BHAI GURDAS INSTITUTE OF ENGINEERING & TECHNOLGY

Electrical Engineering

Electrika 2022

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I H.O.D EE hereby declare that the particulars given above are true to the best of my knowledge and belief.

Er. Sushil Kakkar

HOD Electrical Engineering

June 2022

Vision of Department

It is aimed to provide the finest environment for teaching, learning, research, innovation and character building so as to mould youth of today into world class technocrats of tomorrow who would Endeavour to increase the quality of life for mankind.

Mission of Department

M1 -- 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.

M2 -- To impart the quality education and enhance skills for developing globally competent Electrical Engineers.

M3 -- To provide state –of –the –art facilities and opportunities to create, interpret, apply and disseminate knowledge.

M4 -- To develop students and faculty to cope up with modern technology with research attitude to meet industry standards effective industry interface.

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DIRECTOR'S MESSAGE

Dr. Tanuja Srivastava
Director, BGIET

It is matter of immense pleasure for me that the Electronics & Communication Department Engineering of BGIET, Sangrur committed to excellence through technology is going to launch Annual Magazine “Electrika-22”. This will provide a common platform to Students, Faculty Members and Eminent Engineers to share their ideas and technological assets to translate innovations from basic knowledge to quality products for better returns and competitions at the global level. Besides it will encourage the young students for recognition of their new innovations and technologies at the Institute Level. I congratulate those students and Faculty Members who have contributed and urge other to avail the opportunity next time.

With Best Wishes
Dr. TanujaSrivastva

HOD's MESSAGE

Dear students,

It is a matter of great pride & happiness that the third edition of the Electronics magazine "Electrika-22" is in your hands. You are reading your own creative & technical output. It is an endeavor by the college to provide you with an opportunity to look beyond the mundane routine. I take this opportunity to thank the many people who have made this launch of the magazine possible. First and foremost are the authors of various articles and editorials whose works over the years have made the magazine a reality and I also thank the Publications Board and publications staff of this magazine who have extended themselves to make this magazine possible. Finally, I want to thank all of our readers both those who have been with us for many years and those who have only recently discovered the magazine. It always a pleasure when a reader comes up to me at Semi-Term or writes to me about how much they enjoy the magazine and how useful they have found one of the articles.

Keep it up. Wishing you good luck.

Dr. Sushil Kakkar

HOD Electrical Engineering

EDITOR'S MESSAGE

It gives immense pleasure to bring out the college magazine “Electrika-2022”. This magazine has been an effective platform for students and staff to express their talents and hidden skills. we would like to take this opportunity to express our sincere thanks to all The Director, HODs and Faculty members of BGIET. We thank the Editorial Board Members for their information suggestions and advice. We are indebted to the student members of the Editorial Board for their seamless efforts in bringing out the magazine in a colorful way.

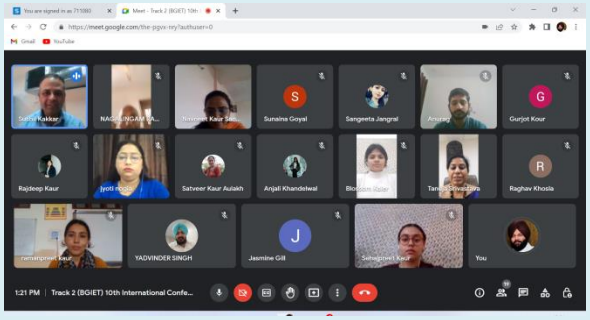
Er. Puneet Chopra

A.P. Electrical Engineering

Departmental Activities

Webinar on "Robotics"

Robotics is the field of technology that deals with the design, construction, and operation of robots. These machines have been developed to perform tasks that are too dangerous, too repetitive, or too complex for humans to undertake. Department of Electrical Engineering conducted Webinar on Robotics resource person was Er. Amandeep Singh Bhandari, Assistant Professor, UCOE, Punjabi University Patiala. He elaborated Robotics has transformed industries such as manufacturing, healthcare, agriculture, and transportation. The use of robots has increased productivity and efficiency, leading to cost savings and higher quality products. They have also helped to reduce workplace injuries by taking on hazardous tasks such as welding or chemical handling. In healthcare, robots are used in surgeries and rehabilitation to enhance patient outcomes. In agriculture, robots are employed for tasks such as planting, harvesting, and irrigation.



