Vel Tech
Rangarajan Dr. Sagunthala
R&D Institute of Science and Technology
(Deemed to be University Estd. u/s 3 of UGC Act, 1956)

Recognised as CATEGORY-1 DEEMED TO BE UNIVERSITY by the UGC University Grants Commission

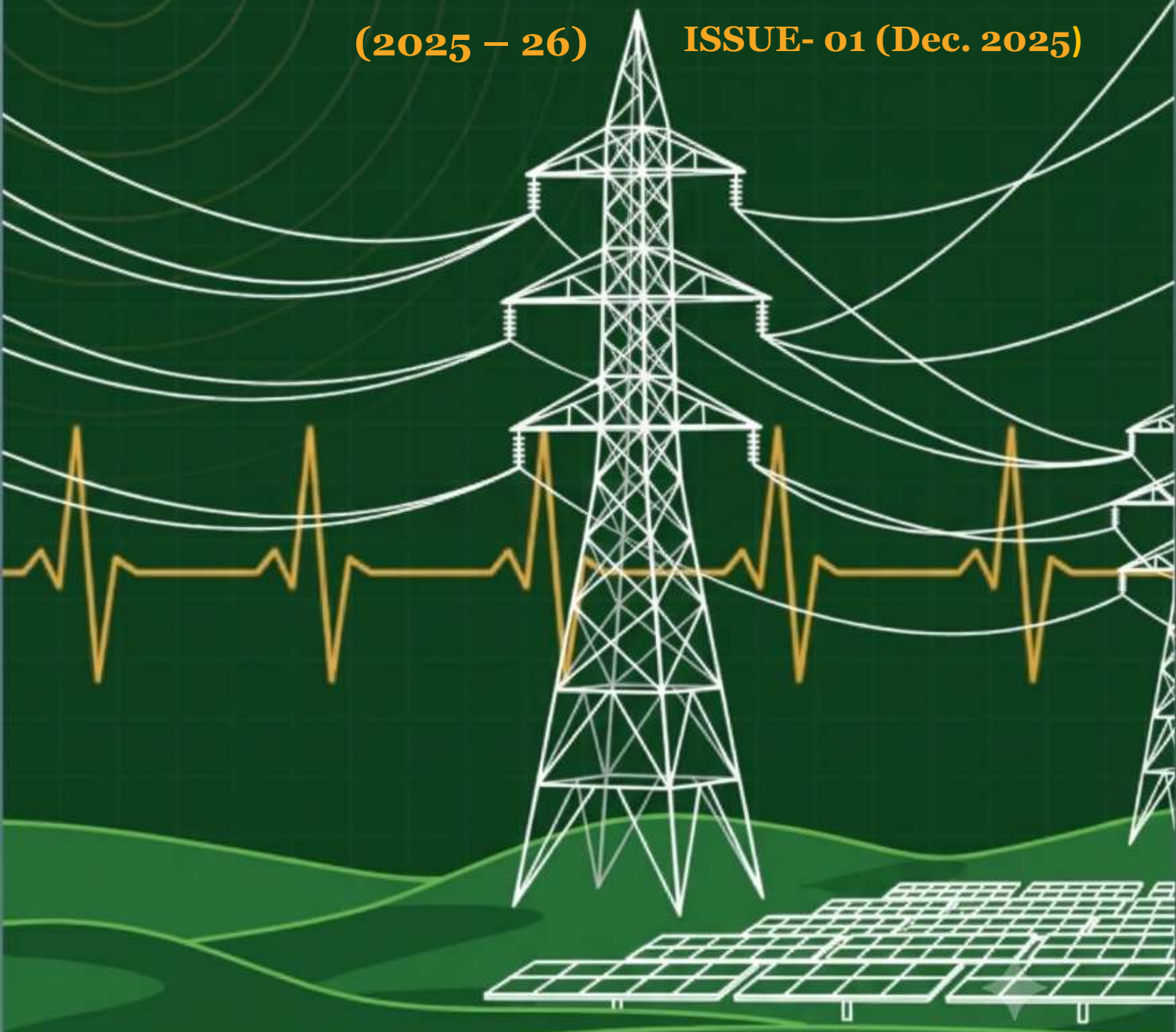
# SCHOOL OF ELECTRICAL AND COMMUNICATION

