GURU NANAK INSTITUTE OF TECHNOLOGY · KOLKATA
DEPARTMENT OF ELECTRICAL ENGINEERING

ElekTOR

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INNOVATION · ENERGY · EXCELLENCE

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EDITOR'S NOTE

Every circuit begins with a spark of curiosity. This 2025 edition of ElekTOR brings together the highlights of both halves of the year — an international conference, seminars and workshops, industrial visits and MoUs, awards, research papers and patents — along with the voices of the students who will power what comes next.

HIGHLIGHTS · 2025

The Year at a Glance

The most important numbers and moments of 2025 — in one place.

9 JOURNAL PAPERS	10 CONFERENCE PAPERS	15 PATENTS PUBLISHED	6 SEMINARS & WORKSHOPS
2 INDUSTRIAL VISITS	2 MoUs SIGNED	4 AWARDS & HONOURS	1 INTERNATIONAL CONFERENCE

Top moments of the year

★ **International Conference AdSoc 5.0**
Co-organised with the CSE Dept. and IEEE Kolkata Section, 14–15 Feb

★ **JIS IDEAJAM 2025 — Winners**
Problem Statements 1 and 3

★ **JIS SAMMAN 2025**
Best Research Credentials and Highest Number of Patents

★ **JIS PURASKAR 2025**
Highest number of publications in indexed journals & conferences

★ **Two MoUs signed**
Reunited Tech Solution Pvt. Ltd. and Trisita Engineering LLP

★ **Two-Day Seminar on Hydrogen Energy**
Opportunities and Innovations, 3–4 Nov

Students Editorial Message

The Department of Electrical Engineering takes great pride in presenting the 2025 edition of our annual publication, "ELEKTOR." The editorial team expresses sincere gratitude to every professor, instructor, and student whose insightful submissions ensured this release achieved outstanding success. Highlighting modern technological breakthroughs and progressive developments in power and electronics, this issue seeks to foster technical expertise and intellectual curiosity across our academic community. Furthermore, we extend profound appreciation to the institute's administrative leadership along with our respected Department Head for their steadfast encouragement throughout this editorial journey. We earnestly anticipate enjoying identical dedication, enthusiasm, and collaborative guidance from all contributors and stakeholders.

Editorial

Satyaki Roy Chowdhury (2nd year, EE, GNIT)
Ekarna Chakraborty (2nd year, EE, GNIT)
Avi Ghosh (3rd year, EE, GNIT)
Sanjana Lama (3rd year, EE, GNIT)

01 · WHO WE ARE

Vision, Mission, PEOs & PSOs

OUR VISION

To produce new generation technologists and entrepreneurs with innovation and advanced research by inculcating world class education to meet industry expectations and impart sustainable growth of the society in global perspective.

Mission

DM1 To impart quality education and innovative teaching learning methodologies.	**DM2** To develop professionals with the ability of critical thinking and innovativeness to face the real-life challenges in their respective domain.
DM3 To inculcate an urge of entrepreneurship, research and pursue higher studies.	**DM4** To imbibe the spirit of moral values and ethics for the sustainable growth of the society.

Program Educational Objectives

PEO1 To implant strong foundation in Science, Mathematics and Electrical Engineering to become successful professionals.	**PEO2** To impart knowledge on emerging technologies and entrepreneurship skills to produce future leaders.
PEO3 To train students in developing ethical attitudes, strong communication skills and capacity to relate engineering issues in social and environmental context.	**PEO4** To facilitate opportunity to work in a team in interdisciplinary projects for building leadership qualities.

Program Specific Outcomes

PSO1 To explore the ideas, methodologies and cutting-edge technologies in Renewable Energy and Electric Vehicles for gaining competence to solve energy related problems.	**PSO2** To analyze, design and provide an engineering solution applying knowledge of Embedded System, Smart Grid, Power Electronics and Electric Drives.	**PSO3** To use modern software tools for simulation, analysis and designing electrical and electronic Systems.

02 · MESSAGE

From the Principal's Desk



It gives me great joy to present the 2025 edition of "ElekTOR", the annual technical magazine of the Department of Electrical Engineering, Guru Nanak Institute of Technology. Bringing together the highlights of January–June and July–December 2025, this issue is a fitting record of a year of learning, research and engagement beyond the classroom.

The department has had a remarkable year. It co-organised the international conference AdSoc 5.0 with the IEEE Kolkata Section, hosted seminars on power conversion for electric vehicles and on hydrogen energy, and signed MoUs with Reunited Tech Solution Pvt. Ltd. and Trisita Engineering LLP that bring industry closer to our classrooms. Faculty members and students have published in indexed journals and conferences and filed a number of patents, and their work has been recognised at JIS SAMMAN, JIS PURASKAR and JIS IDEAJAM 2025.

Engineering education today must prepare young minds not only to master circuits and machines, but also to answer the needs of society — clean energy, sustainable mobility and smart, safe infrastructure. I am glad to see our students rising to that responsibility, whether through industrial visits, outreach to school students or research carried out alongside their teachers.

I congratulate the Head of the Department, the faculty members, the staff, the students and the editorial board for their dedication in bringing out this magazine. I wish the Department of Electrical Engineering continued success and many more milestones in the years ahead.

PROF. (DR.) SWARUP KUMAR MITRA
Principal, GNIT

03 · MESSAGE

From the HOD's Desk



It is with immense pleasure and pride that we present the latest edition of our departmental e-magazine, "ElekTOR."

This digital publication serves as a vibrant platform to celebrate innovation, technical creativity, and the collaborative spirit of the Department of Electrical Engineering at Guru Nanak Institute of Technology. Designed to bridge academic learning with dynamic industry practices, this issue highlights our collective journey—from scholarly research, publications, and patents to impressive student achievements and professional placements.

Within these digital pages, you will find a reflection of our department's hands-on culture, where theoretical knowledge transforms into practical capability through advanced laboratories, computational tools, and technical discourse. More than just a record of milestones, this e-magazine is a testament to our community's curiosity, resilience, and drive to address contemporary engineering challenges.

We extend our sincere gratitude to the institute management, the Principal, our dedicated faculty, alumni, and students whose ongoing encouragement makes this platform possible. Special appreciation goes to the editorial team for their effort in curating and shaping this edition.

We invite you to explore, learn, and be inspired. Happy reading to all our budding electrical engineers and technology enthusiasts!

DR. BARNALI KUNDU
HOD, EE Dept.

04 · KNOWLEDGE SESSIONS

Seminars, Workshops & Events

From an international conference on smart healthcare to a two-day seminar on hydrogen energy, 2025 kept our classrooms connected to the frontiers of electrical engineering.

14–15 FEB 2025	**International Conference AdSoc 5.0** AI-Driven Smart Healthcare for Society 5.0 · with IEEE Kolkata Section
21 FEB 2025	**Workshop: "Igniting the Entrepreneurial Spirit"** With EDII, EDC and IIC of GNIT
26 FEB 2025	**Hands-on Session on IoT and Raspberry Pi** With Reunited Tech Solution Pvt. Ltd.
10 SEP 2025	**Seminar: Power Conversion in Modern Electric Vehicles** Department of Electrical Engineering
03–04 NOV 2025	**Two-Day Seminar: Hydrogen Energy** With the ASHU Department
16 DEC 2025	**Electrical Model Competition for School Students** With the Admission Cell

INTERNATIONAL CONFERENCE · 14–15 FEB 2025

AdSoc 5.0 — AI-Driven Smart Healthcare for Society 5.0

Organised by the Department of Computer Science & Engineering and the Department of Electrical Engineering, GNIT, in collaboration with the **IEEE Kolkata Section**.