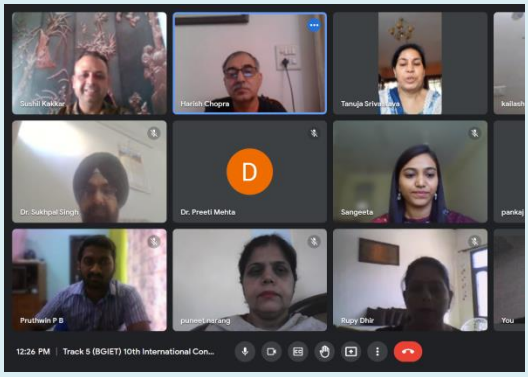
Despite the benefits of robotics, there are also concerns about the impact on jobs and the economy. As more tasks are automated, there is a risk of job displacement and a shift in the nature of work. It is essential to consider the social implications of robotics and ensure that the benefits are distributed equitably. He concluded, robotics has the potential to revolutionize many industries and improve our lives in numerous ways. It is important to approach the development and implementation of robots with care and consideration for the broader impact on society

Webinar on IOT

Department of EE conducted webinar on IOT. The Internet of Things (IoT) refers to a network of physical devices, vehicles, buildings, and other objects that are embedded with sensors, software, and connectivity, which enables them to collect and exchange data. IoT has a significant impact on many industries, including core industries such as manufacturing, energy, transportation, and agriculture. Resource person Dr. Ashish Sharma, Department of Electrical Engineering, Chandigarh University, Gharuan discussed about IOT manufacturing industry, IoT can be used to optimize production processes, monitor equipment performance, and reduce downtime. For example, sensors can be attached to machines to collect data on their performance, which can be used to predict maintenance needs and schedule repairs before a breakdown occurs. IoT can also help manufacturers track inventory levels, streamline supply chain management, and improve product quality.

In the energy industry, IoT can be used to monitor and control power generation and distribution systems,

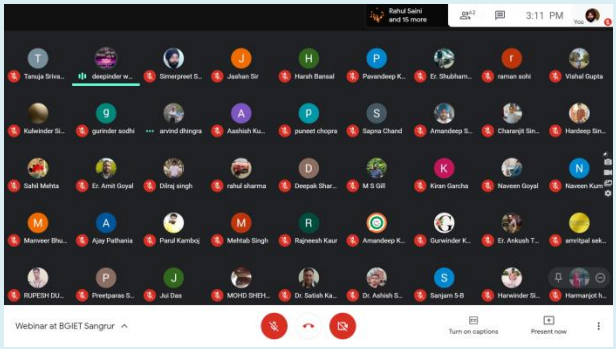
optimize energy consumption, and improve safety. For example, smart grids can be used to manage energy demand and supply in real-time, reducing the risk of power outages and improving the overall efficiency of the grid. IoT can also be used to monitor the condition of equipment in power plants and detect potential failures before they occur. In the transportation industry, IoT can be used to improve logistics and supply chain management, optimize vehicle performance, and enhance passenger safety and comfort. For example, connected vehicles can communicate with each other and with roadside infrastructure to optimize traffic flow and reduce congestion. IoT can also be used to track shipments in real-time, monitor the condition of vehicles, and provide real-time data to drivers and passengers.



