ELECTROWRITE

A Newsletter From Dept. of Electrical Engineering, S.I.T

VOL 3 ISSUE 1

Vision & Mission

Vision

To emerge as a leading Department of Electrical Engineering that caters to the latest needs of power sector, electrical & allied industry in the region.

Mission

To evolve as an innovative & globally competent Electrical Engineering department that contributes to the socio - economic growth of region by utilizing the advancement in Electrical Engineering by providing conducive learning and interactive environment to students and faculty.

...In The News

Researchers find a new way to convert heat into electricity by developing a new thermoelectric material

Power plants may be able to reclaim more power from heat waste in the future.

When we think about ways to make existing power plants more efficient, we typically look at waste heat. Capturing and using this heat to generate electricity which can save money and reduce fossil fuel consumption.
A team of researchers from the University of Houston, Cambridge, Morgan State University and other institutions have created a new thermoelectric material that offers almost more than twice as much power output than the average power conversion compound. The thermoelectric are measured by either their power efficiency or their power factor. Most materials are considered "good" if they have a power factor of about 40. The group's new material -- a compound made up of niobium, iron, antimony, niobium and titanium -- boasts a power factor of 106.

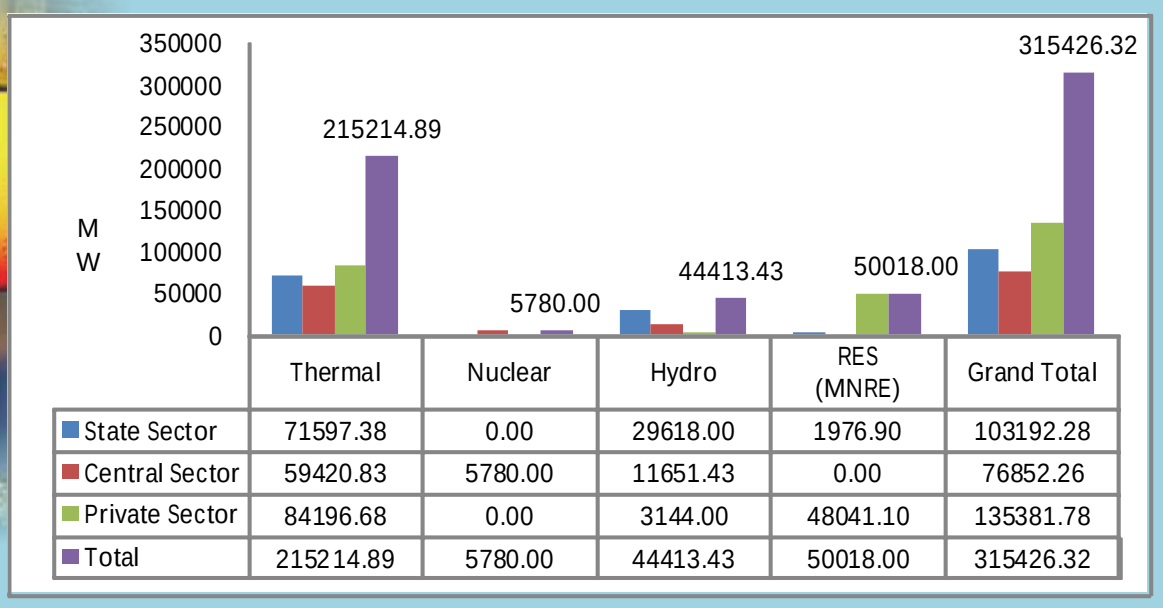
This means the new material can output 22 watts per square centimeter, as oppose to the 5 to 6 watt output that's typically produced from thermoelectric heat reclamation materials. Ironically, this doesn't mean it's more efficient, but it does mean that the new compound could be a better solution for large-scale heat waste sources like coal plants. That could both increase the profitability of a plant *and* help slow climate change by reducing emissions.

Source : www.engadget.com

INDIA'S POWER — India's Total Power Generation Capacity

Source Ministry of Power, GOI

As on 28.02.2017



	Thermal	Nuclear	Hydro	RES (MNRE)	Grand Total
State Sector	71597.38	0.00	29618.00	1976.90	103192.28
Central Sector	59420.83	5780.00	11651.43	0.00	76852.26
Private Sector	84196.68	0.00	3144.00	48041.10	135381.78
Total	215214.89	5780.00	44413.43	50018.00	315426.32

Congratulations

ODD SEMESTER 2016 TOP PERFORMERS IN UNIVERSITY EXAMINATION

MR. PROJOY ROY, 2ND YEAR

MS. SATARUPA MUKHERJEE, 3RD YEAR

MS. KABITA GUPTA, 4TH YEAR

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HV TRANSMISSION LINES EFFECTS ON HUMAN BEINGS

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The increase of power demand has increased the need for transmitting huge amount of power over long distances. Large transmission lines configurations with high voltage and current levels generate large values of electric and magnetic fields stresses which affect the live beings and the nearby objects located at ground surfaces. The electricity system produces extremely low frequency electromagnetic field which comes under Non ionizing radiations which can cause health effects.

