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DEPARTMENT OF ELECTRICAL AND ELELCTRONICS ENGINEERING

ELEKTOR

S V COLLEGE OF ENGINEERING

CONTENTS

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 extra-curricular 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

Message from Faculty Advisor

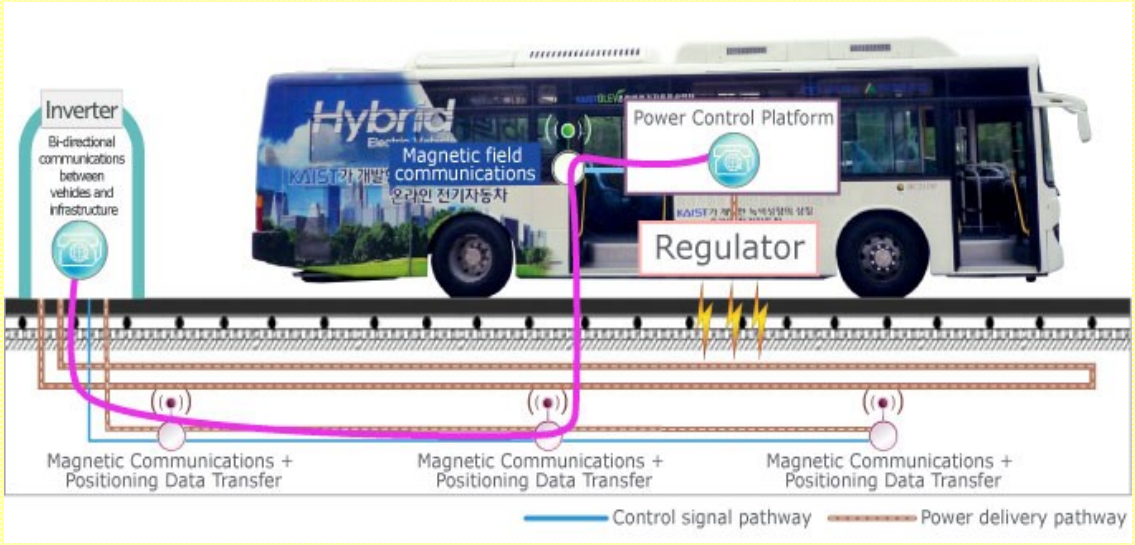
It gives us great pleasure to bring the technical magazine Blaze, the department magazine of EEE. The name and fame of an institute depends on the caliber and achievements of the students and teachers. The role of a teacher is to be a facilitator in nurturing the skills and talents of students. This magazine is a platform to exhibit the literary skills and innovative ideas of teachers and students. We would like to place on record our gratitude and heartfelt thanks to all those who have contributed to make this effort a success. Last but not the least we are thankful to all the authors who have sent their articles. We truly hope that the pages that follow will make an interesting read.

P.Vinod Kumar, Associate Professor, EEE

ONLINE ELECTRIC VEHICLE (OLEV)

Wireless technology can now deliver electric power to moving vehicles. In next-generation electric cars, pick-up coil sets under the vehicle floor receive power remotely via an electromagnetic field broadcast from cables installed under the road.

The current also charges an onboard battery used to power the vehicle when it is out of range. As electricity is supplied externally, these vehicles need only a fifth of the battery capacity of a standard electric car, and can achieve transmission efficiencies of over 80%.



BLADELESS WIND TURBINE

The concept being proposed in this abstract is for a “bladeless” windmill that would drastically reduce or eliminate bird fatalities due to windmills. The idea is based firstly on an electric fan proposed in a Japanese patent which has expired, and the Dyson fan.