In the agriculture industry, IoT can be used to optimize crop production, reduce waste, and improve resource efficiency. For example, sensors can be used to monitor soil moisture levels, temperature, and nutrient levels, which can be used to optimize irrigation and fertilization schedules. IoT can also be used to monitor weather conditions and predict crop yields, helping farmers make informed decisions about planting, harvesting, and marketing their crops. Overall, IoT has the potential to revolutionize many core industries by enabling more efficient, cost-effective, and sustainable operations. By leveraging the power of IoT, businesses can improve their competitiveness, reduce their environmental impact, and create new opportunities for growth and innovation.

Webinar on Embedded Systems and Control

Er. Gurmeet Sharma, Eureka Electrosoft Solutions Pvt. Ltd was the resource person in the webinar on Embedded system control He elaborated the use of computer systems that are embedded into a larger mechanical or electrical system to control its functions. These systems are designed to perform specific tasks or functions, and are often used in industrial or automotive applications, as well as in consumer electronics. Embedded systems typically consist of a microcontroller or microprocessor, which is programmed to control the system's operation.



The software running on the microcontroller or microprocessor is usually designed to interface with the hardware components of the system, including sensors, actuators, and

other control devices. The control functions of an embedded system can be simple or complex, depending on the application. For example, a simple embedded system might be used to control the temperature of a room, while a more complex system might be used to control the operation of a large factory or manufacturing plant. One of the key benefits of embedded system control is its ability to automate processes and functions, which can lead to increased efficiency and productivity. Embedded systems are also often used to monitor and control safety-critical functions, such as those in automotive or medical applications.

Guest Lecture "Electronics Devices "

Department has organized guest lecture on Electronic Devices in the campus. Te resource person was Er. Madhusudhan, Semiconic devices pvt ltd. New Delhi. Aproximately 80 students of ElectricalEngineering Department participated and gained precious knowledge from industry expert. He said Electronic devices refer to any device that uses electricity to perform a function or provide a service. These devices are ubiquitous in our daily lives and can range from small handheld gadgets like smartphones and tablets to larger appliances like refrigerators and washing machines.

- He dicussed various applications of electronic devices such as:
- Smartphones and tablets: portable devices that allow users to make phone calls, send messages, browse the internet, and run various applications.
- Computers and laptops: devices that allow users to perform a wide range of tasks, including word processing, internet browsing, gaming, and more.
- Televisions and home entertainment systems: devices that allow users to watch movies, TV shows, and other forms of entertainment.
- Appliances: devices that are used in homes and businesses for a variety of purposes, such as refrigerators, washing machines, and air conditioners.
- Wearable technology: devices that can be worn on the body, such as smartwatches and fitness trackers.
- Electronic devices are made up of a combination of hardware and software components. The hardware components include things like the motherboard, processor, memory, and storage, while the software components include the operating system, applications, and drivers.

He concluded that, electronic devices have revolutionized the way we live and work, and continue to play an increasingly important role in our lives.

Workshop on Energy Efficient Machines

One day workshop on “Energy Efficient Machines” has been organized by the department of Electrical Engineering. The guest was Dr. Munish Kumar, Assistant Professor, Central University, Haryana he expressed his research area on Electric Machines and elaborated Working concepts and Reduction of Losses in Machines to the students. Aproximately 80 students collected knowledge fromhis vaueable research and experience. He simple words he discussed that energy efficient electrical machines are designed to minimize the amount of energy lost due to factors such as heat, friction, and electrical resistance. These machines can be used in a wide range of applications, including industrial machinery, electric vehicles, appliances, and HVAC systems. Different factors that contribute to the energy efficiency of electrical machines. These include the design of the motor or generator, the materials used in construction, the control systems used to regulate power input and output, and the overall system design. Some common strategies for improving energy efficiency in electrical machines include:

- Using high-efficiency materials: High-quality materials such as copper, aluminum, and silicon steel can reduce energy losses due to electrical resistance.
- Optimizing the design: Motor and generator designs can be optimized to reduce energy losses due to factors such as friction and magnetic hysteresis.
- Using variable speed drives: These drives allow motors to operate at varying speeds and power levels, reducing energy consumption when full power is not needed.
- Using regenerative braking: Regenerative braking systems can capture energy that would otherwise be lost during braking and reuse it to power the machine.
- Implementing energy management systems: These systems can monitor and optimize energy use in real-time, ensuring that machines are only using the power they need.

