



APPLICATIONS OF ELECTRICAL APPLIANCES IN REAL LIFE

AS PART OF ADD-ON COURSES (2020-2021)

Dr. V S Krishna Government Degree & PG College

SCIENCE STREAM

ADD - ON COURSE

From 01-11-2020 to 30-11-2020

DEPARTMENT OF PHYSICS

2020-2021

COURSE COORDINATOR

H.SUDHEER M.Sc

LECTURER IN PHYSICS

Head of the Department

Dr. D. Sravankumar M.Sc. Ph.D.

OBJECTIVES

- ❖ ACADEMIC ENHANCEMENT
- ❖ CAREER OPPORTUNITIES
- ❖ PERSONAL DEVELOPMENT
- ❖ UNDERSTANDING PHYSICS in DAILY LIFE



SYLLABUS OF APPLICATIONS OF ELECTRICAL APPLIANCES IN REAL LIFE

AS PART OF ADD-ON COURSES (2020-2021)

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SCIENCE STREAM

Total: 30 hrs.

Learning Outcomes:

By successful completion of the course, students will be able to:

1. Acquire necessary skills/hand on experience/ working knowledge on Multimeter, galvanometers, ammeters, voltmeters,
2. Electrical protection devices.
3. Understand the working principles of different household domestic appliances.

Syllabus of

APPLICATIONS OF ELECTRICAL APPLIANCES IN REAL LIFE

SYLLABUS

UNIT-I (15hr)

i. Voltage, Current, Resistance, Electrical conductors and Insulators, Ohm's law, Series and parallel combinations of resistors, , Capacitance, Series and parallel combinations of capacitors.

ii. Inductance, Transformers, Electrical energy, Power, Kilowatt hour (kWh), consumption of electrical power.

Calculation of electrical bill (domestic)

UNIT-II (15hrs)

i. Fuses, MCB, ELCB, Insulation,

ii. Electric fan, Electric Iron box, Water heater; Electric bulbs, CFL, LED lights.

iii. Multimeter, galvanometers, ammeters, voltmeters,

Reference Books:

1. A Text book on Electrical Technology, B.L.Theraja, S.Chand& Co.,
2. A Text book on Electrical Technology, A.K.Theraja.
3. Performance and design of AC machines, M.G.Say, ELBSEdn.,
4. Domestic Appliances Servicing, K.P.Anwer, Scholar Institute Publications

Hand out

Voltage, also known as electric potential difference, is the measure of the electric potential energy per unit charge between two points in an electric circuit. It is typically measured in volts (V) and represents the electrical force that drives the flow of electric current through a circuit. Voltage can be thought of as the "pressure" or "push" that drives electrons through a circuit, similar to the pressure that drives water through a pipe.

Voltage is a fundamental concept in electrical engineering and is used in a wide variety of applications, from powering electrical devices to transmitting power over long distances through power grids.

1. Voltage: Voltage is the electrical potential difference between two points in an electrical circuit. It is measured in volts (V) and is the force that drives current flow through a circuit.

Voltage, also known as electric potential difference, is the measure of the electric potential energy per unit charge in an electrical circuit. It is typically measured in volts (V) and represents the force that drives electric charge through a conductor.

2. Current: Current is the flow of electrical charge through a circuit. It is measured in amperes (A) and is the rate at which electrical charge flows through a conductor.

Current is the flow of electric charge in a circuit, typically measured in amperes (A). It represents the rate at which electric charge flows through a conductor and is driven by the voltage difference in the circuit.

3. Resistance: Resistance is the opposition of a material to the flow of electrical current through it. It is measured in ohms (Ω) and is the ratio of the voltage applied to a circuit to the resulting current flow.

Resistance is the measure of how much an object or material impedes the flow of electric current through it. It is typically measured in ohms (Ω) and is dependent on the physical properties of the material, such as its size, shape, and composition.

Ohm's law

Ohm's law states that the current through a conductor between two points is directly proportional to the voltage across the two points. In other words, for a given conductor at a constant temperature, the electrical current (I) flowing through the conductor is directly proportional to the voltage (V) applied across it, and inversely proportional to the resistance (R) of the conductor.