WORKSHOP · 21 FEB 2025

Igniting the Entrepreneurial Spirit

Organised by the Department of Electrical Engineering and the Department of Food Technology in collaboration with the **Entrepreneurship Development Institute of India (EDII)**, in association with the EDC and the IIC of GNIT.



HANDS-ON SESSION · 26 FEB 2025

Hands-on Session on IoT and Raspberry Pi

Organised by the Department of Electrical Engineering in collaboration with **Reunited Tech Solution Pvt. Ltd.**





SEMINAR · 10 SEP 2025

Role of Power Conversion Technologies in Modern Electric Vehicles

The Department of Electrical Engineering organised a highly engaging seminar on **modern electric-vehicle power conversion technologies**.





TWO-DAY SEMINAR · 3–4 NOV 2025

Opportunities and Innovations in Hydrogen Energy

Organised by the Department of Electrical Engineering in association with the **ASHU Department**.





SCHOOL OUTREACH · 16 DEC 2025

Electrical Model Competition for School Students

Organised by the Department of Electrical Engineering in association with the **Admission Cell**.





05 · BEYOND THE CLASSROOM

Industry Visits & Collaboration

Learning where engineering happens — substations, railway workshops and industry partners who open their doors to our students.

INDUSTRIAL VISIT · 18 FEB 2025

WBSEDCL 33/11 kV Substation, Belgharia

The department organised a one-day industrial visit for B.Tech students to the **West Bengal State Electricity Distribution Company Limited (WBSEDCL)** 33/11 kV Substation, Belgharia.





MoU · 5 MAR 2025

MoU Signed with Reunited Tech Solution Pvt. Ltd.

The Department of Electrical Engineering, GNIT signed a **Memorandum of Understanding** with Reunited Tech Solution Pvt. Ltd.





MoU · 2025

MoU Signed with Trisita Engineering LLP

The Department of Electrical Engineering, GNIT signed a **Memorandum of Understanding** with Trisita Engineering LLP.





ALUMNI INTERACTION & INDUSTRIAL VISIT · SEP–OCT 2025

Alumni Talk on CBTC and a Visit to the Liluah Railway Workshop

An alumni interaction programme on **"CBTC System in East West Metro"** was held on 17 October 2025 at the GNIT Seminar Hall, and students visited the **Indian Railway Workshop, Liluah, Howrah** on 5 September 2025.



Alumni Interaction Programme on CBTC · 17 Oct 2025



Industrial visit to Indian Railway Workshop, Liluah · 5 Sep 2025

06 · RECOGNITION

Achievements

Awards that celebrate the ideas, research and hard work of our students and faculty members in 2025.

Student Achievements

JIS IDEAJAM 2025 · WINNERS

Winners of JIS IDEAJAM 2025

Our students were the **winners of JIS IDEAJAM 2025** for Problem Statement 1 (left) and Problem Statement 3 (right).



Problem Statement 1



Problem Statement 3

JIS SAMMAN 2025

JIS Samman 2025

Received JIS Samman 2025 — **Appreciation for 1st Runner-Up in Made In JIS 2024**.



Faculty Achievements

JIS SAMMAN 2025

Best Research Credentials & Highest Number of Patents

Faculty members Mr. Susovan Dutta received JIS SAMMAN 2025 for **Best Research Credentials** and for the **Highest Number of Patents**.



Best Research Credentials



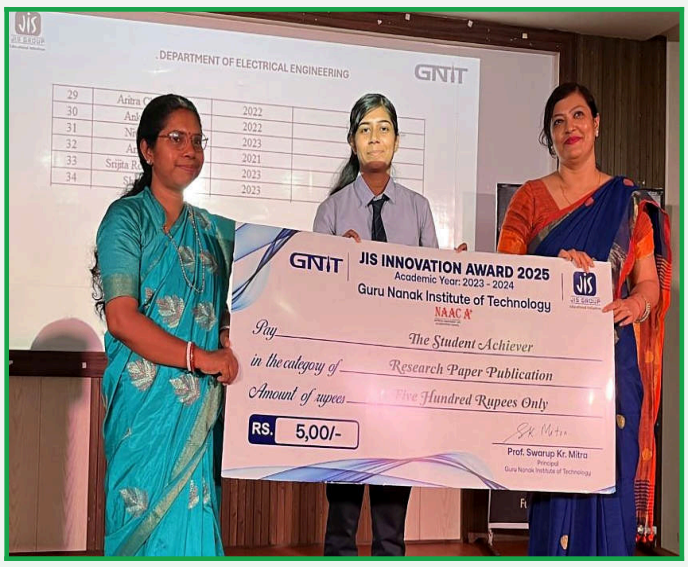
Highest Number of Patents

JIS PURASKAR 2025 · 13 MAR 2025

JIS Puraskar 2025

Awarded JIS PURASKAR 2025 for the **Highest Number of Publications in Indexed Journals and Conferences**.





07 · FACULTY SCHOLARSHIP

Research, Publications & Patents

9	10	15
JOURNAL PAPERS	CONFERENCE PAPERS	PATENTS PUBLISHED

International Journal Papers

01 **Aveek Chattopadhyaya,** Suparna Biswas, Saswati Rakshit, Nanda Dulal Jana, & Abhijit Mondal. (2025). Statistical Signal Processing and Machine Learning Based Diagnosis of Arrhythmia. International Journal of Computer Information Systems and Industrial Management Applications, 17, 29.05.2025 pp. 362–374. https://doi.org/10.70917/ijcisim-2025-0024 **(Q4 Journal)**

02 Sumangal Bhowmick**, Aveek Chattopadhyaya**, Jitendra Nath Bera — "Fast islanding detection using intra harmonic analysis and support vector machine based root cause identification in grid connected DC microgrid", Renewable Energy Focus (Science Direct, Elsevier), 54 (2025) 100703, 15.03.2025, pp. 1-13, https://doi.org/10.1016/j.ref.2025.100703. **(SCOPUS/ESCI, Q1 Journal)**

03 Sumangal Bhowmick, **Aveek Chattopadhyaya**, Jitendra Nath Bera — "Detection and Classification of Faults in Renewable Energy Penetrated Stand Alone Microgrids Using SVM and DWT Techniques", Electric Power System Research. Accepted on 17.03.2025. **(SCIE/SCOPUS, Q1 Journal)**

04 **Akash Bhowmick, Kumari Guriya Rani, Arghyadeep Ghosh, Aveek Chattopadhyaya, Suman Ghosh, Amit Debnath** — "Advanced Digital Signal Processing, Interpolation and Extrapolation Based Symmetrical Fault Assessment in Transmission Line", Journal of Scientific Research, 01.01.2025, pp. 43-55, ISSN 2070-0237, **(UGC care I)**

05 Nidhi R, Biman Kumar Saha Roy, **Debasree Saha,** Manas Mukherjee — "Performance Comparison of PSO, HGSO, and DE Optimization Techniques for Computation of Directional Overcurrent Relay Coordination in Power Systems", Engineering Review, Volume 44, no. 2, pp. 69-86, Nov'2024, (SCOPUS and Web of Science (Emerging Sources Citation Index).