Dr. Kumar concluded that energy efficient electrical machines can provide significant benefits in terms of reduced energy consumption, lower operating costs, and improved environmental sustainability.

Articles by students

CLOUD COMPUTING

Cloud computing is a model for delivering computing services over the internet, including software, storage, and processing power. Rather than owning and managing their own computing infrastructure, businesses and individuals can use remote servers hosted by cloud service providers to store and access data and applications.

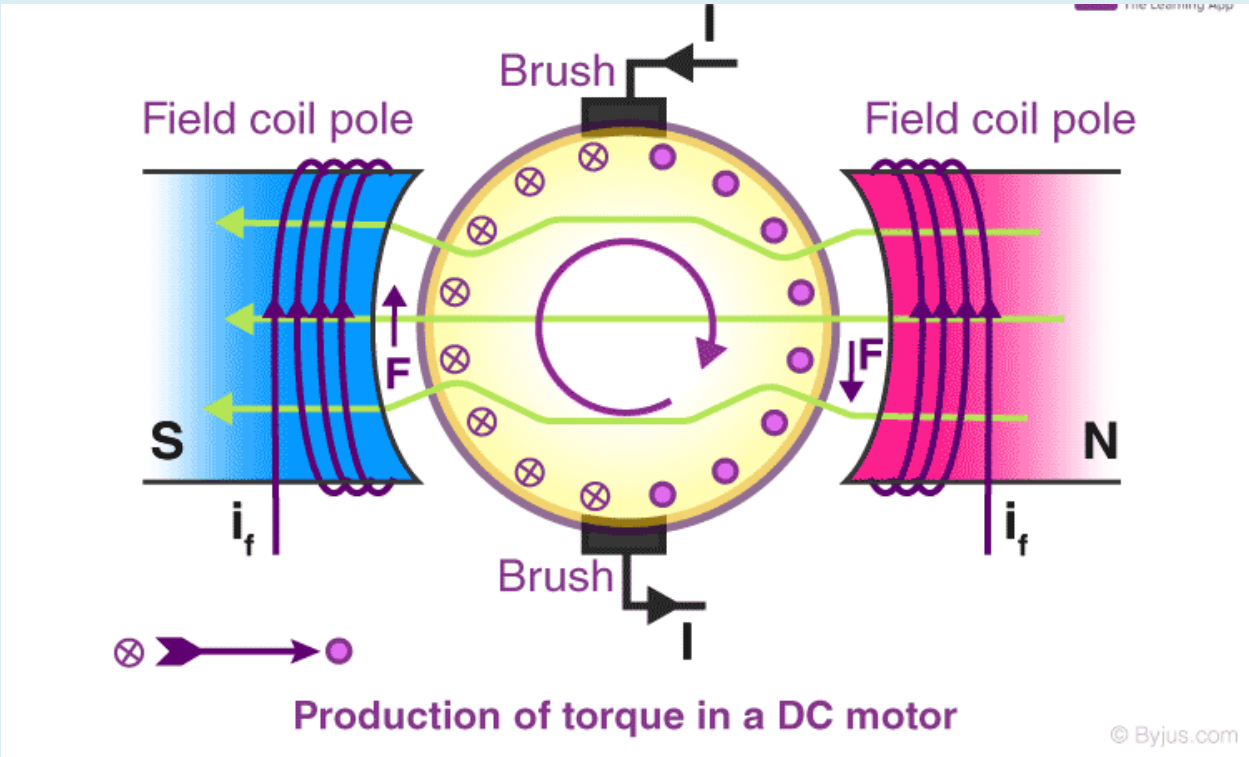
Cloud computing offers numerous benefits, including scalability, cost savings, and flexibility. With the ability to quickly and easily add or remove computing resources as needed, organizations can respond to changing demands and avoid the expense and complexity of maintaining their own IT infrastructure. Additionally, cloud computing allows for remote access to data and applications, making it easy for teams to collaborate and work from anywhere.