## DEPARTMENT OF

## ELECTRICAL AND ELECTRONICS ENGINEERING

# Spark Magazine

**(2025 – 26)** **ISSUE- 01 (Dec. 2025)**



DEPARTMENT OF EEE

# Foreword



**Col. Prof. Vel. Dr. R. Rangarajan**
**Founder President & Chancellor**



**Dr. Mrs. Sagunthala Rangarajan**
**Foundress President**

We remain committed to building an educational environment that nurtures knowledge, character, innovation, and excellence. Our institution continues to encourage students and faculty to pursue meaningful academic, research, and technological endeavors, supported by modern infrastructure, well-equipped laboratories, and a dedicated faculty. The Department of Electrical and Electronics Engineering reflects this vision through its academic achievements, research initiatives, funded projects, industry collaborations, and the accomplishments of its students and faculty.



DEPARTMENT OF EEE

# Foreword



**Mrs. Rangarajan Mahalakshmi Kishore**
Chairperson & Managing Trustee

Delighted to witness the achievements of faculty and students across academic and research activities, the Chairperson congratulates the entire team on the effort behind this report and commends the department for producing talent-driven, innovative engineers to meet society's new and challenging issues.



DEPARTMENT OF EEE

# Foreword



Prof. Dr. Rajat Gupta
Vice Chancellor

I am delighted to present the latest edition of Spark, the flagship magazine of the EEE Department. This magazine reflects our continuous pursuit of research excellence, creativity, co-curricular activity and technical learning of our students. Kudos to the editorial team, faculty, and brilliant students whose hard work and contributions made this edition possible.



Prof. Dr. E. Kannan
*Registrar*

I warmly congratulate the EEE Department on launching this vibrant edition of Spark. This platform beautifully captures the dynamic activities, student achievements, and academic excellence of the department. I wish the EEE team continued success in inspiring our community through such creative and meaningful initiatives.



# Message from Dean and Head of the Department

**Dr. R. S. Valarmathi**
Professor & Dean
School Of Electrical and Communication



The School continues to make remarkable progress, driven by the achievements of our faculty, students and staff in cutting-edge research, academic excellence, and industry collaboration. Spark, the magazine of EEE department serves as a wonderful window into this journey—reflecting our focus on innovation, hands-on learning, and community impact. I commend the entire team for shaping our students into future-ready professionals and bringing these milestones to light.

**Dr. K.Karunanithi**
Professor & Head
Department of Electrical and Electronics Engineering



It is with great pleasure and immense pride that I present Spark, the official magazine of the Department of Electrical and Electronics Engineering. I invite you to explore these pages to discover the remarkable achievements and creative brilliance within our department. Together, as we continue to push boundaries, we look forward to a vibrant future driven by transformative education, innovative research, and impactful contributions to the world of EEE.

## VISION OF THE DEPARTMENT

To provide intellectual curiosity in the field of Electrical and Electronics engineering that produces skilled interdisciplinary engineers to serve the society

## MISSION OF THE DEPARTMENT

**M1:** To inculcate knowledge among the students through comprehensive curriculum.

**M2:** To enrich the academic experience in terms of flexibility, teamwork, design skills, practice and industrial trainings.

**M3:** To produce competent graduates suitable for a successful career in Industry and Research.

## PROGRAMME EDUCATIONAL OBJECTIVE

**PEO1:** Design and analyse electrical and electronic systems by applying the knowledge of mathematics and engineering.

**PEO2:** Provide practical solution to multidisciplinary societal problems through innovative ideas.

**PEO3:** Secure positions and continue as valued, creative and proficient employees in a wide variety of fields and industries for a rewarding career.



Powering Future

# POWERING TOMORROW: The Electrical Revolution



Electrical energy is the foundation of modern civilization. From homes and industries to electric vehicles, artificial intelligence, and space technology, the demand for reliable electricity continues to grow. Electricity is one of the most important discoveries in human history and plays a major role in the development of modern society. The electrical sector includes power generation, transmission, distribution, and utilization. Electricity is essential for homes, industries, hospitals, schools, transportation, and many other sectors. It supports the operation of computers, communication systems, electrical appliances, and modern machinery, making everyday life easier and more efficient.

