They named their latest invention "Piezo-tree." The tree generates electricity when the wind blows and makes the leaves move; their motion is transformed into energy. It is worth mentioning that the key component of the Piezo-tree is flexible piezoelectric material known as Polyvinylidene Fluoride (PVDF).

PADS USE PAPER BATTERY TO GENERATE POWER WHEN SOMEONE WALKS OVER THEM

An interesting eco-friendly idea was proposed by designer Stephen Chan Wing Tak. He is the author of the Eco-Energy Flooring System pads that feature a paper battery system used to collect energy that is generated when people walk and run over the piezoelectric blocks. To put it simple: the system is composed of blocks that are mounted on the floor and when someone steps on these blocks, energy is produced. Afterwards the collected power



is used to light up LEDs. Each pad is made of six layers, with the upper one being water resistant and covered with ultrasonic welding to make it humidity-proof. The next layer features an OLED board that can have all sorts of symbols, letters, numbers that can light up. Then there's a sponge material that dispenses the



force and pressure. The follow-up level includes the piezoelectric board featuring crystal boards to produce power. Below there's the paper battery and the last layer is the one that touches the ground. The system is

easy to transport and use.

SUJANA
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High-Altitude Wind Energy For Sustainable Marine Transportation

Abstract:

This abstract reports the use of a controlled tethered wing, or kite, for naval transportation. Linked to a boat by light composite-fiber lines, the kite is able to fly between 200 and 600 m above the sea and to generate high traction forces. A mechatronic system named Kite Steering Unit (KSU) that is installed on the boat controls the kite and converts the line speed and force into electricity. Different from previous works, the boat is also equipped with electric propellers so that naval propulsion can be achieved both directly, i.e., through the towing forces exerted by the lines, and indirectly, i.e., through the electricity generated by the KSU that is fed to the electric propellers via a battery pack. The optimal system operating conditions that maximize the boat speed for the given wind characteristics are computed. Then, a model predictive controller is designed, and numerical simulations with a realistic model are carried out to assess the performance of the control system against the optimal operating conditions. The results indicate that, with this system, a completely green naval transportation system can be obtained, regardless of the wind direction.

Smart Stick-on Sensors for the Smart Grid

Abstract:

Rapid increase in electric power demand, introduction of RPS mandates, and a push towards electrification in the transportation sector is expected to increase power system stresses and disturbances. To tackle these power system issues and maintain high system

reliability, it is essential to have information about the condition of assets present on the grid. Presently, due to the absence of low cost flexible grid wide monitoring solutions, complete information of the system is not achievable. This paper deals with the development of a new class of sensors called the smart “stick-on” sensors. These are low cost, self-powered, universal sensors that provide a flexible monitoring solution for grid assets. These sensors can be mass deployed due to low cost, need low maintenance as they are self-powered, and can be used for monitoring a variety of grid assets. This paper also presents the details on the network architecture, interoperability and integration, and different design aspects of the stick-on sensor, such as novel energy harvesting techniques, power management, wide operating range, and reliability. It is envisioned that the smart stick-on sensors shall be an enabling technology for monitoring a variety of grid assets and prove to be an essential element of the Smart Grid.

Intelligent DC Micro grid with Smart Grid Communications: Control Strategy Consideration and Design

Abstract:

Aiming at photovoltaic (PV)—storage urban building integrated system, this paper proposes a DC micro grid with multilayer control and smart grid communications. The paper focuses on power balancing, with load shedding and PV constrained production, and takes into account the grid availability and grid vulnerability by smart grid messages. The system behavior modeling by MATLAB State flow leads to the whole control strategy design, which concerns the power balancing and imposed power limits by the utility grid, while

providing interface for energy management. Experimental results evaluate the feasibility of the proposed control strategy. As further development of this control design, an intelligent multi-layer supervision is suggested. This supervision, able to exchange data with the smart grid, deals with the end-user demand, forecast of photovoltaic production, prediction of load consumption, and energy management. The major technical contribution of this paper is linked to the proposed control design that permits better DC micro grid integration (avoids undesired injection, mitigates fluctuations in grid power, and reduces grid peak consumption) and provides possibility to reduce the negative impact on the utility grid thanks to the supervision interface. The power balancing control interface provides possibility for advanced energy management with low speed communication.

HID Lamp Electronic Ballast Based on Chopper Converters

Abstract:

This paper proposes some topologies for developing electronic ballasts, supplying high-intensity discharge lamps fed by a pulse width-modulation ac-ac converter, implemented with bidirectional switches. The lamp operates directly from the ac mains; thus, operation with low frequency so as to prevent the occurrence of destructive acoustic resonance is provided. The features of the proposed solution are high efficiency, high power factor, low cost, and the absence of electrolytic capacitors. This paper includes the design of passive elements, the transfer function, and the development of the control strategy. The experimental results qualify the viability of the system feasibility.