This relationship is expressed mathematically as: $V = IR$

Where V is the voltage, I is the current, and R is the resistance. Ohm's law is named after Georg Simon Ohm, a German physicist who first formulated it in 1827. It is one of the fundamental laws of electrical circuits and is widely used in electrical engineering and electronics to calculate and design circuits.

Series combination of resistors

When two or more resistors are connected end-to-end in a series combination, the current flowing through each resistor is the same, and the total resistance of the combination is equal to the sum of the individual resistances.

The total resistance is calculated as:

$$R_{\text{total}} = R_1 + R_2 + \dots + R_n$$

Where R_1, R_2, \dots, R_n are the individual resistances.

Parallel combination of resistors

When two or more resistors are connected in a parallel combination, the voltage across each resistor is the same, and the total resistance of the combination is less than the resistance of the smallest resistor. The total resistance is calculated as:

$$1/R_{\text{total}} = 1/R_1 + 1/R_2 + \dots + 1/R_n$$

Where R_1, R_2, \dots, R_n are the individual resistances.

Series combinations of resistors are used to increase the total resistance of a circuit, while parallel combinations of resistors are used to reduce the total resistance of a circuit. Series combinations of resistors are commonly used in voltage dividers, while parallel combinations of resistors are commonly used in current dividers and in applications where high current flow is required.

Capacitance

Capacitance: Capacitance is a measure of a capacitor's ability to store an electric charge. It is the ratio of the electric charge stored on each plate of a capacitor to the potential difference (voltage) between the plates. Capacitance is measured in farads (F), named after Michael Faraday, a British physicist and chemist who discovered electromagnetic induction and electrolysis. Capacitors are commonly used in electronic circuits to store electrical energy, block DC voltage, filter noise, and control timing.

Series and Parallel Combinations of Capacitors: In a series combination of capacitors, the capacitors are connected end-to-end such that the positive plate of one capacitor is connected to the negative plate of the next capacitor. The total capacitance of the combination is less than the value of the smallest capacitor. The total capacitance is calculated as:

$$\frac{1}{C_{total}} = \frac{1}{C_1} + \frac{1}{C_2} + \dots + \frac{1}{C_n}$$

Where C_1, C_2, \dots, C_n are the capacitances of the individual capacitors.

In a parallel combination of capacitors, the capacitors are connected so that the positive plate of each capacitor is connected to the positive plate of the other capacitors, and the negative plate of each capacitor is connected to the negative plate of the other capacitors. The total capacitance of the combination is equal to the sum of the capacitances of the individual capacitors. The total capacitance is calculated as:

$$C_{total} = C_1 + C_2 + \dots + C_n$$

Where C_1, C_2 and C_n are the capacitances of the individual capacitor. Parallel combinations of capacitors are used to increase the total capacitance of a circuit and reduce the effective resistance of a circuit, while series combinations of capacitors are used to reduce the total capacitance of a circuit and increase the effective resistance of a circuit.

Inductance

Inductance: Inductance is the property of an electrical circuit that opposes changes in current. It is measured in henry (H) and is a measure of the ability of a circuit component, such as a coil, to store energy in a magnetic field when current flows through it.

Inductance:

Inductance is the measure of the ability of an electrical component, such as a coil or a solenoid, to store energy in a magnetic field when an electric current flows through it. It is typically measured in henries (H) and is dependent on the number of turns in the coil, the material it is made of, and the dimensions of the coil.

Transformer:

A transformer is an electrical device that is used to transfer electrical energy from one circuit to another by means of electromagnetic induction.

Transformers consist of two coils of wire, known as the primary and secondary windings, which are wrapped around a magnetic core. When an AC voltage is applied to the primary winding, an alternating magnetic field is generated in the core, which induces an AC voltage in the secondary winding. The voltage induced in the secondary winding is proportional to the ratio of the number of turns in the secondary winding to the number of turns in the primary winding, known as the turn's ratio.

Transformers are used in a wide variety of applications in electrical engineering and electronics, including power transmission and distribution, voltage regulation, impedance matching, isolation, and signal amplification.

Transformers are particularly useful in power transmission because they allow for the efficient transfer of electrical energy over long distances at high voltages, which reduce power losses due to resistance in the transmission lines. Transformers also play a key role in electronic devices, such as power supplies, where they are used to convert AC voltage to DC voltage or to step up or step down voltage levels.