However, there are also potential challenges associated with cloud computing, including security concerns, vendor lock-in, and reliance on internet connectivity. Despite these challenges, cloud computing is becoming an increasingly popular choice for businesses and individuals looking to streamline their computing processes and leverage the power of remote computing resources.

Navpreet Kaur
Sem 3rd EE

DC MACHINES

DC machines are electrical devices that convert electrical energy into mechanical energy or vice versa. They consist of two main components: the stator, which generates a stationary magnetic field, and the rotor, which rotates within the magnetic field. The DC machines are classified into two types based on the way the magnetic field is produced: the DC generator and the DC motor. In a DC generator, the mechanical energy is converted into electrical energy, whereas in a DC motor, the electrical energy is converted into mechanical energy.



The operation of DC machines is based on the principle of Faraday's law of electromagnetic induction. When a conductor moves in a magnetic field, an emf is induced in the conductor. This emf causes a current to flow in the conductor, which produces a magnetic field that interacts with the stationary magnetic field, causing the rotor to rotate. The DC machines have several advantages, including high efficiency, high torque, and good speed control. They are widely used in various applications, including electric vehicles, cranes, elevators, and machine tools.

However, they also have some limitations, such as the need for regular maintenance, high cost, and limited operating range. Additionally, DC machines require a DC power supply, which can be expensive and difficult to implement in some applications. In conclusion, DC machines

are essential components in modern electrical systems. Their efficiency, reliability, and controllability make them suitable for a wide range of applications, from small motors to large generators. As technology advances, we can expect to see further developments and improvements in DC machine technology.

Naresh Kumar
Sem 3rd EE

TRANSFORMER

The transformer in the simplest way can be described as a thing that steps up or steps down voltage. In a step-up transformer, the output voltage is increased and in a step-down transformer, the output voltage is decreased. The step-up transformer will decrease the output current and the step-down transformer will increase the output current for keeping the input and the output power of the system equal. The transformer is basically a voltage control device that is used widely in the distribution and transmission of alternating current power. The idea of a transformer was first discussed by Michael Faraday in the year 1831 and was carried forward by many other prominent scientific scholars. However, the general purpose of using transformers was to maintain a balance between the electricity that was generated at very high voltages and consumption which was done at very low voltages.

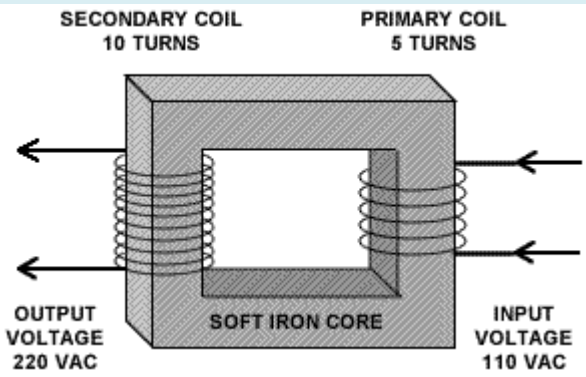
Transformer Types

Transformers are used in various fields like power generation grid, distribution sector, transmission and electric energy consumption. There are various types of transformers which are classified based on the following factors;

- Working voltage range.
- The medium used in the core.
- Winding arrangement.
- Installation location.

Working Principle of a Transformer

The transformer works on the principle of Faraday's law of electromagnetic induction and mutual induction.