Electrical energy can be generated from both conventional and renewable energy sources. Coal, natural gas, nuclear energy, solar energy, wind energy, and hydropower are some of the major sources used for electricity generation.

Next Power

# India's Electrical Sector:  Upcoming Future



India's electrical sector is undergoing an unprecedented structural transition, emerging as a global powerhouse in sustainable energy. Driven by ambitious decarbonization goals, the nation targets 500 GW of non-fossil fuel capacity by 2030, alongside achieving net-zero carbon emissions by 2070. Rapid expansion in solar, wind, and pumped hydro infrastructure—backed by production-linked incentives (PLI) and programs like the PM Surya Ghar initiative—is accelerating indigenous manufacturing and green energy adoption. Complementing generation growth, extensive digital upgrades to the national transmission grid, integration of utility-scale battery energy storage systems (BESS), and green hydrogen ecosystems are ensuring grid reliability and energy security. Through massive capital inflows and robust policy support, India is building a resilient, self-reliant, and modernized power ecosystem..

VTU29122, GUTTI PRUDHVI

# Renewable Energy: Powering a Greener India

Empowering Tomorrow







Renewable energy is obtained from natural sources that are continuously replenished or renewed over relatively short periods. Solar energy, wind energy, hydropower, and biomass are some of the major renewable energy sources used for electricity generation. Renewable energy plays an important role in reducing dependence on fossil fuels such as coal, petroleum, and natural gas.

Solar energy is generated by converting sunlight directly into electrical energy using solar panels. Wind energy is produced by wind turbines, which use the movement of air to rotate their blades connected to a generator. Hydropower plants generate electricity by utilizing the energy of flowing or falling water. Biomass energy is produced from organic materials such as agricultural residues, plant materials, and other suitable biological waste.

VTU26817, K.HARISH RAJ

Empowering Tomorrow

# Solar Power: Energy from Sunlight



Solar energy is obtained from the radiation emitted by the Sun and is one of the most widely used renewable energy resources. It is a clean and sustainable source of energy that can be used for electricity generation, heating, and various other applications. Solar photovoltaic (PV) technology is commonly used to convert sunlight directly into electrical energy.

A solar cell is the basic unit of a solar photovoltaic system and is generally made from semiconductor materials such as silicon. When sunlight falls on the surface of a solar cell, the energy from the light is absorbed by the semiconductor material, generating electrical charge carriers.

Solar photovoltaic (PV) cells convert sunlight directly into electrical energy through the photovoltaic effect.

Current developments

•Rooftop solar installations for houses and commercial buildings.

•Large-scale solar parks connected to the electricity grid.

•Solar-powered irrigation and rural electrification.

Future potential: More efficient solar cells, floating solar plants, building-integrated PV, and solar-plus-battery systems.

VTU29745, KONIREDDY ANITHA

Spinning Watts

# Wind Energy: Turning Motion into Electricity



Wind energy is a renewable energy source that uses the natural movement of air to generate electricity. Wind turbines convert the kinetic energy of wind into mechanical energy, which is then converted into electrical energy by a generator. It is a clean source of energy that helps reduce dependence on fossil fuels and greenhouse gas emissions. Wind energy is widely used in onshore and offshore wind farms to produce electricity. Technological advancements are improving the efficiency and reliability of wind power generation. Therefore, wind energy plays an important role in building a cleaner, greener, and more sustainable future. It produces electricity without directly emitting greenhouse gases during operation. Wind farms can be installed on land and offshore to generate large amounts of electricity. Modern wind turbines are becoming more efficient and reliable. Wind energy also creates employment opportunities in manufacturing, installation, and maintenance. Therefore, wind energy plays an important role in developing a clean, green, and sustainable future.

Electrifying India

## India's EV & Charging Ecosystem







Electric vehicles (EVs) are becoming increasingly popular in India as an alternative to conventional petrol and diesel vehicles. They use electric motors powered by rechargeable batteries to drive the vehicle. EVs help reduce air pollution and dependence on fossil fuels. Charging stations are being developed across cities, highways, and public places to make charging more convenient. The expansion of charging infrastructure improvements in battery technology are supporting the growth of electric mobility. Electric vehicles will play an important role in building a cleaner, more energy-efficient, and sustainable transportation system in India.