RNP-SA: Joint Relay Placement and Sub-Carrier Allocation in Wireless Communication Networks with Sustainable Energy

Abstract:

Green energy is emerging as a promising alternative energy source to power network devices in next-generation wireless networks. Different from traditional energy, green energy is replenished from nature, e.g., solar and wind, and is highly dependent on the capacities and locations of the electronic devices. As such, the fundamental design criterion in the network deployment and management is shifted from energy efficiency to energy sustainability due to the sustainable nature of green energy. In this paper, we study the network resource management issues in next-generation wireless networks with sustainable energy supply. Our objective is to deploy the minimal number of green RNs, i.e., RNs powered by green energy, and optimize resource allocation to ensure full network connectivity and users' Quality of Service (QoS) requirements can be fulfilled with the harvested energy based on the cost threshold. To this end, the RN placement and sub-carrier allocation (RNP-SA) issues are jointly formulated into a mixed integer non-linear programming problem. Two low-complexity heuristic algorithms, namely RNP-SA with top-down/bottom-up algorithms (RNP-SA_{t/b}), are presented to solve the non-linear programming problem in different network scenarios. Extensive simulations show that the proposed algorithms provide simple yet efficient solutions and offer important guidelines on network deployment and resource management in a green radio network with sustainable energy sources.

Luigi Galvani(1737-1798) :

Luigi Galvani was an Italian physician and physicist. One of the early pioneers of bioelectricity, he is known for his extraordinary work on the nature and effects of electricity in an animal tissue, which later led to the invention of the voltaic pile. In 1762, Galvani became a lecturer of anatomy at the University of Bologna. During a random experiment on November 6, 1787, Galvani discovered that a frog muscle could be made to contract by placing an iron wire to the muscle and a copper wire to the nerve. He built an instrument in which a frog's nerve was attached to an electrode of one metal, and an electrode of a different metal was attached with the frog muscle. He was well aware of the fact that an animal body grew convulsive movements when electricity was applied to it. The discovery played a historical role in bioelectricity as it proved that electricity was not direct in its action. He established that it did not flow directly from the conductor into the frog muscle but was discharged from the conductor to another element in what he termed as a "metallic arc".



Luigi Galvani
(1737-1798)

Alessandro Volta (1745-1827) :

Alessandro Volta was a physicist, chemist and a pioneer of electrical science. He is most famous for his invention of the first electric battery, which people then called the "voltaic pile" in 1800. Using his invention, scientists were able to produce steady flows of electric current for the first time. In 1778 – Volta discovered that the *electrical potential* (we now often call this the *voltage*) in a capacitor is directly proportional to electrical charge. In 1794 – At the age of 50, Volta was awarded the Royal Society's top prize – the Copley Medal – for his contributions to scientific understanding of electricity. In 1881, scientists decided that the unit of electric potential would be called



Alessandro Volta
(1745-1827)

the *volt* to recognize Volta's great contributions to electrical science.

Andre Marie Ampère (1775-1836)

The French physicist and mathematician, Andre Marie Ampère is mainly credited for laying down the basis of electrodynamics (now known as electromagnetism). He was the first person to demonstrate that a magnetic field is generated when two parallel wires are charged with electricity and is also known for inventing the astatic needle, a significant component of the contemporary astatic galvanometer. Ampère, on becoming influenced by Ørsted's discovery performed a series of experiments to clarify the exact nature of the relationship between electric current-flow and magnetism, as well as the relationships governing the behavior of electric currents in various types of conductors. Moreover he demonstrated that two parallel wires carrying electric currents magnetically attract each other if the currents are in the same direction and repel if the currents are in opposite directions.



André-Marie Ampère
(1775-1836)

On the basis of these experiments, Ampère formulated his famous law of electromagnetism known as Ampère's law. This law is mathematical description of the magnetic force between two electrical currents. His findings were reported in the Académie des Sciences a week after Ørsted's discovery. This laid the foundation of electrodynamics. The SI unit of measurement of electric current, the ampere, is named after him.



[New Fuel Cell Technology Generates Electricity- Bloom Energy](#)

Date: May 19, 2012

Source: University of California - Santa Barbara

Summary: The Bloom Energy Server produces clean, reliable, and affordable electricity on-site and generates power 24 hours a day, seven days a week. The system utilizes a unique fuel cell technology, which converts fuel into electricity via an electro-chemical process, without any combustion or harmful, smog-forming particulates. The system is extremely efficient, cutting carbon emissions by almost 30 percent, nearly eliminating nitrogen oxide and sulfur dioxide pollution, and producing electricity using 99.99 percent less water than an average power plant.

[Building ultra-low power wireless networks](#)

Date: February 29, 2012

Source: University of Arkansas, Fayetteville

Summary: Engineering researchers have received funding to create distortion-tolerant communications for wireless networks that use very little power. The research will improve wireless sensors deployed in remote areas where these systems must rely on batteries or energy-harvesting devices for power.