Electrical energy, Power, Kilowatt hour (kWh)

Electrical Energy: Electrical energy is the energy that is transferred by an electric current. It is the amount of work done by an electric current over time and is measured in joules (J) or kilowatt-hours (kWh). Electrical energy is typically generated at power plants by converting other forms of energy, such as mechanical, chemical, or nuclear energy, into electrical energy.

Power: Power is the rate at which energy is transferred or work is done. In electrical systems, power is measured in watts (W) or kilowatts (kW). Power is calculated as the product of voltage and current, or by dividing the amount of work done by the time it takes to do the work.

Kilowatt-hour (kWh): The kilowatt-hour (kWh) is a unit of energy commonly used to measure electrical energy consumption. One kilowatt-hour is equal to the amount of energy consumed by a device with a power rating of one kilowatt over the course of one hour. For example, if a 100-watt light bulb is left on for 10 hours, it will consume 1 kilowatt-hour of electrical energy.

Consumption of Electrical Power: The consumption of electrical power refers to the amount of electrical energy used by an electrical device over a certain period of time. This is usually measured in kilowatt-hours (kWh). The consumption of electrical power can be calculated by multiplying the power rating of the device in kilowatts by the time the device is in use, typically measured in hours. For example, if a 1 kW air conditioner is used for 5 hours per day, the daily consumption of electrical power is 5 kWh. The consumption of electrical power is an important factor to consider when managing energy costs and reducing energy consumption.

The calculation of an electrical bill for a domestic consumer typically involves the following components:

Energy Charge: This is the cost of the actual energy consumed by the consumer, and is calculated based on the number of units of electricity consumed during the billing period. One unit of electricity is equal to one kilowatt-hour (kWh).

Fixed Charges: This is a fixed fee that is charged by the utility company for providing electrical service to the consumer, regardless of the amount of energy consumed.

Taxes: Various taxes, such as sales tax or value-added tax, may be applicable on the energy charges or fixed charges.

The following steps can be used to calculate the electrical bill for a domestic consumer:

Step 1: Determine the total number of units of electricity consumed during the billing period. This information can be obtained from the electricity meter.

Step 2: Determine the energy charge per unit of electricity consumed. This information can be obtained from the electricity tariff provided by the utility company.

Step 3: Multiply the total number of units of electricity consumed by the energy charge per unit of electricity consumed to calculate the energy charges.

Energy Charges = Total Number of Units of Electricity Consumed x Energy Charge per Unit of Electricity

Step 4: Add the fixed charges to the energy charges to calculate the total bill amount before taxes.

Total Bill Amount before Taxes = Energy Charges + Fixed Charges

Step 5: If applicable, add the taxes to the total bill amount before taxes to calculate the final bill amount.

Final Bill Amount = Total Bill Amount before Taxes + Taxes

It's important to note that the steps and calculations involved may vary depending on the specific tariff and billing system used by the utility company.

Fuses: A fuse is a safety device that is used to protect electrical circuit from overcurrent conditions that could potentially cause damage to equipment or start a fire. Fuses are made of a thin wire or filament that melts when the current flowing through it exceeds a certain level, breaking the circuit and preventing further current flow.

MCB (Miniature Circuit Breaker)

MCB (Miniature Circuit Breaker): MCB is an electromechanical device that is used to protect electrical circuits from overcurrent conditions. MCB works by detecting over currents and quickly shutting off the electrical circuit, which prevents damage to equipment and reduces the risk of fire. MCB is typically used in low voltage electrical systems.

MCB (Miniature Circuit Breaker) is a type of electrical switch that automatically turns off the electrical circuit when there is an overcurrent or short circuit condition. It is designed to protect electrical equipment and wiring from damage caused by excessive current flow.

MCBs typically consist of a thermal trip and a magnetic trip. The thermal trip is a bimetallic strip that is sensitive to the heat generated by overcurrent conditions. When the current flowing through the MCB exceeds a certain level for a certain amount of time, the bimetallic strip heats up and bends, which causes the MCB to trip and disconnect the circuit.

The magnetic trip, on the other hand, is sensitive to the magnetic field generated by overcurrent conditions. When the current flowing through the MCB exceeds a certain level for a short period of time, the magnetic field generated by the current causes the magnetic trip to trip and disconnects the circuit.