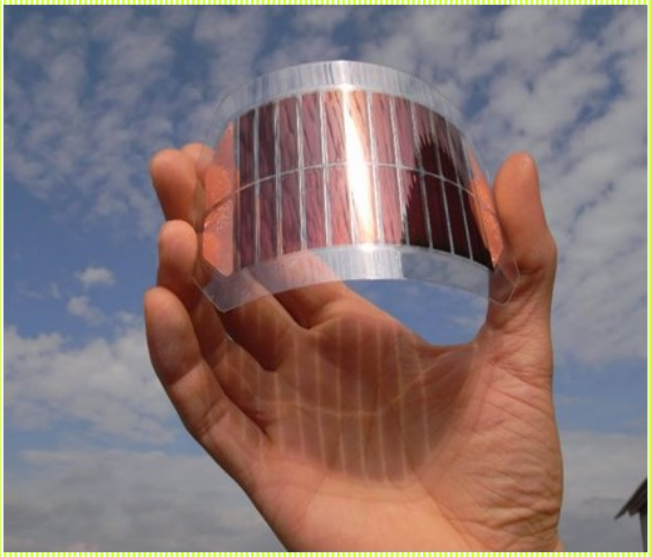
The Dyson bladeless fan has used airfoil technology to increase the speed and volume of the air moved by the fan – the “air multiplier” effect.

This concept proposes to use similar technology as these fans in a wind turbine in which the turbine is held at the base of windmill housing and is encapsulated except for slits that allow it to expel air.

Air entering the annular ring at the top of the windmill is collected into the stem of the windmill and forced down to turn the turbine which powers a generator. Bladeless windmills can be used in a variety of locations from cottages to wind farms.

ORGANIC ELECTRONICS AND PHOTOVOLTAICS

Organic electronics – a type of printed electronics – is the use of organic materials such as polymers to create electronic circuits and devices. In contrast to traditional (silicon-based) semiconductors that are fabricated with expensive photolithographic techniques, organic electronics can be printed using low-cost, scalable processes such as ink jet printing, making them extremely cheap compared with traditional electronics devices, both in terms of the cost per device and the capital equipment required to produce them. While organic electronics are currently unlikely to compete with silicon in terms of speed and density, they have the potential to provide a significant edge in cost and versatility. The cost implications of printed mass-produced solar photovoltaic collectors, for example, could accelerate the transition to renewable energy.



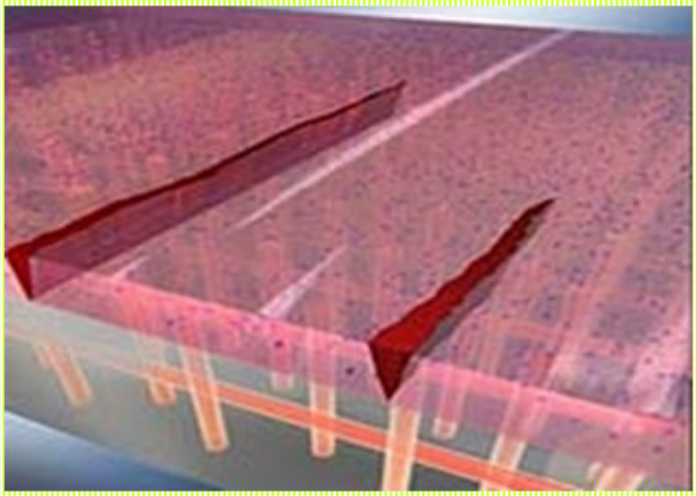
FLYING CAR

The world's first light roadable aircraft has been officially approved, and the in-line production will begin in the near future. It takes Terrafugia's *Transition*30 seconds to convert from a normal car into a two-seat light aircraft. Taking off with a full tank, the vehicle has a flight range of 644km and a cruising

flight speed of 185km/h. To take off, the aircraft needs a 500m long runway, and it has a load capacity of approx. 200kg.

The aircraft is extremely easy to fly, and to become a pilot you need as little as 20 hours of flight time, which can multiply the number of potential customers.

SELF-HEALING MATERIALS



One of the most important features of living organisms is that they are able to repair their physical damage on their own. Think about the skin which heals nicely without any help if injured. Based on this, inorganic construction materials are developed, which are also able to repair their damages on their own, such as cuts, tears or cracks. This technology provides longer life for manufactured goods and reduce the demand of raw materials, as well as greatly improve the safety when used in buildings or airplanes.

MIND-READING CAMERA

How many times has a moment so absolutely hilarious or unbelievably adorable unfolded before your eyes, making you

wish you'd been holding a video camera? Japanese tech company Neurowear's high-tech headgear, Neurocam, aims to solve that problem for you. The device straps a camera and an electroencephalogramreader to the wearer's cranium. During moments of high-frequency electronic signals detected through the skull — a general indication of excitement — the camera switches on to record short five-second GIFs onto an iPhone that is somewhat awkwardly attached to the device.