There are usually two coils primary coil and secondary coil on the transformer core. The core laminations are joined in the form of strips. The two coils have high mutual inductance. When an alternating current pass through the primary coil it creates a varying magnetic flux. As per faraday's law of electromagnetic induction, this change in magnetic flux induces an emf (electromotive force) in the secondary coil which is linked to the core having a primary coil. This is mutual induction. Overall, a transformer carries the below operations:

1. Transfer of electrical energy from circuit to another
2. Transfer of electrical power through electromagnetic induction
3. Electric power transfer without any change in frequency
4. Two circuits are linked with mutual induction

Lovnish Sharma
Sem 3rd

TRANSMISSION LINES

AC (alternating current) transmission lines are used to transmit electrical power over long distances from power plants to distribution centers, factories, and homes. AC transmission lines carry electrical power in the form of AC voltage, which oscillates back and forth at a certain frequency. There are different types of AC transmission lines, including overhead lines, underground cables, and submarine cables. Overhead lines are the most common type and are composed of a series of towers or poles that support the transmission lines. Underground cables are used when overhead lines are not feasible or desirable, such as in urban areas, while submarine cables are used to transmit power across bodies of water. The behavior of AC transmission lines is affected by several factors, including the length of the line, the type of conductor used, the frequency of the AC voltage, and the level of power being transmitted. The

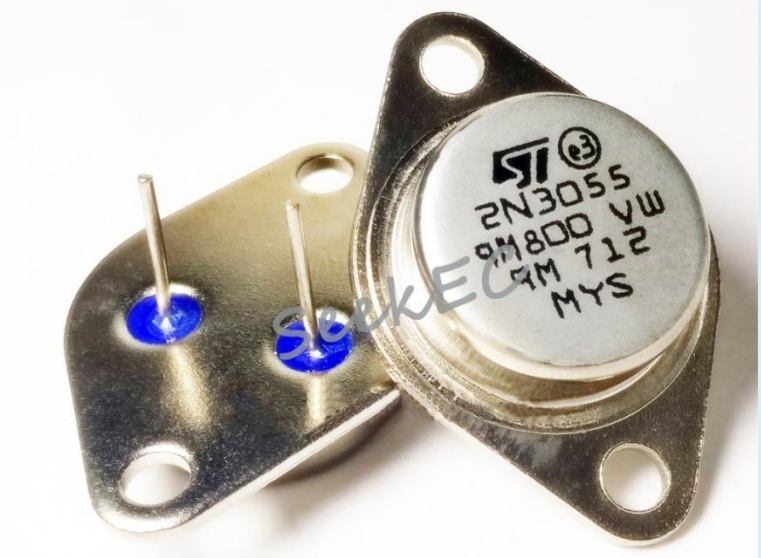
resistance, inductance, and capacitance of the transmission line all play a role in determining the line's characteristics, including its impedance, voltage drop, and power losses.

To optimize the performance of AC transmission lines, various techniques are used, including adjusting the line's voltage and reactive power levels, using power factor correction, and implementing active and reactive power control strategies. These techniques help to minimize power losses, improve voltage regulation, and ensure the stability and reliability of the power system.

Simranjot Kaur
Sem 5th

POWER TRANSISTOR

It is a type of transistor that is designed to handle high power levels and currents. It is used in various applications such as power supplies, motor control, and audio amplifiers. Power transistors are typically made from materials such as silicon or germanium, and are classified based on their structure and characteristics. The most common types of power transistors include bipolar junction transistors (BJTs), metal-oxide-semiconductor field-effect transistors (MOSFETs), and insulated gate bipolar transistors (IGBTs).



BJTs are the simplest type of power transistor, and are commonly used in linear power amplifier circuits. MOSFETs are known for their fast switching speeds and are often used in switching power supplies and motor control circuits. IGBTs combine the high input impedance of MOSFETs with the low on-state conduction losses of BJTs, and are commonly used in high power applications such as electric vehicles and industrial equipment. Power transistors are available in a variety of packages such as through-hole, surface mount, and module formats, and are selected based on the specific application requirements.