06 Rabel Guharoy, Nanda Dulal Jana, Suparna Biswas, **Aveek Chattopadhyaya**, "Integration of DWT, FFT, and Spatial domain for the identification of epileptic seizure utilizing electroencephalogram signal," International Journal on Smart Sensing And Intelligent Systems, Volume 18, Issue 1, Pages 1-12, Published by Sciendo, 08/08/2025. **[ESCI/SCOPUS]**

07 **Susovan Dutta,** Bishaljit Paul, **Barnali Kundu**, Chandan Kumar Chanda, "Deterministic Scheduling of Reserve and Energy Market", Journal of Technology, ISSN: 10123407, VOLUME 13 ISSUE 7, July 2025,pp:826-845, DOI:18.15001/JOT.2025/V13I7.25.1720

08 **Dutta, S.,** Paul, **B., Kundu,** B. Paul K, Sinha, P, Shuaibu, H. A & Ustun, T.S., "Hybrid manta ray foraging and sine cosine algorithm for managing power transmission congestion influenced by wind energy". Sci Rep 15, 32373, 05.09.2025. https://doi.org/10.1038/s41598-025-13988-z

09 **Aveek Chattopadhyaya, Suman Ghosh, Sumangal Bhaumik,** and Surajit Chattopadhyay. "Radial basis neural network and discrete wavelet transform based RMS estimation for fault assessment in three phase transmission line." Engineering Review, Vol. 45, no. 2, December, 2025, 129-141. https://doi.org/10.30765/er.2779 **[WoS/SCOPUS]**

Conference Papers

01 Subhankar Mukherjee, Suparna Biswas, **Aveek Chattopadhyaya,** Soumik Poddar — "An Efficient Technique for the Diagnosis of Sleep Apnea by Integrating Wavelet Transform and Statistical Analysis", International Conference on Recent Developments and Applications in Materials Science and Engineering (RDAMSE 2025), Organized by Department of Basic Science & Humanities, Dr. Sudhir Chandra Sur Institute of Technology and Sports Complex (Sur Tech), Kolkata, 30-31 January, 2025, PP. 80-81, ISBN: 978-81-983133-3-1.

02 **Debasree Saha, Barnali Kundu, Arpan Das, Srijita Roy Chowdhury, Nilutpal Chowdhury** — "AI based Fault Recognition and Classification in Microgrid System", 1st International Conference on Energy, Environment, and Green Technology (ICEEGT 2025), organized by the Department of Electrical Engineering, NITTTR Kolkata, India. April 3-4, 2025, Lecture Notes in Electrical Engineering (Accepted)

03 Soumya Kanti Bandyopadhyay, Soumen Biswas, Susanta Dutta, Sidhartha Ghosh, **Aveek Chattopadhyaya,** Sudipta Banerjee — "Effectiveness of CC-FO Hybrid controller over PID,FOTID,3DOF-PID for LFC of Solar,Wind & EV based multisource system", 7th International Conference on Signal Processing, Computing and Control (ISPCC2k25), 08. 03.2025, Jaypeee University of Information Technology, HP, India **(Accepted will be published in IEEE Xplore Digital Library)**

04 Atanu Maji, Soumen Biswas, **Aveek Chattopadhyaya,** Sanjoy Saha, Sudipta Banerjee — "A Comparative Study of PID, FOPID, and TID Controllers Using Harris Hawk Optimization for Load Frequency Control of Renewable Energy Grids in Deregulated Environments", 7th International Conference on Signal Processing, Computing and Control (ISPCC2k25), 08. 03.2025, Jaypeee University of Information Technology, HP, India **(Accepted will be published in IEEE Xplore Digital Library)**

05 **Aveek Chattopadhyaya**, Aritra Chattopadhyay, Debopoma Kar Ray, Tamal Roy, Surajit Chattopadhyay — "Enhancing Energy Efficiency in Induction Motors Fed by PWM Using Continuous Wavelet Transform (CWT) for Sustainable Development", International Conference on Sustainable Communication, Machine Intelligence, and Metaverse (SCMIM) 2025, 7-8 February, 2025, MCKV Institute of Engineering, Howrah, India **(2nd Best Paper, Sent for Lecture Notes in Springer)**

06 Suparna Karmakar, Suparna Biswas, Nanda Dulal Jana, **Aveek Chattopadhyaya**, Bishal Sarkar — "Electroencephalography based Autism Detection: A Comprehensive Review", Sixth International Ethical Hacking Conference: AI and Law (eHaCON 2025), UEM, 20/02/2025 - 21/02/2025

07 Sumangal Bhaumik, **Aveek Chattopadhyaya,** Jitendra Nath Bera — " SVM and DWT based Detection and Classification of Microgrid Faults using Single Point Measurement", India smart Grid Forum ISGF 25, New Delhi, 20.03.2025 **(Will be Published in IEEE Xplore Digital Library)**

08 **Suman Ghosh, Aveek Chattopadhyaya,** Suptasish Sarkar, Soumya kanti Bandyopadhyay , Sumangal Bhaumik — "Design and Development of an IoT-based Automatic Phase Selection System", International Conference on Smart Systems for applications in Electrical Sciences ICSSES-2025, Accepted, Will be Published in IEEE Explore Digital Library, Date: 21/03/2025.

09 **Arpan Das, Barnali Kundu**, Taniska Sarkar, **Suman Ghosh, Debasree Saha,** Dr. Bashari Deb Majumder — "Identification of Dental Diseases Using Convolutional and Regional Convolutional Neural Networks", IEEE Flagship International Conference 2025 AI-Driven Smart Healthcare for Society 5.0 (AdSoc5.0) 14th – 15th February, 2025 Guru Nanak Institute of Technology, Kolkata, West Bengal, India..

10 **Arpan Das, Barnali Kundu**, Shrayasee Gain, **Aritra Chowdhury, Ankur Vaibhav, Ekarna Chakraborty**, "Artificial Intelligence-Based Comparative Analysis of Wind Energy Forecasting Models", 2025 IEEE North-East India International Energy Conversion Conference and Exhibition (NE-IECCE), Published in IEEE Xplore Digital Library, 10.10.2025, ISBN:979-8-3315-1062-6, DOI: 10.1109/NEIECCE64154.2025.11183120

Patents Published

01 **Dr. Debasree Saha,** Dr. Sreyasree Basu, Dr. Barnali Kundu, Dr. Mainak Debnath, Mr. Biswajit Chaki Choudhury, Anshuman Shaw, Ujjwal Bhattacharyya — "IOT-BASED SMART CLEANUP SYSTEM FOR RESTORING AND REJUVENATING CONTAMINATED WATER BODIES", Application No.202531013815, Date of filing of Application :18/02/2025, Publication Date: 07/03/2025, Journal No. 10/2025 Dated 07/03/2025.

02 **Dr. Barnali Kundu, Aritra Chowdhury, Arpan Das** — "SYSTEM AND METHOD OF WASTE WATER TREATMENT AND HYDROGEN PRODUCTION", Application No: 202531013814, Date of filing of Application :18/02/2025, Publication Date: 07/03/2025, Journal No. 10/2025 Dated 07/03/2025.

03 Mr. Moloy Dhar, **Dr. Debasree Saha,** Dr. Suparna Biswas, Mr. Biswajit Chaki Choudhuri, Mr. Soumyajit Nandi — "An AI-driven adaptive lighting system to alleviate digital eye strain: A Futuristic Approach", Application No. 202531002349 A, Date of filing of Application: 10/01/2025, Publication Date: 17/01/2025, The Patent Office Journal No. 03/2025.