Poem

# The Magic of Electricity

Electricity is a wonderful light, It makes our homes so warm and bright. It runs our fans and TVs too, And helps our computers work for you.

From morning sun to evening night, Electricity makes everything bright. It powers trains and lights the way, And helps us work and learn each day.

A tiny spark, a powerful flow, It makes our modern world just glow. But use it safely, every day, Keep electric shocks and dangers away!

So let us save it, use it right, And switch off lights when not in sight. Electricity is a gift to you and me, Let's use it wisely for a better tomorrow!

**Save Energy, Save the Future!**

VTU30268, ANGOTHU SATHISH

Poem

# Moon in the Sky

A silver lantern in the velvet night,

It bathes the sleepy world in gentle light.

A silent watcher in the starry deep,

Guarding the earth while dreamers fall asleep.

It changes shape with every passing day,

A crescent arc or full moon's glowing ray.

It pulls the ocean tides across the sea,

A beacon of calm, timeless mystery.

Though high above where quiet shadows fall,

Its soft white radiance shines down on us all.

VTU26889, K.DHANUSH

TRIBUTE

# Missile Man of India: Dr. A.P.J. Abdul Kalam



Dr. A.P.J. Abdul Kalam, fondly remembered as the "Missile Man of India," was a visionary scientist, statesman, and the 11th President of India. Born in Rameswaram, Tamil Nadu, his extraordinary journey from selling newspapers to becoming India's premier space and defense scientist remains an enduring inspiration.

Dr. Kalam played a pivotal role in shaping India's space and missile development programs over four decades. At the Indian Space Research Organisation (ISRO), he served as the Project Director for India's first Satellite Launch Vehicle (SLV-III), which successfully deployed the Rohini satellite into orbit in 1980.

Yoga for Everyone

Later, as the chief executive of the Defence Research and Development Organisation (DRDO), he spearheaded the Integrated Guided Missile Development Programme (IGMDP). Under his leadership, India successfully developed indigenous tactical and strategic missiles, including Agni (an intermediate-range ballistic missile) and Prithvi (a surface-to-surface missile), solidifying India's position as a major defense power. He also played a key technical and political role during the Pokhran-II nuclear tests in 1998.

Beyond his scientific achievements, Dr. Kalam was celebrated as the "People's President." Renowned for his humility, deep commitment to education, and passion for inspiring youth, he spent his later years empowering students to dream big and innovate for a stronger nation.

VTU26889, K.DHANUSH

Essay

# Yoga For Everyone



Yoga is a timeless, holistic practice accessible to individuals of all ages, fitness levels, and backgrounds. Originating thousands of years ago in India, yoga unites the mind, body, and spirit through physical postures (asanas), controlled breathing techniques (pranayama), and mindfulness or meditation..

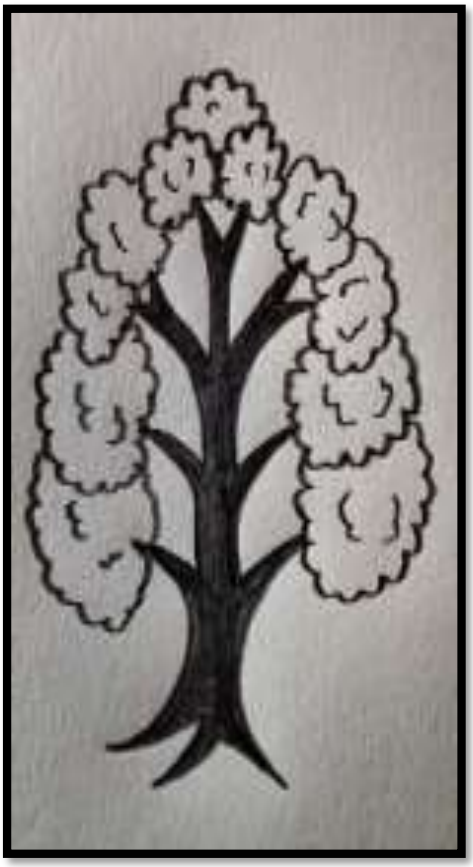
What makes yoga truly universal is its adaptable nature. Modifiable to suit beginners, seniors, athletes, or those recovering from injuries, yoga does not demand extraordinary flexibility or strength to begin. Instead, it serves as a gentle path toward developing them over time. Regular practice enhances flexibility, improves muscular strength, corrects posture, and boosts cardiovascular health. Beyond the physical rewards, yoga offers deep mental benefits by lowering stress, relieving anxiety, and enhancing focus.