MCBs are commonly used in low voltage electrical systems such as residential and commercial buildings. They are preferred over fuses because they can be reset and reused, whereas fuses need to be replaced every time they trip. MCBs also provide better protection against short circuits and overloads compared to fuses.

ELCB (Earth Leakage Circuit Breaker)

ELCB (Earth Leakage Circuit Breaker): ELCB is an electrical safety device that is used to protect people from electric shock. ELCB detects small leakage currents that may be flowing through the electrical system due to a ground fault or insulation failure and quickly shuts off the power supply. ELCB is typically used in high voltage electrical systems.

ELCB (Earth Leakage Circuit Breaker) is a type of electrical safety device that is designed to protect people from electric shock. It detects small leakage currents that may be flowing through the electrical system due to a ground fault or insulation failure and quickly shuts off the power supply.

ELCB works by comparing the current flowing through the live and neutral wires of the electrical circuit. If the current flowing through the live wire is not equal to the current flowing through the neutral wire, it means that some current is leaking to the ground. ELCB detects this imbalance and trips the circuit to prevent electrical shock.

There are two types of ELCBs: voltage-operated and current-operated. Voltage-operated ELCBs work by detecting a difference in voltage between the live and neutral wires, while current-operated ELCBs detect the imbalance in current flowing through the live and neutral wires.

ELCBs are typically used in high voltage electrical systems such as industrial plants, hospitals, and large commercial buildings. They are also commonly used in areas where people are more likely to come into contact with electrical equipment, such as swimming pools and construction sites.

Overall, ELCBs play an important role in electrical safety by detecting and preventing electric shocks caused by ground faults or insulation failures. They are a crucial component of any electrical safety system and should be installed in areas where people are at risk of electrical shock.

Insulation: Insulation is a material used to separate electrical conductors and prevent current flow between them. Insulation is essential for the safe operation of electrical equipment as it prevents electrical shock and short circuits. The insulation material used depends on the application and the voltage level of the system. Common insulation materials include rubber, plastic, and fiberglass.

Overall, fuses, MCBs, and ELCBs are all used to protect electrical circuits and equipment from overcurrent conditions, but they operate in slightly different ways and are used in different types of electrical systems. Insulation, on the other hand, is used to prevent electrical shock and short circuits by separating electrical conductors.

ELECTRIC FAN

An electric fan is a device that uses electricity to create a flow of air. It typically consists of a motor that drives a set of blades or an impeller, which rotates and moves air in a specific direction. Electric fans are commonly used to cool people or equipment, circulate air in a room, or ventilate an enclosed space.

There are various types of electric fans, including ceiling fans, pedestal fans, table fans, tower fans, and box fans. Ceiling fans are mounted on the ceiling and are designed to circulate air in a room by creating a downward flow. Pedestal fans are free-standing and have an adjustable height, making them ideal for use in large rooms or outdoor spaces. Table fans are small and lightweight, and are designed to be placed on a table or desk. Tower fans are tall and slim, and are ideal for use in small spaces where a traditional fan would be too bulky. Box fans are square or rectangular, and are designed to be placed on the floor or in a window to draw air into a room.

Electric fans are generally considered to be an efficient and cost-effective way to cool a room or circulate air. They are also relatively easy to maintain and clean. However, they do consume electricity and may not be as effective in extremely hot or humid conditions.

Working principle:

An electric fan works on the principle of converting electrical energy into mechanical energy, which is then used to create a flow of air.

Here's how it works:

1. Electric current flows through the fan's motor, which consists of a rotor and a stator. The stator is a stationary part that contains the coils of wire, while the rotor is the rotating part.
2. The current flowing through the coils of wire creates a magnetic field, which interacts with the magnetic field produced by the rotor. This interaction causes the rotor to rotate.
3. The rotor is connected to a shaft that is attached to the fan blades. As the rotor rotates, it turns the shaft, which in turn causes the fan blades to rotate.

4. The rotating fan blades create a flow of air, which is then directed in a specific direction by the fan's housing or grill.
5. The speed of the fan can be controlled by adjusting the voltage supplied to the motor. This is typically done using a switch or a variable resistor.

Overall, the working principle of an electric fan is based on the conversion of electrical energy into mechanical energy, which is then used to create a flow of air.