Dilraj Singh
Sem 5th

Artificial intelligence (AI) is becoming increasingly important in the development of electric cars. The integration of AI in electric cars is helping to improve their efficiency, safety, and overall performance. One major application of AI in electric cars is in the optimization of battery performance. AI algorithms can be used to predict the range of the car based on factors such as driving conditions, battery temperature, and power usage, allowing the car to make more accurate range estimates and optimize its performance accordingly. Artificial intelligence (AI) is becoming increasingly important in the development of electric cars. The integration of AI in electric cars is helping to improve their efficiency, safety, and overall performance.

One major application of AI in electric cars is in the optimization of battery performance. AI algorithms can be used to predict the range of the car based on factors such as driving conditions, battery temperature, and power usage, allowing the car to make more accurate range estimates and optimize its performance accordingly. AI can also be used to improve safety features in electric cars. For example, AI-powered collision avoidance systems can help detect and avoid potential accidents, while lane departure warnings can alert drivers when they are drifting out of their lane. Furthermore, AI can help to optimize the charging process for electric cars. By analyzing factors such as the time of day, energy prices, and the driver's schedule, an AI system can recommend the best time and location for charging the car, reducing costs and maximizing convenience. Overall, the integration of AI in electric cars is helping to improve their efficiency, safety, and convenience, and will likely play an increasingly important role in the development of electric vehicles in the future.

Lovepreet Singh
Sem 5th

Solar power is a promising source of clean energy, but its efficiency can be affected by a variety of factors such as weather conditions and shading. Artificial intelligence (AI) can be used to optimize the performance of solar power systems by predicting solar energy production and adjusting the system's operation accordingly.

Here are some examples of how AI can be used in solar power systems:

1. Predictive maintenance: AI algorithms can be used to analyze data from sensors and predict when maintenance is needed, helping to prevent downtime and improve the system's overall performance.
2. Solar panel monitoring: AI algorithms can be used to monitor solar panels in real-time, detecting any issues such as panel damage or shading, and making adjustments to the system's operation to optimize energy production.
3. Weather forecasting: AI algorithms can be used to analyze weather data and predict solar energy production based on cloud cover, temperature, and other weather factors.
4. Energy storage optimization: AI algorithms can be used to optimize the use of energy storage systems, determining when to charge or discharge batteries to maximize the use of solar energy.
5. Energy demand prediction: AI algorithms can be used to predict energy demand and adjust the operation of solar power systems to meet that demand.

Overall, using AI in solar power systems can help to improve efficiency, reduce downtime, and optimize energy production, making solar power a more viable and reliable source of clean energy.

Riddles

1. What has a heart that doesn't beat?
2. What has a neck but no head, and wears a cap?
3. What do you get when you cross a snowman and a shark?
4. I'm light as a feather, yet the strongest man can't hold me for much more than a minute. What am I?.
5. What starts with the letter "t", is filled with "t" and ends in "t"?
6. What five-letter word becomes shorter when you add two letters to it?
7. What has a face and two hands, but no arms or legs?
8. What has one eye, but can't see?
9. I'm tall when I'm young and short when I'm old. What am I?
10. I have cities, but no houses. I have mountains, but no trees. I have water, but no fish. What am I?.
11. What is always in front of you but can't be seen?
12. What has one head, one foot, and four legs?
13. What is so fragile that saying its name breaks it?
14. What goes up but never comes down?
15. What is full of holes but still holds water?
16. What has four fingers and a thumb, but isn't alive?
17. What starts with "e" and ends with "e" but only contains one letter?
18. I am not alive, but I grow; I don't have lungs, but I need air; I don't have a mouth, but I need water to live. What am I?
19. What is so light that even the strongest man can't hold it for long?
20. What word becomes shorter when you add two letters to it?

Answers

A artichoke, A bottle, Frostbite, Breath, A teapot, Short, A clock, A needle, A candle, A bed, Silence, Age, A sponge, A glove, An envelope, Fire, His breath, Shorter.

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