04 **Dr. Debasree Saha,** Dr. Soma Mukherjee, Soumi Patra**, Pratap Hazra, Raj Kumar Saha** — "ALTERNATIVE METHOD OF GENERATING NUCLEAR ENERGY: A Futuristic Approach", Application No. 202431103514 A, Date of filing of Application: 17/12/2024, Publication Date: 03/01/2025, The Patent Office Journal No. 01/2025.

05 Koushik Pal, Palasri Dhar, Dola Saha, **Debasree Saha,** Souvik Mondal, Sayantani Das — "MOBILE WASTE SORTING AND COLLECTION SYSTEM AND METHOD THEREOF", Application No. 202431103466, Date of filing of Application: 17/12/2024, Publication Date: 03/01/2025, The Patent Office Journal No. 01/2025.

06 Swagata Bhattacharya, Dr.Suparna Biswas, Dr. Nabaneeta Banerjee, Antara Ghosal, **Dr. Debasree Saha,** Dyuti Nandy, Vikas Kumar — "AUTOMATIC GAS OVEN SWITCHING SYSTEM AND METHOD OF SWITCHING", Application No. 202431103458, Date of filing of Application: 17/12/2024, Publication Date: 03/01/2025, The Patent Office Journal No. 01/2025.

07 Surajit Basak, Kaushik Roy, Sunipa Roy and Soumyadeep Ghosh — "TELE-OPERATED GROUND VEHICLE (TGV) FOR PERFORMING RESCUING OPERATIONS AND METHOD THEREFORE", Application No. 202431103459, Date of filing of Application: 17/12/2024, Publication Date: 03/01/2025, The Patent Office Journal No. 01/2025.

08 **Suman Ghosh, Aveek Chattopadhyaya, Amit Debnath, Arnab Kumar Roy** — "A COIN SORTING DEVICE", Application No. 202431103457, Date of filing of Application: 17/12/2024, Publication Date: 03/01/2025, The Patent Office Journal No. 01/2025.

09 Mr. Kaushik Neogi, Dr. Apurba Chatterjee, Dr. Mahendra Nandi, Mr. Amitava Chakraborty, Mr. Rajeev Kumar — "ENGINE DUAL POWER MODE CONTROLLER", Application No. 436630-001, Journal No. 02/2025 Dated 10/01/2025

10 Mr. Moloy Dhar, Ms. Pallabi Das, Mr. Shuvodeep Debnath, **Dr. Debasree Saha**, Mr. Biswajit Chaki Choudhuri, Ujjal Bhattacharya — "MODIFIED CBC AND BUFFER SYSTEM INCORPORATING OLEO HYDRAULIC SYSTEM FOR ENHANCING RAILWAY SAFETY AND SECURITY.", Application No. 202531013845 A,Publication Date: 07/03/2025, Journal No. 10/2025 Dated 07/03/2025

11 **Dr. Suman Ghosh, Dr. Aveek Chattopadhyay, Mr. Amit Debnath, Mr. Arnab Roy, Mr. Saurav Das**, Mr. Sumangal Bhaumik,"Intelligent Iot-Assisted Phase Selector For Three-Phase Electrical Networks", application no 202531059991, published on 4th July 2025.

12 Trishita Ghosh, Suparna Biswas, Suparna Karmakar, **Amit Debnath,** Ujan Ghosh, Annwesha Banerjee majumder, Chowdhury Md. Mizan,"CyberShield: A Real-Time Hardware Trojan Detection Device for Integrated Circuits", application no 202531060011, published on 4th July 2025.

13 **Dr. Barnali Kundu, Dr Debasree Saha, Susovan Dutta,** Biswajit Chaki Choudhury, **Arpan Das**,Smarta Das, Rohan De, "AI-POWERED DUAL-MODE REAL-TIME SIGN LANGUAGE-TO-SPEECH CONVERSION SYSTEM", Application No. 202531088246 A, Publication Date : 07/11/2025

14 Dr. Soma Mukherjee, Dr. Anup Kumar Thander, Dr. Debasree Saha, "SMART, COLLAPSIBLE, SOLAR-POWERED MEDICAL-GRADE WATER FILTRATION DEVICE WITH MULTISTAGE NANO- ANTIMICROBIAL AND SENSOR-ASSISTED PURIFICATION", Application No.202531088186 A, Publication Date : 07/11/2025

15 **Dr. Barnali Kundu, Dr. Debasree Saha, Susovan Dutta, Ekarna Chakraborty, Soumyadeep Mishra, Sougata Paul, Chahat Shaw, Suchandra Kundu**, "AUTONOMOUS MOSS BASED ECOLOGICAL SELF DRIVEN BOT FOR CO2 REDUCTION AND MICROCLIMATE RESTORATION", Application No. 202531087814 A, Publication Date : 07/11/2025

08 · BY STUDENTS, FOR STUDENTS

Student Voices

STUDENT VOICE · RENEWABLE ENERGY

Powering the Net-Zero Decade

Every solar panel and wind turbine speaks direct current or variable-frequency AC, and an electrical engineer teaches it to speak the grid's language. Smart grids now balance rooftop solar, batteries and factories in real time. Our generation will not just build power plants; we will design systems that think about when, where and how energy is used. **Net-zero is not a slogan — it is a circuit diagram waiting to be drawn.**

— PAYEL CHAKRABORTY, 4th year, EE

STUDENT VOICE · POWER ELECTRONICS

The Silent Hero Inside Every EV

When we heard the seminar on power conversion in electric vehicles, one idea stuck: **the motor gets the glory, but converters do the work.** They turn battery DC into precisely shaped AC, recover energy while braking and keep charging safe. Efficiency gained here means kilometres gained on the road. **Every percentage point is a quiet victory for power electronics.**

— DIYA BARUI, 3rd year, ee

STUDENT VOICE · LABS & SIMULATION

When Equations Come Alive

Kirchhoff's laws felt abstract until MATLAB and PSIM showed our circuits breathing on screen. Simulate first, build next: that habit saves components, time and tempers. Add LabVIEW, ETAP and an Electrical Machines lab, and theory stops being homework and becomes a toolbox. My advice to juniors: **break your simulation on purpose, and learn why it broke.**

— JOYDEEP DEY, 2nd year, EE

DID YOU KNOW?

Electrical Engineering at GNIT, Sodepur began in 2003 — and the department's labs run MATLAB, ETAP, PSIM, Mi-POWER and LabVIEW.