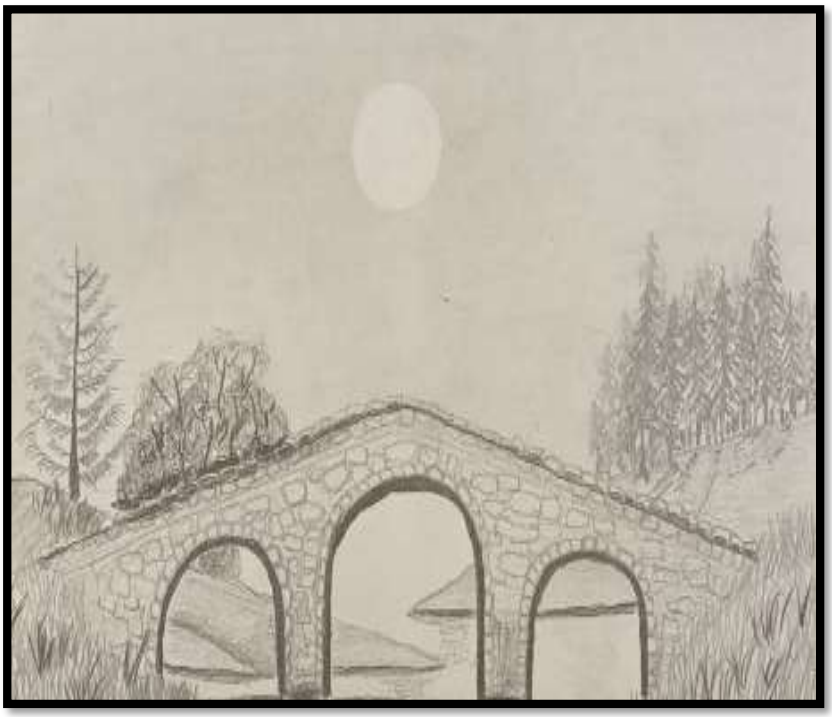
In today's fast-paced world, carving out time for yoga creates a peaceful sanctuary to reconnect with oneself. Whether practicing a dynamic Vinyasa flow, gentle restorative poses, or simply engaging in mindful breathing for a few minutes each day, yoga cultivates harmony and resilience. Ultimately, yoga for everyone is not about achieving perfect postures, but about nurturing self-care, inner calm, and overall well-being.

VTU30280, SANJAY K

# Art: Shading Some Real Truth!

ARTS'





VTU30281, PADACHALA DEEPTHI

RANGOLIS’

# Rangoli: Colors of Joy





VTU30394, BELLAM KAVYA SRI

Sudoku

# Sudoku: Learn and Fun

Fill in the grid with numbers 1 to 9 making sure no number is repeated in every row, every column and within each mini grid.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | | | 5 | | | | 4 |
| | 4 | | 8 | | 6 | | 7 | |
| | | 5 | | 3 | | | 8 | |
| | | 7 | 9 | | | | 5 | |
| 1 | | | | | 8 | 6 | 2 | |
| 3 | | | 4 | | | | | |
| | 2 | 8 | 6 | 1 | | | | |
| | | 9 | 2 | | | 3 | | 1 |
| 7 | | | | | | | | |