ELECTRIC IRON BOX

An electric iron box is a household appliance that is used to remove wrinkles and creases from clothing and fabric by applying heat and pressure. It consists of a flat metal plate, or soleplate, which is heated by electricity and pressed against the fabric to smooth out wrinkles. The heat is controlled by a thermostat, and the iron also usually has a steam function, which adds moisture to the fabric to help with smoothing.

To use an electric iron box, you typically fill the water tank if it has a steam function and plug it into an electrical outlet. Wait for the iron to heat up to the desired temperature, and then run it over the fabric in a back and forth motion, pressing down lightly. Be careful not to leave the iron in one spot for too long, as this can damage the fabric. Most irons also have different heat settings for different types of fabric, such as cotton, silk, or wool.

It's important to follow safety precautions when using an electric iron box, such as unplugging it when not in use, not leaving it unattended while hot, and keeping it out of reach of children and pets. It's also a good idea to clean the soleplate periodically to prevent build-up of fabric residue or minerals from the water.

Working principle:

The working principle of an electric iron box is based on the principles of heat transfer and electricity. The iron box consists of a heating element, usually made of a coil of wire, which is connected to an electrical circuit. When the iron is plugged in and turned on, electricity flows through the coil and heats it up.

The heat generated by the coil is then transferred to the soleplate, which is the flat metal plate that comes in direct contact with the fabric being ironed. The soleplate is typically made of a heat-conducting material such as aluminium or stainless steel, which helps distribute the heat evenly across its surface.

The temperature of the soleplate is controlled by a thermostat, which is a device that senses the temperature and automatically turns the heating element on or off to maintain a constant temperature. Some irons also have variable

temperature settings that allow you to adjust the heat output depending on the type of fabric you are ironing.

In addition to dry heat, many modern electric irons also have a steam function. This works by using a small water tank that is built into the iron. When you press a button or turn a dial, the water is released as steam, which is then sprayed onto the fabric through small holes in the soleplate. The steam helps to loosen wrinkles and creases in the fabric, making it easier to iron and leaving it looking smoother and more polished.

Overall, the working principle of an electric iron box is based on the combination of heat transfer and electricity, with the heating element generating heat that is transferred to the soleplate and controlled by a thermostat to maintain a consistent temperature. The steam function is an additional feature that can help make ironing more effective and efficient.

Water heater

A water heater is a device used to heat water for domestic or commercial purposes. It is typically found in a household or commercial building and is responsible for heating water that is used for showers, washing dishes, laundry, and other purposes.

There are several types of water heaters available, including traditional tank-style heaters, tank-less heaters, heat pump water heaters, and solar water heaters. Each type has its own advantages and disadvantages, and the choice of water heater depends on factors such as energy efficiency, cost, and availability.

Traditional tank-style water heaters store hot water in a tank and constantly maintain the water temperature, which can result in energy waste. On the other hand, tank-less water heaters, heat water only when it is needed, which can result in energy savings. Heat pump water heaters use electricity to move heat from the air or ground to heat water and they are very energy-efficient. Solar water heaters use the energy from the sun to heat water, making them a very environmentally friendly option.

Regardless of the type of water heater, it is important to properly maintain and regularly inspect the device to ensure it is operating safely and efficiently. Proper maintenance can help prevent damage, leaks, and other issues that can lead to costly repairs or replacement.

Working principle of a water heater

The working principle of a water heater depends on the type of heater, but most heaters operate by using either gas, electricity, or a combination of the two to heat water.

In a traditional tank-style water heater, cold water enters the tank through a pipe and is heated by a gas burner or electric heating element at the bottom of the tank. As the water heats up, it rises to the top of the tank, where it is stored until it is needed. A thermostat on the tank controls the temperature of the water and

shuts off the heating element or gas burner when the desired temperature is reached.

In a tank-less water heater, cold water enters the unit through a pipe and flows over a heat exchanger, which is heated by a gas burner or electric heating element. The heat exchanger quickly heats the water to the desired temperature as it passes through the unit and then delivers the hot water to the faucet or appliance. Because tank-less heaters heat water on demand, they are typically more energy-efficient than traditional tank-style heaters.

Heat pump water heaters work by using electricity to move heat from the air or ground to heat water. The unit consists of a heat pump and a storage tank, and it can be powered by either electricity or natural gas. The heat pump extracts heat from the air or ground and transfers it to the water, which is stored in the tank until it is needed.