09 · সাহিত্য ও সৃজন

Bengali Corner · বাংলা সাহিত্য

গল্প

লোডশেডিংয়ের রাত

শ্রাবণের সন্ধ্যা। সোদপুরের পাড়াটা হঠাৎ অন্ধকারে ডুবে গেল। ঝড়ে ট্রান্সফর্মার বিগড়েছে। জানালার ধারে বসে পায়েল মোমবাতি জ্বালাতে গিয়েও থামল। পুরনো ফোনের ব্যাটারি, একটা ছোট সোলার প্যানেল আর কয়েকটা এলইডি—গত সেমিস্টারের প্রজেক্টের জিনিসপত্র ড্রয়ারেই পড়ে ছিল।

আধঘণ্টার মধ্যে তার ঘরে জ্বলে উঠল নরম হলুদ আলো। দাদু অবাক হয়ে বললেন, "এ যে জাদু রে!" পায়েল হেসে বলল, "না দাদু, এ হল সার্কিট। জাদুর চেয়েও সৎ—যা দাও, তাই ফেরত দেয়।"

পাশের বাড়ির ছোট্ট টুবাই অন্ধকারে পড়তে পারছিল না। তার ডাকও এল। সেই রাতে পায়েল বুঝল—ইঞ্জিনিয়ারিং মানে শুধু যন্ত্র বানানো নয়, অন্ধকারে পাশের মানুষটার জন্য একটু আলো জ্বেলে দেওয়া।

— PAYEL CHAKRABORTY, 4th year, EE

Did You Know? – Electric Vehicles

Electric vehicles use power electronic converters and motor drives to control speed, torque and energy flow, making transportation more energy-efficient

কবিতা

তারের গান

তারে তারে বইছে সুর,
আলোর দেশে যাচ্ছে দূর;
শহর জাগে, গ্রাম হাসে,
স্বপ্ন ফোটে নীল আকাশে।

কবিতা

ল্যাবের বিকেল

ল্যাবের জানালায় বিকেল নামে,
অসিলোস্কোপে কাঁপে সবুজ ঢেউ।
খাতার মার্জিনে লিখে রাখি স্বপ্ন—
একদিন আমার সার্কিটে জ্বলবে সারা দেশের ঘর।

পরীক্ষার ভয়, প্রজেক্টের জেদ,

ভোল্টেজ-কারেন্ট হাত ধরে,
যন্ত্র নাচে ঘরে ঘরে;
আমরা শিখি দিনের শেষে—
আলো মানেই ভালোবেসে।

— ADITI DAS, 2nd year, EE

বন্ধুর চায়ের ভাঁড়—সব মিলে এই জীবন,
যেন এক লম্বা সিরিজ সার্কিট:
একটা ছিঁড়লে সবাই অন্ধকার,
তাই হাত ধরে থাকি, ভাই।

— SAYANA SEN, 2nd year, EE

ছড়া

ওহমের ছড়া

ভোল্ট বাড়ে, কারেন্ট নাচে,
রোধ যদি রয় স্থির,
ওহম-সাহেব বলেন হেসে—
"সূত্র মানো, বীর!"

— SOUMODIP DAS, 1st year, EE

নতুন গল্প · New Story



ছবি: বজ্রনিরোধক দণ্ড ও আর্থিং বাজের বিদ্যুৎকে নিরাপদ পথে মাটিতে নামিয়ে দেয়।

গল্প

বাজ পড়ার রাত

বৈশাখের শেষ বিকেল। কালো মেঘে ঢেকে গেছে নবগ্রামের আকাশ। গরমের ছুটিতে বাড়ি ফিরেছে সৃজিত — ইলেকট্রিক্যাল ইঞ্জিনিয়ারিংয়ের তৃতীয় বর্ষের ছাত্র। গত বছর এই ছুটিতেই সে হেডস্যারকে বুঝিয়ে-সুঝিয়ে গ্রামের প্রাইমারি স্কুলের ছাদে বসিয়েছিল একটা তামার দণ্ড, আর মাটির গভীরে পুঁতে দিয়েছিল মোটা আর্থিংয়ের তার।

তখন অনেকেই হেসেছিল। মুদির দোকানের নিতাইকাকা বলেছিলেন, "একটা শিক দিয়ে আকাশের বাজ আটকাবি? বেশি পড়াশোনা করে মাথাটাই গেছে!" সৃজিত শুধু বলেছিল, "বাজ আটকানো যায় না কাকা, তাকে ঠিক রাস্তা দেখিয়ে মাটিতে নামিয়ে দিতে হয়।"

সেদিন সন্ধ্যায় ঝড় উঠল প্রবল বেগে। নদীর ধারের কাঁচা বাড়িগুলো থেকে মানুষজন ছুটে এসে আশ্রয় নিল পাকা স্কুলবাড়িতে। বাচ্চারা কাঁদছে, জানালা দিয়ে ঢুকছে বৃষ্টির ছাট। হঠাৎ চোখ-ধাঁধানো সাদা আলো, আর তার পরেই এমন শব্দ, যেন আকাশটা দু'ভাগ হয়ে গেল।

কয়েক মুহূর্ত সব চুপ। তারপর কেউ একজন টর্চ জ্বেলে দেখল—সবাই ঠিক আছে। শুধু ছাদের তামার দণ্ডের মাথাটা কালো হয়ে গেছে, আর মাঠের কোণে আর্থিংয়ের জায়গা থেকে উঠছে হালকা ধোঁয়া। বাজ পড়েছিল ঠিক স্কুলের ওপরেই, কিন্তু তামার পথ ধরে চুপচাপ নেমে গেছে মাটির বুকে।

ভোরবেলা নিতাইকাকা এক ঠোঙা গরম জিলিপি নিয়ে হাজির। সৃজিত হাতে দিয়ে একটু লজ্জা পেয়ে বললেন, "তোর ওই শিকটার নাম কী যেন বলেছিলি?" সৃজিত হেসে বলল, "লাইটনিং কন্ডাক্টর, কাকা—বাংলায় বজ্রনিরোধক। আর আসল কাজটা করে আর্থিং, যাকে চোখে দেখা যায় না, অথচ সবাইকে বাঁচিয়ে রাখে।"

সেদিন সৃজিত বুঝেছিল—ভালো ইঞ্জিনিয়ারিং অনেক সময় এমনই। চুপচাপ মাটির নিচে পোঁতা থাকে, ধন্যবাদ চায় না, শুধু বিপদের দিনে ঠিক কাজটা করে।

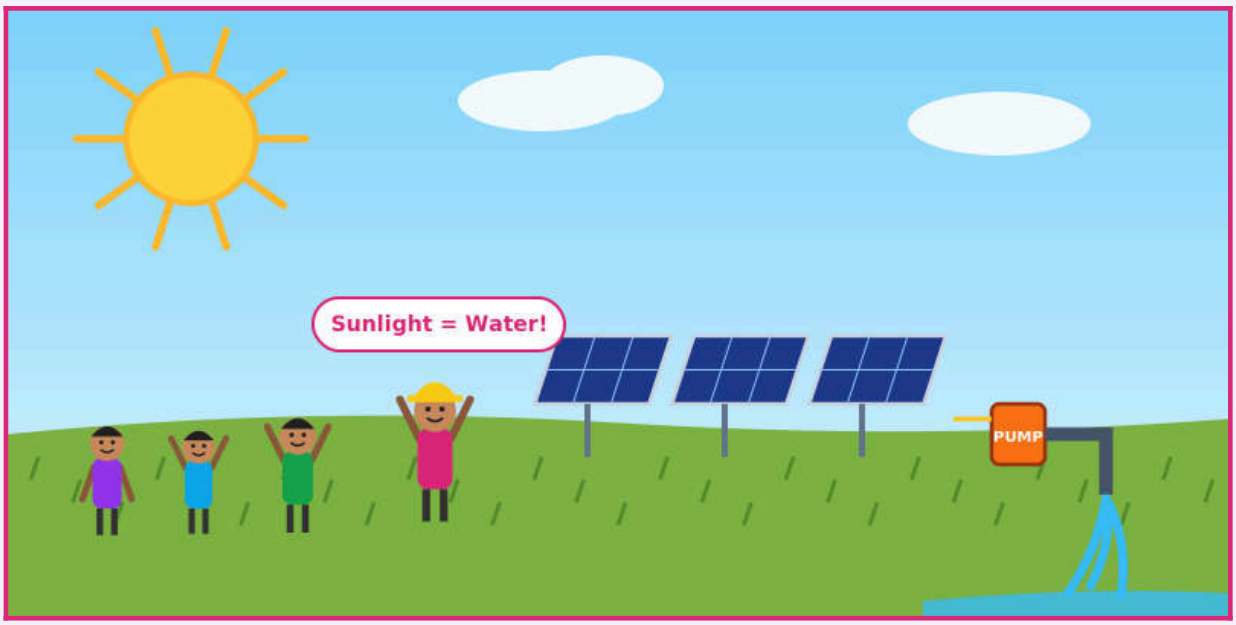
— SRIJEET DAS, 2nd year, EE

জানো কি?