G. BANDHAVYA
17BF1A0239

CURRENT EEE

A Motor-Drive-Based Operating Mechanism for High-Voltage Circuit Breaker

Abstract:
In order to improve the operation flexibility and reliability of high-voltage circuit breakers (HVCBs) and to realize the full control capability during the opening and closing operations, a new type of motor-drive operating mechanism is investigated in this paper. In this operating mechanism, the travel of the moving contact of HVCB is precisely controlled by controlling the motion of the permanent-magnet synchronous motor (PMSM). A simulation model of the motor control system is built in MATLAB/Simulink and the control algorithm of the PMSM is then introduced. Based on the control theory and simulations, an experimental system with a 126-kV HVCB and a 30-kW PMSM is established to test the motor-drive operating mechanism. The experimental system is an all-digital position servo system with a vector control algorithm built in a digital signal processor controller. The simulation results and the operating curves from the experimental system show that the proposed motor-drive operating mechanism can fulfill the requirements of HVCB operations and the desired precise travel control of the moving contact of HVCB. This operating mechanism can also enable the intelligent operations of HVCB to meet future requirements of the modern electric power grid.

A comparison of the voltage withstand properties of ester and mineral oils:

Abstract:
The growing price of mineral oils (MOs) over the last 15 years, and environmental and safety concerns, have promoted research on alternative insulating fluids. Ester oils (EOs), which were used initially in transformer insulation [1], have again attracted attention; both synthetic and natural liquids have been investigated thoroughly in the search for suitable substitutes for MOs. EOs have interesting properties [1]. Their most attractive properties are those concerning flammability; depending on their chemical structure, their fire points are 100??C to 200??C higher than those of MOs, which ensures that fires are less likely in EO-filled transformers. They are also biodegradable, a property that has favored their use in environments where oil spills cannot be easily confined, e.g., traction and off-shore transformers. They are also much more hygroscopic than MOs, a property which favors drying of solid insulation, thus ensuring that depolymerization of cellulose is slowed down. This improves the long-term mechanical stability of transformer solid insulation.

A novel method of wind energy generation-the electrostatic wind energy

Abstract:
Since ancient times humanity has been harnessing the power of the wind in various forms, such as discovering the planet in sailboats, creating living space in the Dutch polders, or providing bread by flour-grinding windmills. Since 1887 wind has also been used to generate electricity as the shift to renewable energy production is being made [1]. In order to fulfill the long-term carbon emission goals set by, for example, the EU for 2050, the share of renewable energy (wind, solar, hydro, biofuels) needs to increase substantially [2]. Of these various means of renewable energy, wind energy is still the largest part. Therefore, wind farms, both decentralized and bulk, are being constructed. In 2010 wind energy constituted 2.5% of the global electricity production [3]. The article explores a novel method of wind energy generation using an electrostatic wind energy converter or EWICON.

The hidden threat to HVDC polymeric insulation at design field: Solitonic conduction

Abstract:
While HVDC assets are impetuously expanding worldwide, the design of HVDC polymeric insulation systems still contains unknowns. It has been ascertained that space charge plays a fundamental role in DC insulation reliability because of modifications it may induce in the (Poissonian) electric field distribution, especially when heterocharge is formed during voltage application. Heterocharge (charge close to an

electrode of opposite polarity to that of the electrode) can increase the electric field at the interface between electrode and polymer, thereby enhancing injection from the electrode. This can cause so large a field concentration as to increase the conductivity abruptly and lead to insulation failure due to the electrical discharge process called, usually, thermal instability breakdown

Device development and pulse performance of super-12 Si SGTO

Abstract:

The U.S. Army Research Laboratory (ARL) has conducted research on silicon super gate turn-off thyristors (SGTOs) for high action pulse switching required for survivability and lethality systems. The silicon SGTO designed by Silicon Power Corporation (SPCO) was evaluated to determine its stable, repeatable peak pulse current capability at wide and narrow pulse-widths. The Si SGTO design has a 3.5 cm^2 chip area with a 2.0 cm^2 mesa area and it is rated for 7 kV forward blocking and a continuous current rate over 100 A with adequate cooling.