The Electric and Magnetic fields:

- **EMF (Electro Magnetic Field)** is fields of force and is created by electric voltage and current. They occur around electrical devices or whenever power lines are energized.
- **Electric fields** : When a conductor carries current due to voltage so they are present in electrical electromotive force.
- The strength of the electric field is typically measured in volts per meter (V/m) or in kilovolts per meter (kV/m). Electric fields are weakened by objects like trees, buildings, and vehicles. Burying power lines can eliminate human exposure to electric fields from this source.
- **Magnetic fields** result from the motion of the electric charge or current, such as when there is current flowing through a power line .
- Magnetic field lines run in circles around the conductor (i.e. produces magnetic induction on objects and induced currents inside human and animal (or any other conducting) bodies causing possible health effects and a multitude of interference problems). The higher the current, the greater the strength of the magnetic field.
- Magnetic fields are typically measured in tesla (T) or more commonly, in gauss (G) and milli gauss (mG). One tesla equals 10,000 gauss and one gauss equals 1,000 milli gauss.
- Both fields are invisible and perfectly silent.
- Extremely high voltages in EHV lines cause electrostatic effects, where as short circuit currents & line loading currents are responsible for electromagnetic effects. The effect of these electrostatic fields is seen prominent with living things like humans, plants, animals along with vehicles, fences & buried pipes under & close to these lines.

EMF Effects Human beings:

- The human body is a composed of some biological materials like blood (presence of iron particle), bone, brain, lungs, muscle, skin etc. The permeability of human body is equals to permeability of air but within a human body has different electromagnetic values at a certain frequency for different material.
- The human body contains free electric charges (largely in ion-rich fluids such as blood and lymph) that move in response to forces exerted by charges on and currents flowing in nearby power lines. The processes that produce these body currents are called electric and magnetic induction.
- In electric induction, charges on a power line attract or repel free charges within the body. Since body fluids are good conductors of electricity, charges in the body move to its surface under the influence of this electric force.
- The currents induced in the body by magnetic fields are greatest near the periphery of the body and smallest at the center of the body.
- It is believed that, the magnetic field might induce a voltage in the tissue of human body which causes a current to flow through it due to its conductivity of around them.
- The magnetic field stimulates some tissues in the human body. These influences may be beneficial or harmful depending upon its nature.
- When a person who is isolated from ground by some insulating material comes in close proximity to an overhead transmission line, an electrostatic field is set in the body of live beings, having a resistance of about 2000 ohms. Body resistance of a general human body is 5000 Ω. A person touches a any electrofied object, it will discharge through his body causing a large amount of discharge current to flow through the body. Discharge currents from the electrofied affect the brain and heart. 9mA current flow for 3secs may fatal for human.
- For human beings the limit for undisturbed field is 15 kV/m, R.M.S., to experience possible shock. When designing a transmission lines this limit is not crossed, in addition to this proper care has been taken in order to keep minimum clearance between transmission lines indicated in IS 5613(4parts).

According to research and publications put out by the World Health Organization (WHO), EMF such as those from power lines, can also cause:

Short term Health Problem

(a) Headaches. (b) Fatigue (c) Anxiety (d) Insomnia (e) Prickling and/or burning skin (f) Rashes (g) Muscle pain

Long term Health Problem

(a) Risk of damaging DNA. (b) Risk of Cancer (c) Risk of Leukemia (d) Risk of Neurodegenerative disease (e) Risk of Miscarriage

Electric fields cause harmful effects when their magnitude exceeds stimulation thresholds for neural tissues (central nervous system and brain), muscle and heart as per the following current density chart:

In India it is stipulated that electric field intensity should not exceed 4.16 kV/m and magnetic field intensity should not exceed 100μT in public areas.

Surface Current Density(mA/m^2)	Health Effect
<1	Absence of any established effects
1 To 10	Minor biological effects
10 To 100	Well established effects(a) Visual effect.(b) Possible nervous system effect
100 To 1000	Changes in central nervous System
>1000	Ventricular Fibrillation

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EVENTS & ACTIVITIES:

Parents teacher meeting of 4th semester students of EE Department—24.03.2017

Interview Skills and and Industry orientation Program—23.03.2017

Hon'ble Consul General of France Mr.Damien Syed addressed the students of SIT on prospect & facilities for higher studies at France. - 09.03.2017



Workshop on ENTREPRENEURSHIP ORIENTATION—03.03.2017

"Days with Books"2017 - 16.02.2017 to 18.02.2017

Communication and Administration Workshop—07.02.2017

Interactive session with Mr.Robert Jackson, Director Security of Australian Federal Police. Ms.Fran Raymond,CFO of Australian Army.— 04.01.2017

TECHNOVISION 2017—23.03.207 to 24.03.2017

The annual intra-college technical exhibition.