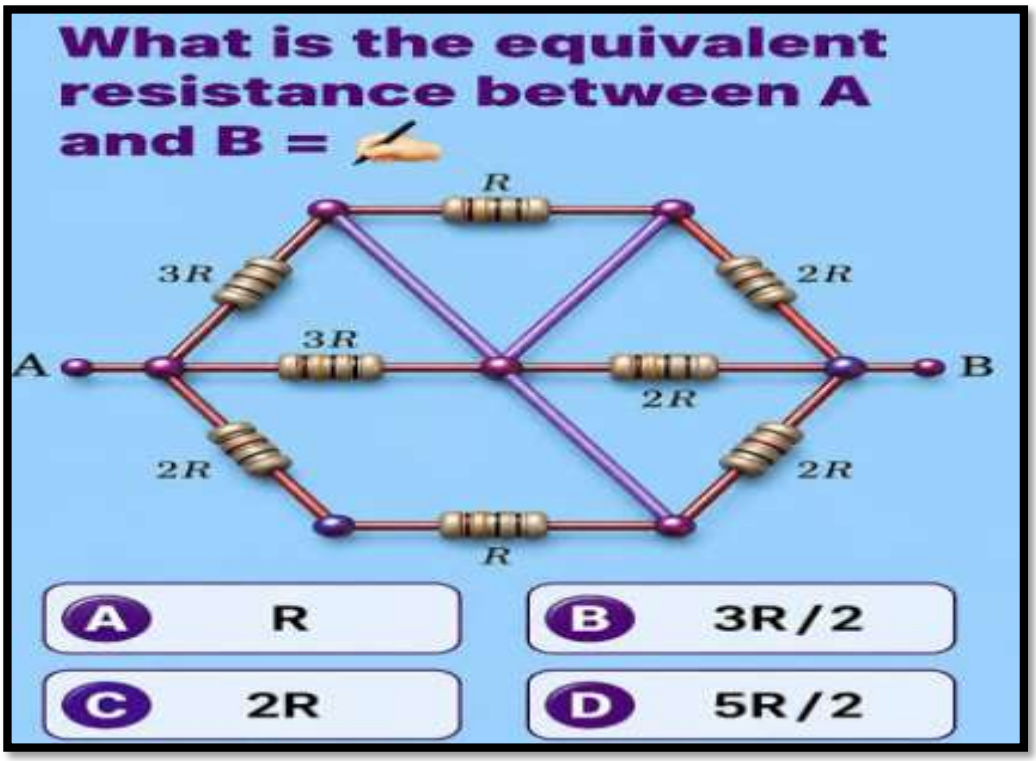
**Answer**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 8 | 1 | 6 | 7 | 5 | 2 | 9 | 3 | 4 |
| 2 | 4 | 3 | 8 | 9 | 6 | 1 | 7 | 5 |
| 9 | 7 | 5 | 1 | 3 | 4 | 2 | 8 | 6 |
| 6 | 8 | 7 | 9 | 2 | 1 | 4 | 5 | 3 |
| 1 | 5 | 4 | 3 | 7 | 8 | 6 | 2 | 9 |
| 3 | 9 | 2 | 4 | 6 | 5 | 7 | 1 | 8 |
| 4 | 2 | 8 | 6 | 1 | 3 | 5 | 9 | 7 |
| 5 | 6 | 9 | 2 | 8 | 7 | 3 | 4 | 1 |
| 7 | 3 | 1 | 5 | 4 | 9 | 8 | 6 | 2 |