A ThinPak lid and high voltage silicone gel compound was used in packaging the SGTOs. The purpose of the ThinPak lid was to eliminate wire bonds and other parasitic elements such as stray inductance and bond resistance associated with conventional packaging. ThinPak technology improves device reliability by reducing thermal, electrical, and mechanical stress that the die is subjected to during high pulsing conditions. This work highlights the device optimization that SPCO has since made on the Si SGTO to improve the device pulsing performance.

GaAs/AlGaAs electrooptic modulator with novel electrodes and bandwidth in excess of 40 GHz:

Abstract:

This abstract reports the latest results of our ongoing effort on GaAs/AlGaAs traveling wave Mach-Zehnder electrooptic modulators. Previously we reported >40 GHz electrical bandwidths but with rather large on/off voltage V/sub /spl pi//. By introducing a completely different electrode design we have reduced the V/sub /spl pi// from 28 V to 10 V while keeping the measured bandwidth >40 GHz. Furthermore the new design reduces the microwave loss, which determines the bandwidth, from 4.6 to 3.2 dB/cm at 35 GHz. Additionally, this new electrode geometry has the potential for further V/sub /spl pi// reduction while maintaining low loss.

Power modulators and repetitive pulsed power:

Abstract

We are pleased to present this fourth special issue of the IEEE Transactions on Dielectrics and Electrical Insulation (TDEI) on Power Modulators and Repetitive Pulsed Power. A call for manuscripts for this volume was issued in TDEI and in conjunction with the 2012 IEEE International Power Modulator and High Voltage Conference (IPMHVC), which was held in San Diego, CA, USA during June 3-7, 2012. This meeting has emerged from a long tradition of jointly held International Power Modulator Symposia and High Voltage Workshops which eventually merged into a single conference for the first time in 2010 and again in 2012. The IPMHVC provides a forum for researchers and practitioners, who are engaged with the science and technology of power modulators and repetitive pulsed power as well as closely interrelated research on high voltage questions and developments, to meet and exchange ideas and the latest advances in these fields. There has been a strong and growing international interest in these topics, as is indicated by participants from 26 different countries and a steadily increasing number of abstract submissions, which exceeded 300 at this most recent IPMHVC.

An Effective Illumination on streets

This paper mentions the dependence of effectiveness in street lighting upon municipal appropriations and efficient lamps, but discusses more particularly those aspects of effectiveness which are dependent upon skilful utilization of the light to produce the most effective illumination. There are included a classification of streets, a statement of the objects of street lighting and the elements of vision under street lighting conditions.

SADVIKA
17BF1A0263

Mega Minds

Edwin Armstrong (1890–1954) :

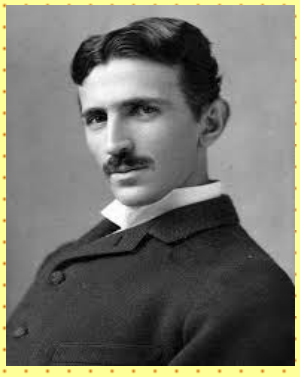
Edwin Howard Armstrong was one of great engineers of the 20th century, he was born in 1890, in New York City, and died in 1954, also in New York City. Edwin Armstrong was only eleven when Marconi made the first trans-Atlantic radio transmission. Enthralled, the young Armstrong began studying radio and building homemade wireless equipment, including a 125 foot antenna in his parent's backyard. Edwin Armstrong invented the superhetrodyne tuner that allowed radios to tune into different radio stations.

William Stanley (1858-1916) :

William Stanley was an inventor and engineer. He developed the first practical transformer (which spurred the development of AC power) as well as other developments; like an improved electric meter and the first metal thermos bottle (vacuum flask). He lived most of his life and ran his businesses in Western Massachusetts during the golden age of electric development.

Nikola Tesla(1856–1943) :

Serbian-American inventor Nikola Tesla contributed to the development of the alternating-current electrical system that's widely used today and discovered the rotating magnetic field (the basis of most AC machinery).