[Dye-sensitized solar cells that use carbon nanotube thin films as transparent electrodes offer significant cost savings](#)

Date: March 14, 2012

Source: The Agency for Science, Technology and Research (A*STAR)

Summary: Dye-sensitized solar cells that use carbon nanotube thin films as transparent electrodes offer significant cost savings. Carbon nanotube electrodes. The use of carbon nanotubes has a significant cost advantage. However, in earlier designs (left), the carbon nanotubes degraded through chemical processes (e-: electrons, I³⁻: ions in the liquid). Using a thin protective layer of titanium oxide now stabilizes the nanotubes (right), increasing the performance of these cells. .

[Faster, cheaper way found to cool electronic devices](#)

Date: April 9, 2012

Source: North Carolina State University

Summary: Researchers have developed a more efficient, less expensive way of cooling electronic devices – particularly devices that generate a lot of heat, such as lasers and power devices. The technique uses a "heat spreader" made of a copper-graphene composite, which is attached to the electronic device using an indium-graphene interface film "Both the copper-graphene and indium-graphene have higher thermal conductivity, allowing the device to cool efficiently,"

[Pocket microscope with accessory for ordinary smart phone](#)

Date: February 15, 2012

Source: VTT Technical Research Centre of Finland

Summary: Engineers have developed an optical accessory that turns an ordinary camera phone into a high-resolution microscope. The device is accurate to one hundredth of a millimeter. Among those who will benefit from the device are the printing industry, consumers, the security business, and even health care professionals.

[New possibilities for solar power](#)

Date: June 10, 2012

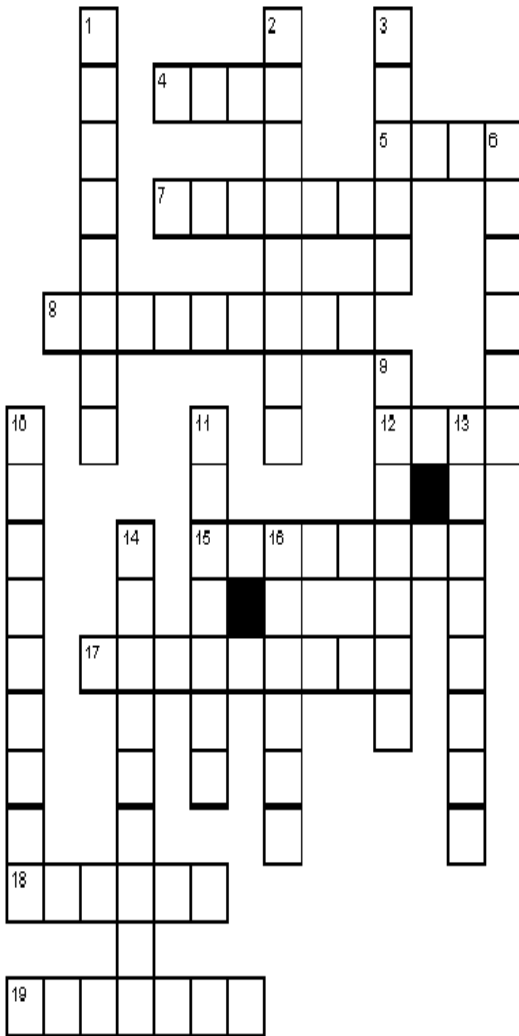
Source: Queen's University

Summary: Researchers have made a significant breakthrough in solar technology. A newly developed solar photovoltaic thermal system (PVTs) generates both electricity and heat. Solar PVTs are normally made with crystal silicon cells which generate electricity, but little heat. The research shows increased heat generation because of higher operating temperatures and 10 per cent more solar electric output.



IGNITE YOURSELF

CROSS WORDS ON CIRCUITS



Across:

- 4. A safety device that break a circuit when too much current is flowing. (4)
- 5. The unit that resistance is measured in. (4)
- 7. A switch that open a circuit when too much current is flowing. (7)
- 8. An electric discharge from the sky to the ground during a storm. (9)
- 12. The unit that current is measured in (for short). (4)
- 15. A device that resists the flow of electricity in a circuit. (8)
- 17. A material that doesn't conduct electricity well. (9)
- 18. A device that will open or close a circuit. (6)
- 19. The flow of electrons through a material is called electric _____. (7)

Down

- 1. The charge on a proton. (8)
- 2. The charge on an electron. (8)
- 3. A type of circuit where current by passes most resistance and large, dangerous currents flow (5)
- 6. A circuit with only one path through which electrons flow. (6)
- 9. A voltage supply used in flashlights and many toys. (7)
- 10. Electricity is the movement of _____ through a conductor. (9)
- 11. A path through which electric current flows. (7)
- 13. A circuit with more than one path through which electrons can flow. (8)
- 14. A material that conducts electricity will. (9)
- 16. Kind of electricity resulting from a build up of charged particles. (6)

REDDY SHEKAR
17BF1A0266

**Why Human body feel Electric shock ??
and in an Electric train during running ,
We didnt feel any Shock ? Why**

**Ans : The electric train is well insulat-
ed from its electrical system**