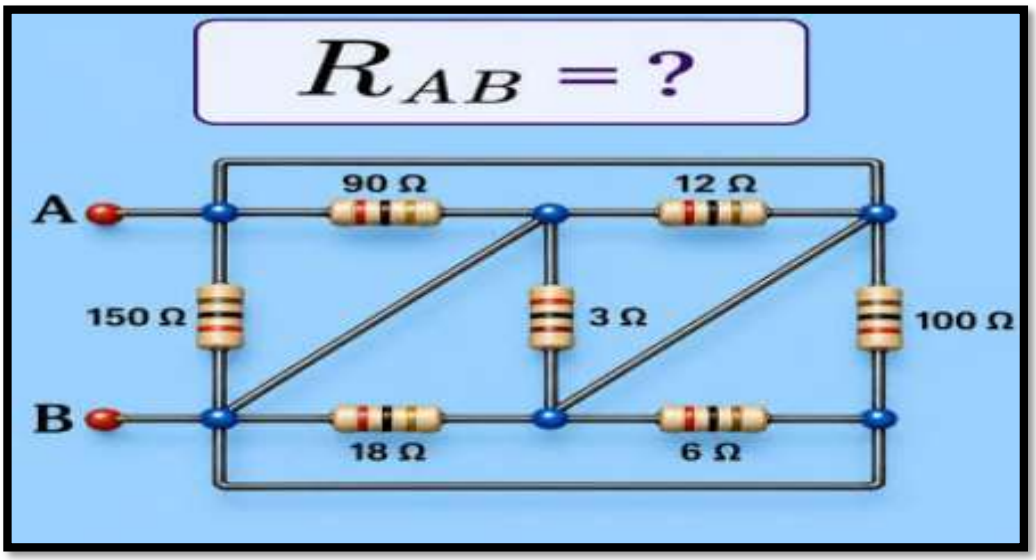
VTU26940, PRETHVI ADRIAN.S

Puzzle

# Puzzle: The Resistor Grid




**Answer: D**




**Answer:1.5Ω**

# Brain Teaser: Try once!

Brain Teaser

•I oppose changes in electric current and store energy in a magnetic field. What am I?
**Answer: Inductor**
•I convert energy from sunlight directly into electricity using the photovoltaic effect. What am I?
**Answer: Solar Panel (Photovoltaic Cell)**
•I convert the kinetic energy of blowing air into mechanical power and then into electrical power. What am I?
**Answer: Wind Turbine**
•I step up or step down AC voltage levels to transport electrical power efficiently across long distances. What am I?
**Answer: Transformer**
•I safely direct fault currents and lightning surges into the ground to protect power systems. What am I?
**Answer: Earthing / Grounding System**
•I convert the kinetic and potential energy of falling water into mechanical work to turn a generator. What am I?
**Answer: Hydro Turbine**
•I produce electricity by combining hydrogen fuel and oxygen through an electrochemical reaction, emitting only water and heat. What am I?
**Answer: Fuel Cell**
•I store large amounts of renewable electrical energy when supply is high and release it back to the grid when demand is high. What am I?
**Answer: Battery**

TTS 351, Dr. P.K. Dhal

# Quiz Challenge




➢What renewable energy source generates electricity by using photovoltaic cells to capture energy directly from sunlight? A) Wind Energy B) Solar Energy C) Geothermal Energy D) Biomass Energy
**Answer: B) Solar Energy**

➢Which key component in an Electric Vehicle (EV) is responsible for converting direct current (DC) from the battery into alternating current (AC) to drive the electric motor? A) Rectifier B) Inverter C) Transformer D) Inductor
**Answer: B) Inverter**

➢What is the primary function of a Regenerative Braking System in an Electric Vehicle? A) Dissipating kinetic energy entirely as heat B) Increasing tire traction on slick roads C) Converting kinetic energy back into electrical energy to recharge the battery D) Stepping down voltage from the charging station
**Answer: C) Converting kinetic energy back into electrical energy to recharge the battery**