একটি বজ্রপাতে বিভব-পার্থক্য কোটি কোটি ভোল্টে পৌঁছতে পারে—তাই উঁচু বাড়িতে বজ্রনিরোধক আর ভালো আর্থিং খুব জরুরি।

10 · हिंदी साहित्य

Hindi Corner · हिंदी कोना



चित्र: धूप से चलता सोलर पंप—खेतों तक पानी, बिना डीज़ल के।

कहानी

सोलर वाली दीदी

रामपुर गाँव में हर साल गर्मी आते ही पानी की कमी हो जाती थी। डीज़ल पंप चलाना बहुत महँगा था और बिजली भी कभी-कभार ही आती थी। उसी गाँव का लड़का रोहन कोलकाता में इलेक्ट्रिकल इंजीनियरिंग की पढ़ाई कर रहा था।

छुट्टियों में घर लौटने पर उसने देखा कि उसके पिताजी सुबह चार बजे से खेत में बैठकर बिजली आने का इंतज़ार कर रहे हैं। रोहन ने पूछा, “पिताजी, सूरज की रोशनी तो हमें हर दिन मुफ़्त में मिलती है, फिर हम उससे पंप क्यों नहीं चलाते?”

जब उसने पंचायत में सोलर पंप लगाने का प्रस्ताव रखा, तो सरपंच जी हँस पड़े—“बेटा, क्या धूप से भी मोटर चल सकती है? ये सब शहरों की बातें हैं!”

लेकिन रोहन ने हार नहीं मानी। उसने सोलर पंप योजना के लिए ज़रूरी फ़ॉर्म भरवाए, सोलर पैनलों का सही कोण मापा और गाँव के लड़कों को वायरिंग तथा रखरखाव का काम सिखाया।

तीन महीने बाद, जिस दिन पहली बार सोलर पैनलों पर धूप पड़ते ही पाइप से पानी की तेज़ धार निकली, पूरा गाँव तालियों से गूँज उठा। सबसे पहले सरपंच जी ही बोले, “आज से इस पंप का नाम होगा—‘सोलर दादा का पंप’!”

रोहन मुस्कुराया। उसे अपनी लैब में प्रोफेसर की कही हुई बात याद आ गई—

नेहा मुस्कुराई। उसे लैब में प्रोफ़ेसर की कही बात याद आई—"इंजीनियर वही है, जो किताब के फ़ॉर्मूले को किसी के खेत तक पहुँचा दे।"

— ROHAN SINGH, 3rd year, EE

कविता

बिजली

चुपके-चुपके तारों में, चलती एक कहानी,
गाँव-शहर के आँगन में, भर देती है रवानी।
पंखा घूमे, बल्ब जले, मशीनें गाएँ गीत,
इंजीनियर बनकर हम सीखें, हर अँधेरे पर जीत।

ओम कहे—धीरे चलो, किरचॉफ़ कहे—संभल,
फ़ैराडे का चुंबक बोले—बदलो, आगे चल।
सूत्र नहीं ये सिर्फ़ किताबी, ये जीवन का सार,
जितना बाँटो उजियारा, उतना बढ़ता प्यार।

— CHAHAT SAW, 2nd year, EE

क्या आप जानते हैं?

भारत का पूरा बिजली ग्रिड **'एक राष्ट्र, एक ग्रिड, एक फ़्रीक्वेंसी'** पर चलता है—देश के हर कोने में बिजली 50 हर्ट्ज़ पर दौड़ती है।

बिजली बचाओ, कल बचाओ

- कमरे से निकलते समय लाइट और पंखा बंद करें।
- पुराने बल्ब की जगह LED अपनाएँ।
- AC को 24°C पर चलाएँ—आराम भी, बचत भी।

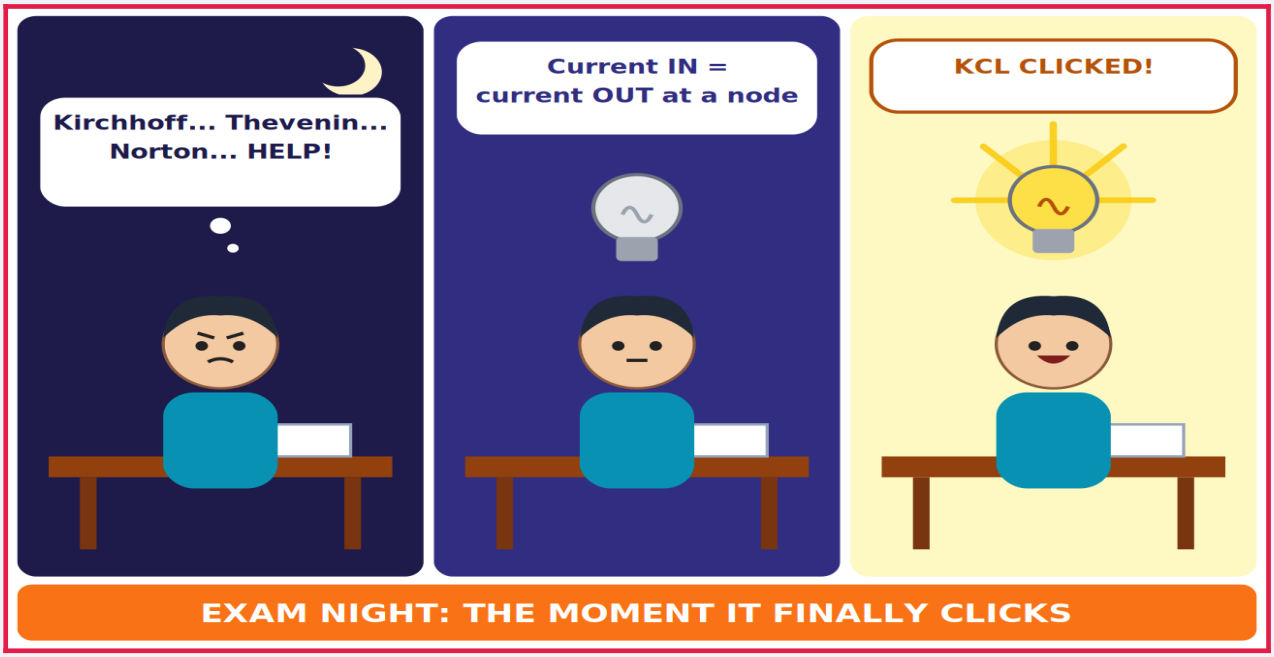
-नारा:

"बिजली बचाने का संकल्प लें, हरित और उज्ज्वल भविष्य का निर्माण करें।"

11 · হাসির কারেন্ট · हँसी का करंट

Cartoon Corner

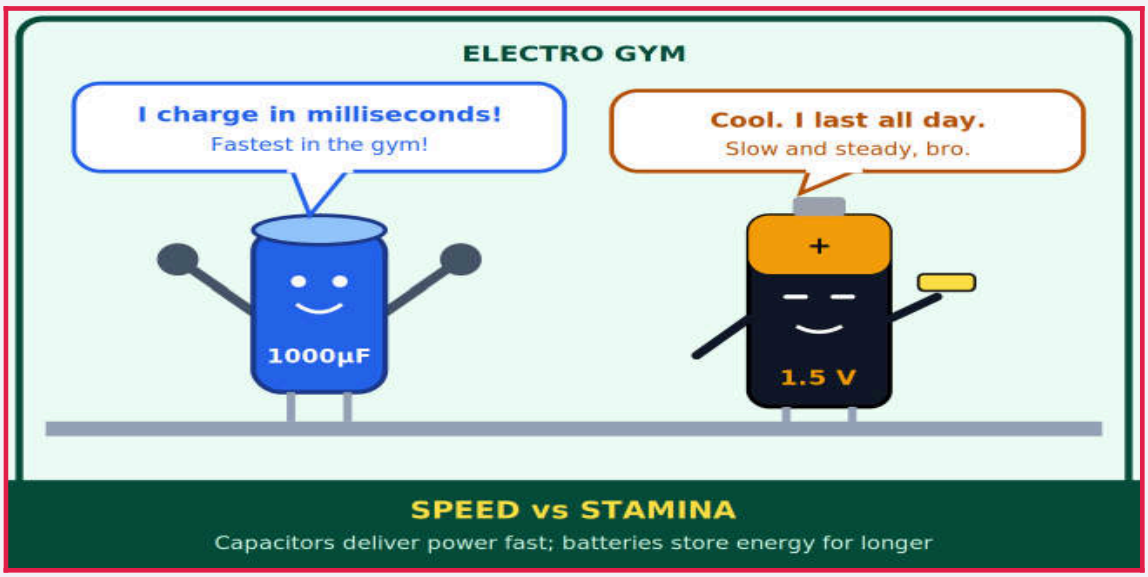
Circuits, but make it funny — three cartoons on the laws we study every day.



পরীক্ষার আগের রাত: যখন KCL শেষমেশ মাথায় ঢোকে! · परीक्षा की रात: जब KCL आख़िरकार समझ आता है!



মিস্টার রেজিস্টর ডিউটিতে—বেশি রোধ, কম কারেন্ট। · ओम का नियम: ज़्यादा रेज़िस्टेंस, कम करंट।



ক্যাপাসিটর দ্রুত, ব্যাটারি টেকসই—দুজনকেই দরকার! · रफ़्तार बनाम दम: दोनों की ज़रूरत है!

Some Photographs Captured by Electrical Engineering (EE) Students:













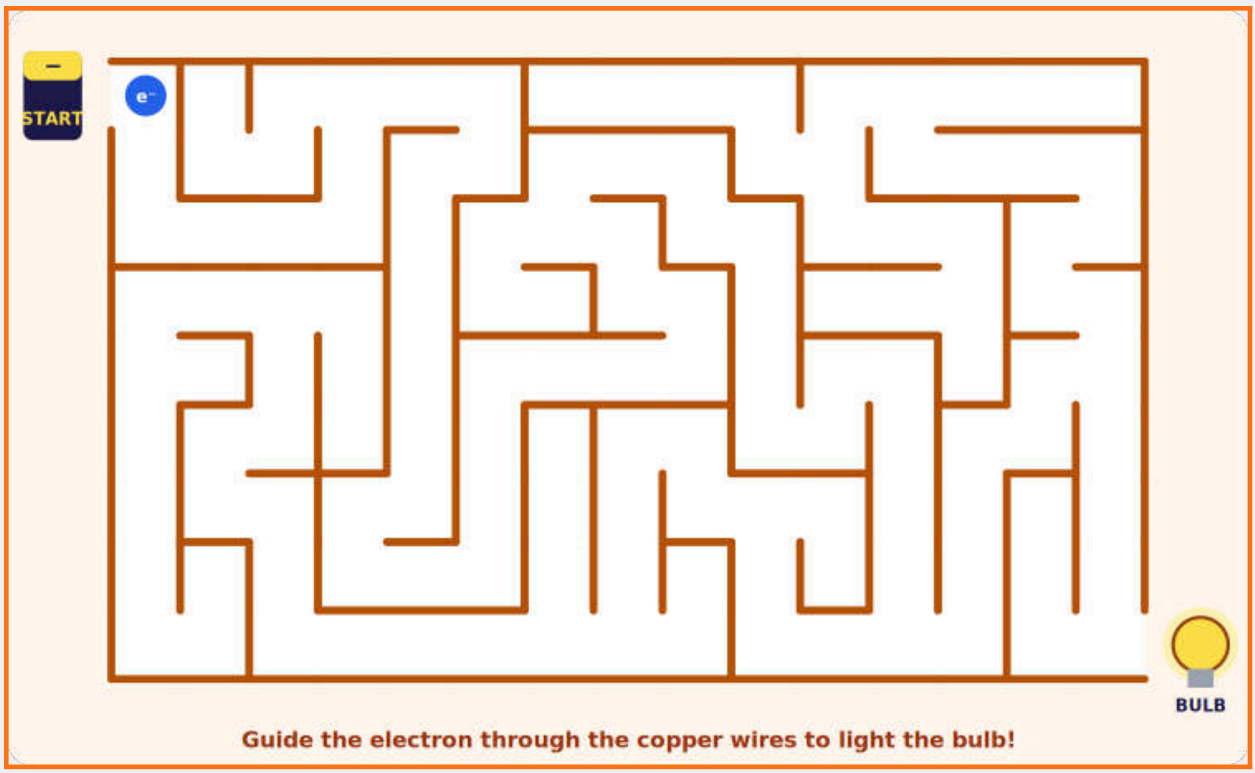
12 · मगजास्त्र · दिमागी कसरत

Logic Games

Puzzles, codes and brain-benders for curious engineers. No calculators allowed! Answers are on the last page of this section.