He invented the first alternating current (AC) motor and developed AC generation and transmission technology. In the 1890s Tesla invented electric oscillators, meters, improved lights and the high-voltage transformer known as the Tesla coil.

Guglielmo Marconi (1874–1937):

The Italian inventor and physicist, Guglielmo Marconi was awarded the Nobel Prize in Physics with Karl Ferdinand Braun for their development of practical wireless telegraphy. His development of a radio telegraph system led to the esbalishment of many associated companies all over the world. During December 1901 Marconi proved that wireless signals were unaffected by the curvature of the earth. He transmitted the first wireless signals across the Atlantic between Poldhu, Cornwall and St, Johns, New Foundland, a distance of 2100 miles.

Heinrich Hertz(1857– 1894) :

The great German physicist, Heinrich Hertz made possible the development of radio, television, and radar by proving that electricity can be transmitted in electromagnetic waves. He explained the electromagnetic theory of light that had been put forth by Maxwell. He was the first person who successfully demonstrated the presence of electromagnetic waves, by building an apparatus that produced and detected the VHF/UHF radio waves. This earned him the honor of having his surname assigned to the international unit of frequency (Hz).

T.PAVITHRA
17BF1A02C9

New effect couples electricity and magnetism in materials

Source: Vienna University of Technology, TU Vienna

Summary: Major industries such as modern microelectronics are based on the interaction between matter and electromagnetism. Electromagnetic signals can be processed and stored in specially tailored materials. In materials science, electric and magnetic effects have usually been studied separately. There are, however, extraordinary materials called "multiferroics," in which electric and magnetic excitations are closely linked. Scientists have now shown in an experiment that magnetic properties and excitations can be influenced by an electric voltage. This opens up completely new possibilities for electronics at high frequencies.

Hydropower set to balance wind power

Source: SINTEF

Summary: While Europe invests in wind energy, Norwegian hydropower offers the key to stable electricity supplies. The key driver of the development of a northern European offshore power grid is the massive investment being made in wind power in the Baltic and in and around the North Sea. The aim here is to reduce CO2 emissions by as much as between 80 and 95 per cent by 2050.

Surprise superconductor

Source: Carnegie Institution

Summary: Superconductivity is a rare physical state in which matter is able to conduct electricity -- maintain a flow of electrons -- without any resistance. This phenomenon can only be found in certain materials under specific low-temperature and high-pressure conditions. New research found unexpected superconductivity that could help scientists better understand the structural changes that create this rare phenomenon.

Plasmonic black metals: Breakthrough in solar energy research?

Source: DOE/Lawrence Livermore National Laboratory

Summary: The use of plasmonic black metals could someday provide a pathway to more efficient photovoltaics -- the use of solar panels containing photovoltaic solar cells -- to improve solar energy harvesting, according to researchers. This new LLNL (Lawrence Livermore National Laboratory) technology could one day be used in the energy harvesting industry such as PV. By incorporating metallic nanostructures with strong coupling of incident light, broad spectral and angular coverage .

Solar-powered battery woven into fabric overcomes hurdle for 'wearable electronics'

Source: American Chemical Society

Summary: Though some people already seem inseparable from their smart phones, even more convenient, wearable, solar-powered electronics could be on the way soon, woven into clothing fibers or incorporated into watchbands. This novel battery development could usher in a new era of "wearable electronics. An unconventional materials was tested and found that they could coat polyester yarn with nickel and then carbon, and use polyurethane as a binder and separator to produce a flexible battery that kept working, even after being folded and unfolded many times.