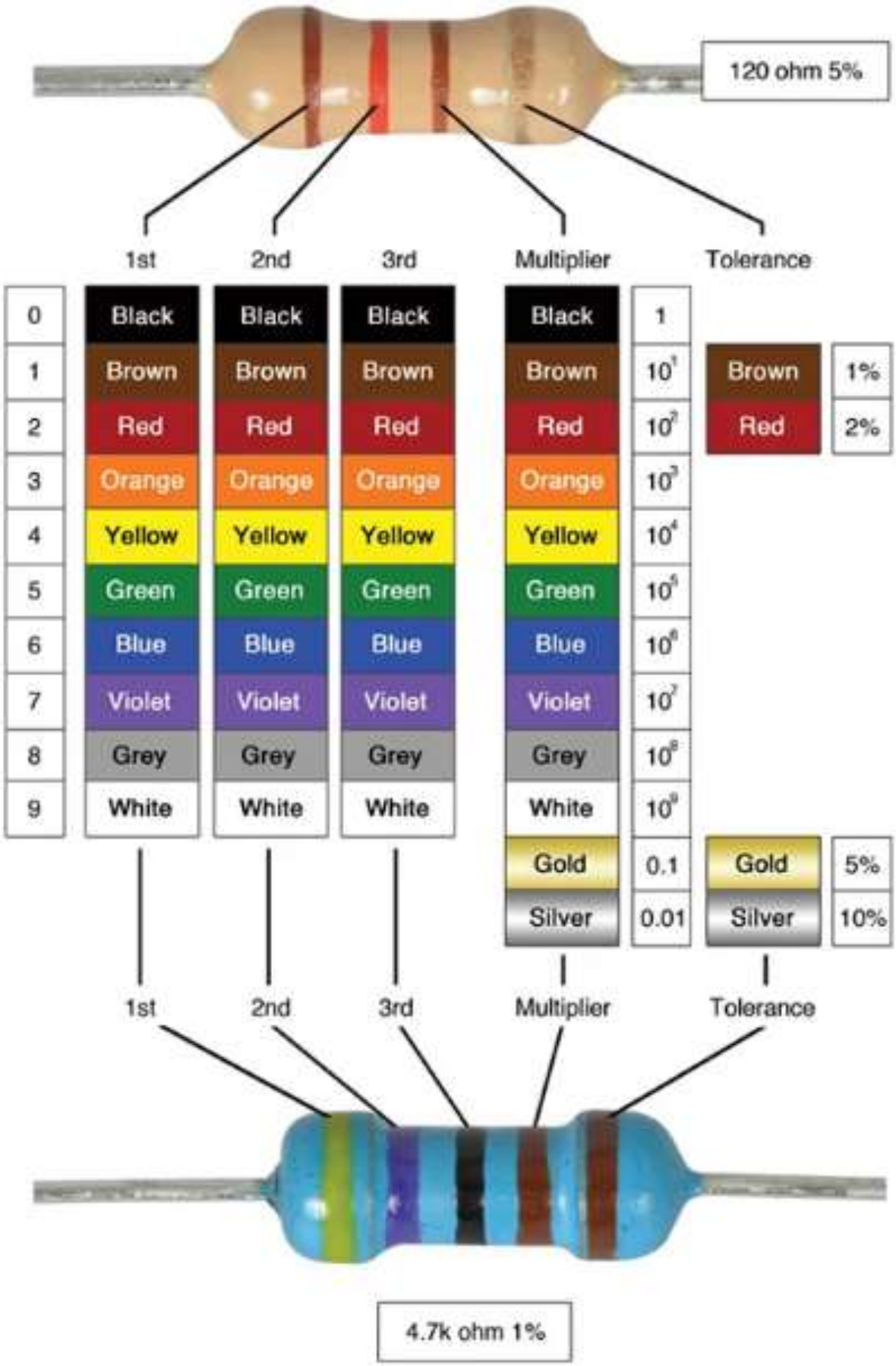
➢Which material is most commonly used as the semiconductor base for manufacturing traditional photovoltaic (solar) cells? A) Copper B) Silicon C) Aluminum D) Carbon
**Answer: B) Silicon**

➢In a wind turbine system, what component is responsible for turning the kinetic energy of the wind into mechanical rotational energy? A) Generator B) Nacelle C) Rotor Blades D) Pitch
**Answer: C) Rotor Blades**

➢What type of battery chemistry is predominantly used in modern Electric Vehicles (EVs) due to its high energy density and efficiency? A) Lead-Acid B) Nickel-Cadmium C) Lithium-ion D) Alkaline
**Answer: C) Lithium-ion**

# Meet the Component: Resistor

Color Code




TTS 2026, Dr.S.Vinoth John Prakash

CREDITS

# Editorial Team & Acknowledgements


## ACKNOWLEDGEMENTS

The editorial team thanks the management of Vel Tech Rangarajan Dr.Sagunthala R&D Institute of Science and Technology for their constant encouragement, the Head of the Department for guidance, the faculty members who contributed articles, and student's who shared their contents.


## EDITORIAL TEAM

1. K. VENKATA SIVA SRIRAM (VTU26924)
2. K.HARISH RAJ (VTU26817)
3. SOMASUNDARAM V (VTU27413)
4. KONDAPAKULA DIVYA (VTU28498)

## PROOF READING

**Dr.S.Vinoth John Prakash**
Associate Professor, EEE