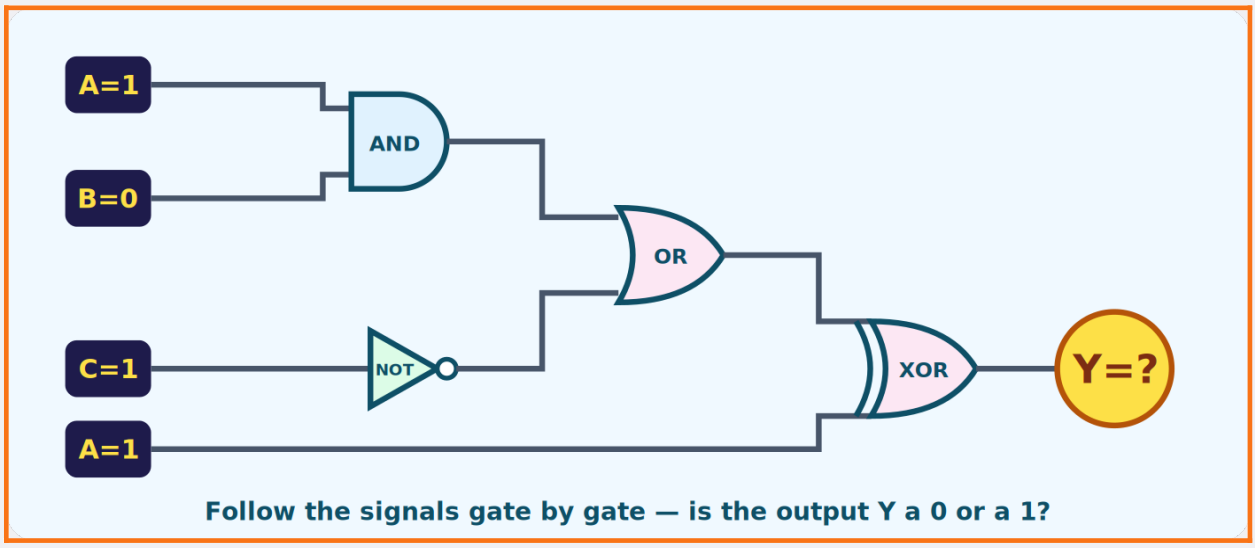
01 Electron Maze

Start at the battery's negative terminal and find the only path that lights the bulb.



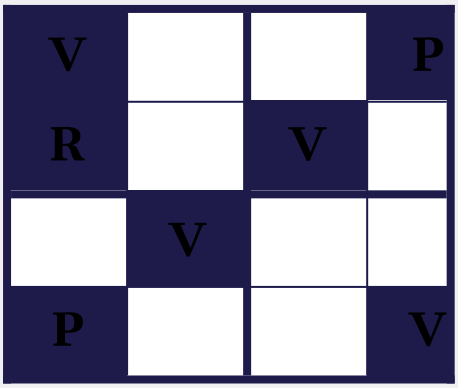
02 Logic Gate Challenge

Inputs A = 1, B = 0, C = 1. Work through AND, NOT, OR and XOR to find the output Y.



03 Electro-Sudoku

Fill the grid so every row, every column and every 2×2 box has V, I, R and P exactly once.



V = Voltage **I** = Current

R = Resistance **P** = Power

Hint: *start with the top-right 2×2 box — only two letters are missing there.*

04 Who Blew the Fuse?

A logic deduction puzzle.

Three lab partners — **Riya, Sumit and Ankit** — were in the lab when the fuse blew. One of them did it, and **exactly ONE** of these statements is true. Who blew the fuse?

Riya: *"Sumit blew it."*
Sumit: *"Riya is lying."*
Ankit: *"It wasn't me."*

05 Brain Teasers

Five quick ones — try to solve each in under a minute.

(a) **Number series:** 2, 6, 12, 20, 30, ___ ?

(b) **Secret code:** each letter moves one step forward, so VOLTAGE → WPMUBHF. Decode: DVSSFOU

(c) **Odd one out:** Volt · Ohm · Farad · Pascal · Henry

(d) **Colour code:** a resistor reads Brown – Black – Red. What is its value?

(e) **Quick calc:** two 10 Ω resistors in parallel, then in series with 5 Ω. Total resistance?

06 धाँधा · पहेली

Riddles in Bengali and Hindi.

1. বাংলা ধাঁধা

ঘরের মাঝে সূর্য থাকে, সুইচ টিপলে হাসে; সুইচ ছাড়লে ঘুমিয়ে পড়ে—বলো তো সে কে?

2. বাংলা ধাঁধা

তিনটে ফুটো, মুখটি নেই, দেয়ালে থাকে চুপটি করে; প্লাগ পেলেই কাজে নামে—বলো তো সে কে?

3. हिंदी पहेली

घूमे पर कहीं न जाए, ठंडी हवा सबको खिलाए;
बिजली मिले तो दौड़ लगाए—बोलो कौन?

4. हिंदी पहेली

बिना पैरों के दौड़ लगाऊँ, तारों में ही आऊँ-जाऊँ; दिखती नहीं, पर झटका देती—बोलो मेरा नाम बताऊँ?

ANSWER KEY · উত্তর · उत्तर

Answers

01 Electron Maze — see the solution below.

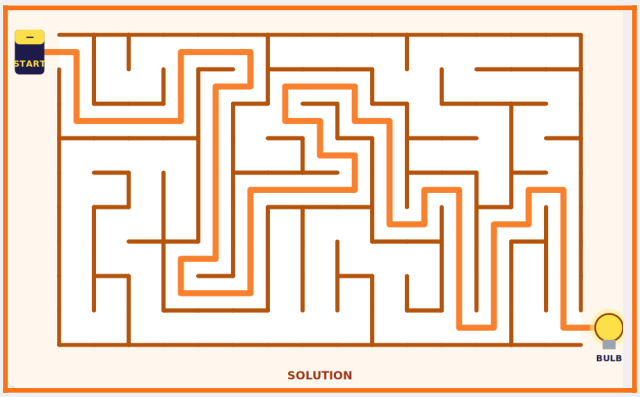
02 Logic Gate Challenge — Y = 1. A AND B = 0; NOT C = 0; 0 OR 0 = 0; then 0 XOR A(1) = 1.

03 Electro-Sudoku — rows read VIRP · RPVI · IVPR · PRIV.

04 Who Blew the Fuse? — Ankit. Riya and Sumit contradict each other, so exactly one of them is true — which means Ankit's statement must be the false one.

05 Brain Teasers — (a) 42, since each term is n × (n + 1) (b) CURRENT (c) Pascal — a unit of pressure; the rest are electrical units (d) $10 \times 10^2\ \Omega = 1\ k\Omega$ (e) $5\ \Omega + 5\ \Omega = 10\ \Omega$

06 धाँधा • **पहेली —** १. वैद्युतिक बाल्व २. सकेट (প্লাগ পয়েন্ট) ३. पंखा ४. बिजली (करंट)



Electro-Sudoku — solution

V	I	R	P
R	P	V	I
I	V	P	R
P	R	I	V

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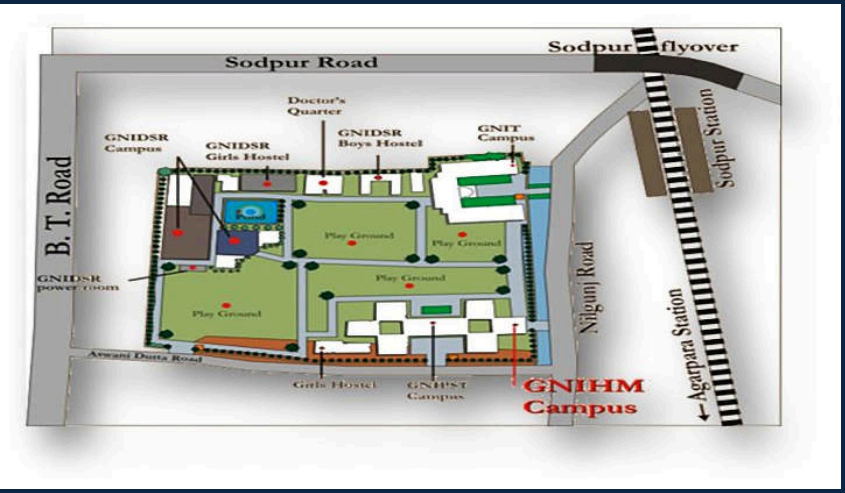

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