AARATHI
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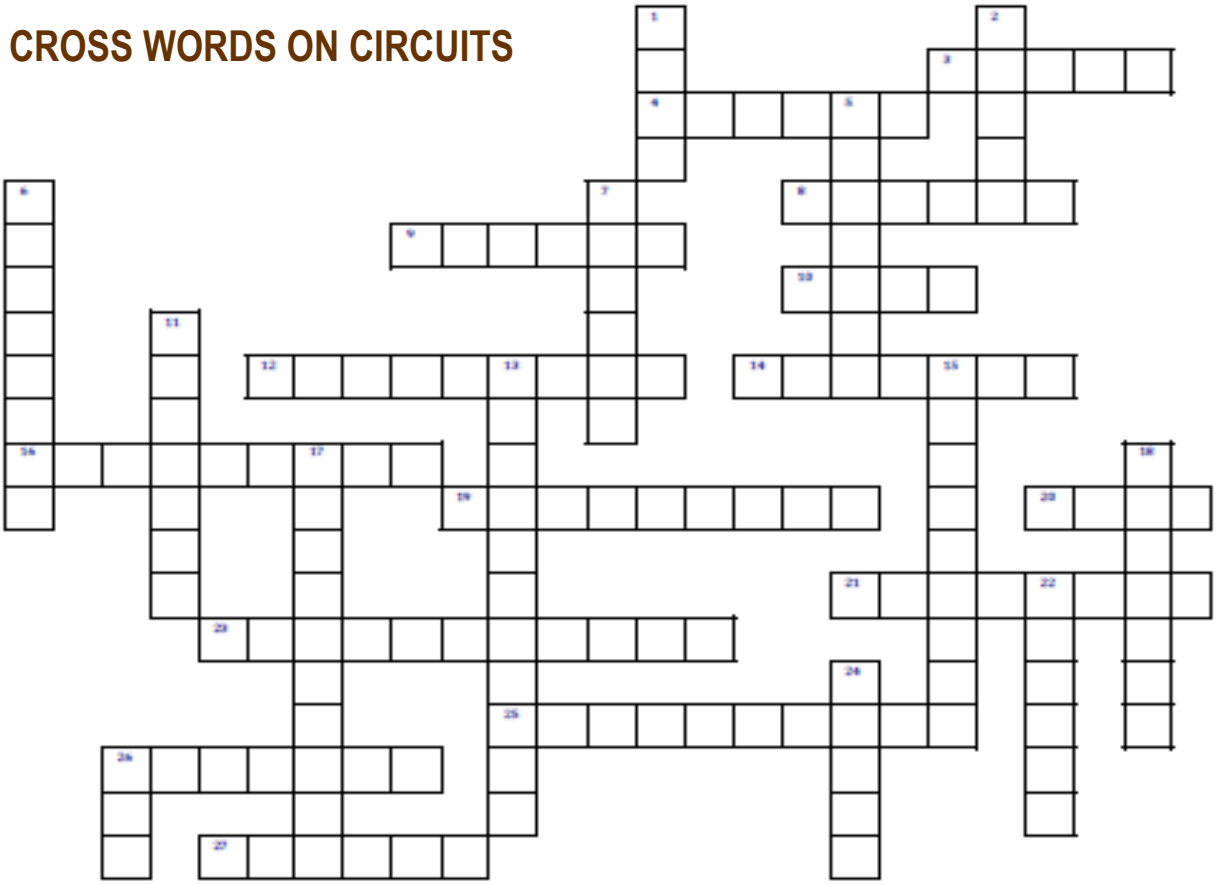
IGNITE YOURSELF

CROSS WORDS ON CIRCUITS



Clues across

3 What causes the resistance of a LDR to decrease?

4 A closed one allows the current to flow.

8 When a circuit is ..... , the current no longer flows.

9 A good conducting metal used in circuits.

10 A type of power source.

12 Adding resistors in series ..... the total resistance in the circuit.

14 This component provides electrical energy.

16 What would you use to measure the potential difference?

19 Adding a resistor in parallel ..... the total resistance in the circuit.

20 Resistance is measured in .....

21 The electric circuit of a car is in .....

23 Increasing this increases a wire's resistance.

25 Poor conductors of electricity.

26 Which component is used to measure current?

27 A battery supplies ..... current.

Clues down

1 Protects equipment from electrical surges.

2 Which component allows the current to flow one way through it?

5 A flow of electrons.

6 The flow of charge in a circuit moves from negative to ...?

7 In which type of circuit is the current the same all the way round?

11 Another word for the potential difference of a cell.

13 Domestic supply uses an ..... current.

15 An electric current is the flow of these.

17 Which component can be used as a temperature sensor?

18 The unit of current.

22 Resistance increases as the ..... of the wire increases.

24 Potential difference is measured in these.

26 To find the total resistance you need to ... the different resistances together.

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