Solar water heaters use the energy from the sun to heat water. The unit consists of a collector that absorbs sunlight and transfers the heat to a fluid, which is then pumped through a heat exchanger to heat the water. The heated water is then stored in a tank until it is needed.

Electric bulbs, CFL, and LED lights are all types of lighting options that are commonly used for residential, commercial, and industrial applications.

Electric bulbs, also known as incandescent bulbs, are the traditional type of light bulb. They work by passing electricity through a thin filament wire, which heats up and produces light. However, they are not energy-efficient and have a short lifespan compared to newer lighting technologies.

CFL (compact fluorescent lamp) bulbs are a more energy-efficient alternative to electric bulbs. They work by passing electricity through a tube filled with gas and a small amount of mercury vapour, which emits ultraviolet light. This light then interacts with a phosphor coating on the inside of the tube, producing visible light. CFL bulbs are more energy-efficient than electric bulbs, last longer, and produce less heat. However, they contain small amounts of mercury, which can be harmful if the bulb is broken.

LED (light-emitting diode) lights are the most energy-efficient lighting option available. They work by passing electricity through a semiconductor material, which emits light. LED lights are highly energy-efficient, have a long lifespan, and produce very little heat. They are also available in a variety of colours and can be dimmed easily. LED lights are more expensive than electric bulbs or CFLs, but their energy efficiency and long lifespan make them a cost-effective choice in the long run.

There are several types of LED lights available on the market, including:

Surface-mounted LEDs (SMD): These are small, compact LED chips mounted directly onto a circuit board. SMD LEDs are commonly used in a variety of applications, including lighting fixtures and electronic displays.

High-power LEDs (HPLD): These are larger, more powerful LED chips that are used for high-brightness applications, such as automotive lighting, stadium lighting, and streetlights.

Organic LEDs (OLED): These are a type of LED that uses an organic compound to emit light when an electric current is passed through it. OLEDs are commonly used in electronic displays, such as smartphones and TVs.

Ultraviolet LEDs (UV-LED): These are LEDs that emit ultraviolet light, which is used for applications such as sterilization, water purification, and insect trapping.

RGB LEDs: These are LEDs that can emit red, green, and blue light, which can be combined to create a wide range of colours. RGB LEDs are commonly used in decorative lighting, gaming peripherals, and stage lighting.

Smart LEDs: These are LEDs that can be controlled using a smartphone app, voice commands, or other smart home devices. Smart LEDs allow you to adjust the colour, brightness, and timing of your lights, and can be programmed to turn on and off automatically.

Multimeter, galvanometer, ammeter and voltmeter

A Multimeter is an electronic instrument used to measure different electrical parameters such as voltage, current, and resistance. It typically combines several measuring functions in one unit and is commonly used in electronic and electrical testing and troubleshooting.

Galvanometers are instruments that detect and measure electric current. They use a coil of wire placed in a magnetic field to deflect a needle or a pointer on a dial. When an electric current flows through the coil, it produces a magnetic field that interacts with the magnetic field around it, causing the needle or pointer to move.

An ammeter is a type of galvanometer that measures the flow of electric current in a circuit. It is connected in series with the circuit, meaning that the current being measured passes directly through the ammeter. The ammeter measures the current by detecting the magnetic field produced by the current as it flows through the coil of wire inside the instrument.

A voltmeter is another type of galvanometer that measures the voltage difference between two points in an electric circuit. Unlike an ammeter, it is connected in parallel with the circuit, meaning that it is connected across the two points between which the voltage is being measured. The voltmeter measures the voltage by detecting the current that flows through the coil of wire inside the instrument, which is proportional to the voltage being measured.

The working principle of all these instruments is based on the interaction between electric and magnetic fields. When an electric current flows through a wire, it produces a magnetic field around the wire. The strength and direction of the magnetic field depend on the amount and direction of the current flow. By using a coil of wire placed in a magnetic field, it is possible to detect the magnetic field produced by the current and measure the current or voltage being measured. The amount of deflection or movement of the needle or pointer on the instrument is proportional to the strength of the magnetic field and therefore to the amount of current or voltage being measured.