Industrial training at L & T switchgear , Kolkata - 06.03.2017 to 08.03.2017

Orientation programme on "Outcome Based Education" for the staff members of EE - 18.02.2017

Remedial coaching classes for reserved category weak students organized by MAKAUT - 08.02.2017

Workshop on Fabrication of Potential Transformer—19.12.2016 to 21.12.2016

Live Broadcast of Smart India Hackathon 2017 by Shri Prakash Javadekar, Hon'ble Union Minister for HRD, Govt. Of India— 18.01.2017

Awareness on usage of Earthen Diyas instead of electric lights during Diwali –an initiative by EES– 18.10.2017

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ALUMNI SPEAKS

Present Role-
Section Head & team lead of Electrical design engineering team of L&T Engineering Design & Research Center Commercial Building and Airports division Kolkata

Functional Area –
Detail engineering of Electrical power distribution system for Airports, Commercial Buildings, Hospitals starting from Substation to further distribution for the projects which involves sizing of equipment, design calculations and simulation through different software .

Some experience want to share
I can highlight some of the important criteria which core sector industry normally seeks from a candidate.
Very basic knowledge and the concept about the Electrical engineering and power distribution system.
Normally it depends on the companies profile where you are giving interview. Like if you are giving interview for a company which is manufacturing industry they will ask according to the requirement like traction, DC machines , starters , earthing , AC and DC motors. If it is a company who is in transmission and distribution business they may ask Voltage levels , conductor sizing ,Earthing, wave traps , insulator ect.Other sector like power /construction /substation they may ask for distribution schematic, transformer sizing, load calculation. APFC sizing calculation, Earthing, starters , cables and conductor ect.
Basic fundamental of protection relay like overcurrent relay, overvoltage and under voltage relay, earth fault protection relay, normally add some value. You can refer Satnam & Gupta . So lets have study on type of business company is doing where you are going for interview.
But if anyone is attending off campus or on campus interview like major companies like TCE, Jacobs, Siemens, ABB , L&T normally basic shortlisting is done by written examination. In this case last few years question papers , normally available in different website may help to get the idea of questions. However the answer shall be validated by teacher .Moreover in this case as per aforesaid statement preparation by type of business is quite difficult since all this companies are doing all type of business.

Some **major and general calculation** like load calculation, transformer sizing calculation, Alternator sizing calculation , short circuit , voltage drop , power factor correction , battery sizing , earthing calculation ,illumination calculation, lightning protection calculation ect; Conductor sizing calculation are some of the important calculation based on which any Electrical industry works.
Presentation skills, Communication skills and Confidence (not over confidence) is most important part to face an interview particularly for fresher because 90% case interviewer start the interview asking question " Please introduce yourself with us". And it the opportunity for the interviewee to break the ice .Most of the time interviewer make their mind of selection based on the first question. It shall be polite and prompt maximum 8 lines.
Software like E-TAP normally adds to much value in any CV since most of the design sector uses it and expertise available in this software is very very less.
Dia-Lux is another software(It is freely available) which plays a major role in lighting industry. All design companies use it as their basic design tool .It is a very very easy software but added some vale in CV.
Core sector is suffering from a huge scarcity of good manpower and they gives values to the people who are in this sector. Starting may be difficult for fresher but journey becomes smooth and valuable as per experience once you start gaining experience.

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Q&A — Your questions answered

What is the difference between MCB & MCCB, Where it can be used?

MCB is miniature circuit breaker which is thermal operated and use for short circuit protection in small current rating circuit. Normally it is used where normal current is less than 100A.

MCCB is moulded case circuit breaker and is thermal operated for over load current and magnetic operation for instant trip in short circuit condition. Under voltage and under frequency may be inbuilt. Normally it is used where normal current is more than 100A.

Which type of A.C motor is used in the fan?

It is Single Phase squirrel cage induction motor and are capacitor start capacitor run.

What is the difference between power transformers & distribution transformers?

Distribution Transformers are designed for a maximum efficiency at 50% of load. Whereas power transformers are designed to deliver max efficiency ay 90% and above loads.

The distribution transformers have low impedance so as to have a better regulation whereas power transformers have higher impedance so as to limit the SC current.

Power transformers are used to step up voltages from 11 KV which is the generating voltage to 132 or whatever will be the transmission voltage levels. Power transformers are having Star-Delta connection. It will be located at power generating stations. Distribution transformers are used to step down voltages from transformer levels to 11 KV/415 V. Will be having Delta-Star. It will be located in substations near load centers.

Send your queries to newsletter.ee.sit@gmail.com