MODEL QUESTION

1. What are the fundamental electrical quantities defined in the syllabus?
2. Explain Ohm's law and its significance in electrical circuits.
3. Differentiate between electrical conductors and insulators.
4. How are resistors connected in series and parallel configurations?
5. Define capacitance and discuss its importance in electrical systems.
6. Describe the series and parallel combinations of capacitors.
7. What is inductance, and how does it affect electrical circuits?
8. Explain the role of transformers in electrical systems.
9. Define electrical energy and its measurement unit.
10. How is power calculated in electrical circuits?
11. Define kilowatt-hour (kWh) and its significance in energy consumption.
12. Outline the process of calculating domestic electrical bills.
13. Discuss the purpose and function of fuses in electrical systems.
14. Compare and contrast MCB and ELCB.
15. Explain the importance of insulation in electrical appliances.
16. Describe the operation of an electric fan.
17. Discuss the working principle of an electric iron box.
18. Explain how a water heater functions.
19. Compare and contrast electric bulbs, CFL, and LED lights.
20. Define multimeter and discuss its various uses.
21. Explain the principle of operation of a galvanometer.
22. Differentiate between ammeters and voltmeters.
23. Discuss the significance of ammeters and voltmeters in electrical measurements.
24. Explain how electrical appliances are tested using galvanometers.
25. Describe the construction and working principle of a voltmeter.




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III B.Sc M.Pc EM has successfully completed the Value Added Course in Applications in Real Life
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 A grade.


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IQAC
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Course
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 grade.

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Coordinator

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Coordinator

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Course
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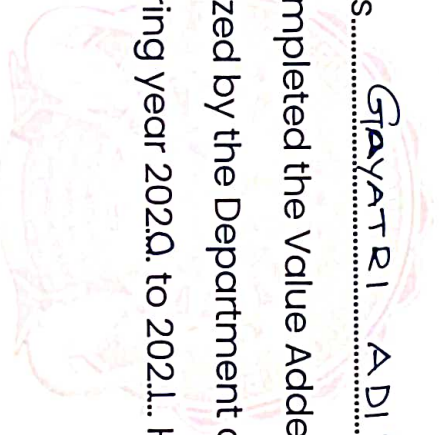
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Value Added Course Certificate

2020.. to 2021...

This is to certify that Mr./Miss.....**Gayatri Adireddy**.....of
Applications of Electrical
 111 BSc MPC EM.....has successfully completed the Value Added Course in.....*Appliances in Real life*
 with Regd No.....18201010.....Organized by the Department of.....**PHYSICS**.....in
 collaboration with.....during year 2020.. to 2021.. He/she has passed the course with
**A**.....grade.



g.v.s

PRINCIPAL

Dr. V.S. Krishna Govt. Degree College (A)

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Academic
Coordinator

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IQAC
Coordinator

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Course
Coordinator





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Value Added Course Certificate

2020.. to 2021..

This is to certify that Mr./Miss..... **NAMRATHA REDDY**..... of
Applications of Electrical
 ...**BSc MPC EM**... has successfully completed the Value Added Course in...*Applications in Real life*
 with Regd No. **18201022**..... Organized by the Department of..... **PHYSICS**..... in
 collaboration with..... during year 2020.. to 2021.. He/She has passed the course with
 **A**..... grade.

[Signature]
Academic
Coordinator

[Signature]
IQAC
Coordinator

[Signature]
Course
Coordinator



[Signature]
PRINCIPAL
Dr. V.S. Krishna Govt. Degree College (A)



Dr. V. S. Krishna Govt. Degree College (A)
 (NAAC ACCREDITED 'A' GRADE INSTITUTION & NODAL RESOURCE CENTRE)
 MADDILAPALEM, VISAKHAPATNAM-530013. ANDHRA PRADESH

Value Added Course Certificate

2020.. to 2021..

This is to certify that Mr./Miss..... **K RISHANA KOTA**of
 Applications of Electrical
 111 B. Sc MPC EM..... has successfully completed the Value Added Course in.....
 with Regd No..... **18201015** Organized by the Department of..... **PHYSICS**in
 collaboration with..... during year 2020.. to 2021.. He/she has passed the course with
 **A** grade.

[Signature]
Academic
 Coordinator

[Signature]
IQAC
 Coordinator

[Signature]
Course
 Coordinator



[Signature]
PRINCIPAL
 Dr. V.S. Krishna Govt. Degree College (A)