M.DASAN INSTITUTE OF TECHNOLOGY (M-DIT)
ULLIYERI P.O,KOZHIKODE DIST, KERALA
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

M DIT KOZHIKODE

e WAVES

TECHNICAL BULLETIN(2019-2020)

CONTENTS

Volume 1 January 2021

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Chairman's message

I am proud that the electrical and electronics engineering department of MDIT is releasing their Technical Magazine. I hope, this Technical Magazine would provide a platform for the MDIT family to exhibit their potential to the panorama of literature. I congratulate all the staff, students especially the editorial board on this remarkable accomplishment and wishing you very best for future.

Shri. M .Mehaboob
Chairman, M-DIT

Secretary's message

It gives me immense pleasure to know that the department of electrical and electronics engineering is bringing out their Technical Magazine. Let this effort continue successfully to motivate the versatile and progressive ideas of MDIT family members. Wish you all the success.

Shri. A. K. Mani
Secretary, M-DIT

Principal's Desk

I am delighted to know that our electrical and electronics engineering department is releasing a Technical Magazine. Glad to congratulate the students for their proactive steps in bringing out the Technical Magazine. I also applaud the editorial board for their commendable work.

Dr.P.M.Maheesan
Principal,M-DIT

Hod's Desk

I am very much grateful to the management and the Principal for their continuous encouragement, inspiration and support extended for the release of this Technical Magazine. The Technical Magazine is an amalgamation of technical events held in the department and it plays a pivotal role in providing a greater exposure of the achievements accomplished by the students and the faculties. I wish all the very best to my students and faculties in future accomplishments and endeavours.

Dr.O.Asokan
HOD-EEE, M-DIT

ABOUT THE INSTITUTE

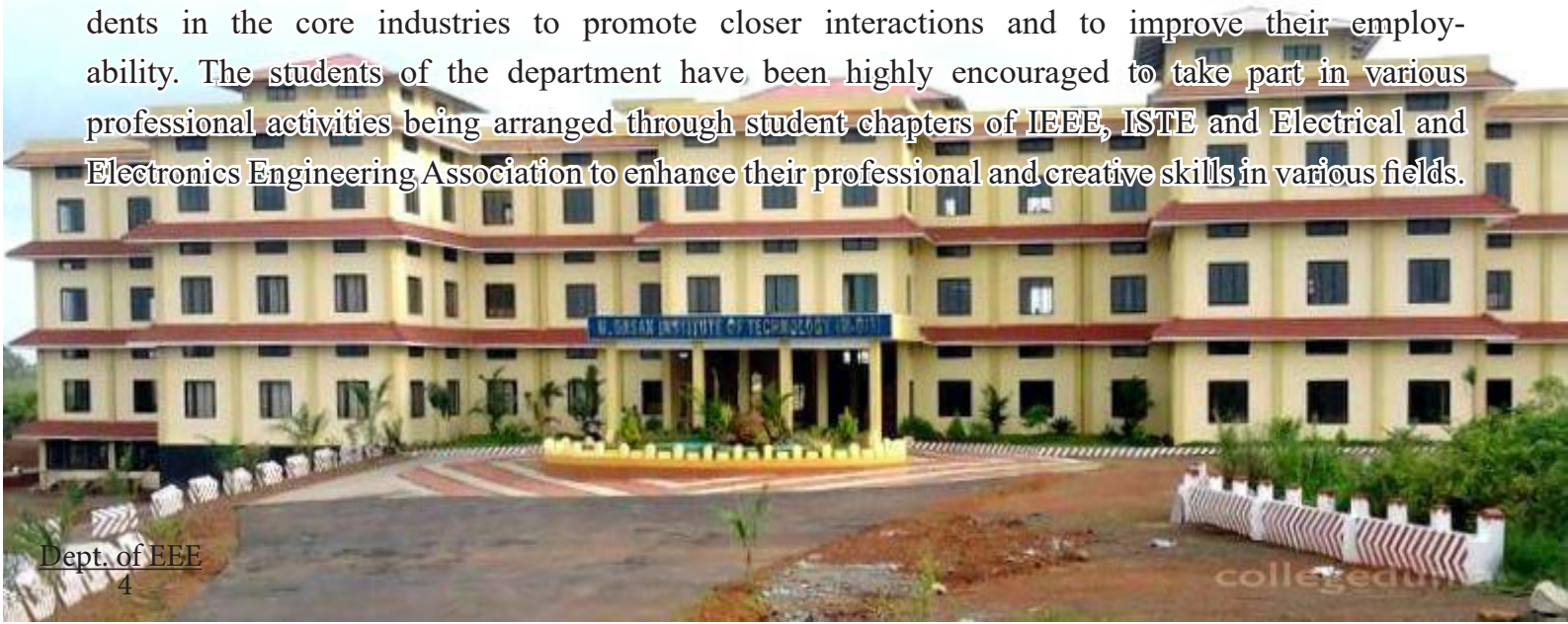
M. Dasan Institute of Technology (M-DIT) Kozhikode was established in 2012-13., with a total of five academic departments. The technology institute was named after the late dynamic visionary Shri M.Dasan, former Member of Kerala Legislative Assembly. M-DIT Kozhikode is a venture of M. Dasan Memorial Co-operative Institute of Engineering and Information Technology. The college is approved by the All India Council for Technical Education, New Delhi and affiliated to the APJ Abdul Kalam Technological University (KTU).

In a short span of time, the Institute has carved a niche in the field of technical education in the state through its advanced courses in engineering and technology and has become one of the most preferred institutions for aspiring students in the state. Students at M-DIT enjoy the twin advantage of quality education and serene environment, at the picturesque hinterlands of the campus located at ulliyeri, in Kozhikode district. .

ABOUT THE DEPARTMENT

The department of Electrical and Electronics Engineering at MDIT was established right from the inception of the institute ie, in the year 2012 offering B-Tech in Electrical and Electronics Engineering. The annual sanctioned in take for the B-Tech program is sixty.The department is backed by a team of highly motivated, dedicated and experienced teachers supported by a strong team of lab assistants. The department functions at the 1st floor in the main building and has excellent infrastructural facilities and well equipped laboratories. The lab facilities are being upgraded from time to time, to provide adequate opportunities for the students to learn and innovate.

Students are strongly motivated and trained towards a successful carrier, imparting strong moral and ethical foundations. Special attention is being given to train students in the core industries to promote closer interactions and to improve their employability. The students of the department have been highly encouraged to take part in various professional activities being arranged through student chapters of IEEE, ISTE and Electrical and Electronics Engineering Association to enhance their professional and creative skills in various fields.



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Syam mohan

VISION

Be a centre of academic excellence through imparting Electrical and Electronics Engineering education and research, foster innovative mind-set in the students to enable them keep abreast with developments in the field.

MISSION

- Provide quality teaching and best academic practices to foster Electrical and Electronics Engineers of international stature.
- Impart value based education with socially commitment for the development of the community around, and the nation.
- Electrical and Electronics Engineering students will have a culture of conducting eco-friendly research, consultancy services and lifelong learning founded on teamwork.

PROGRAM EDUCATION OBJECTIVES (PEOS)

- The students will have knowledge of Electrical & Electronics Engineering and the associated technological advancements
- The program will nurture professionally competent, socially committed and self confident students with ability to pursue higher education and attain professional excellence.
- The students will have analytical logical and design skills to keep abreast with the changing technological scenario.
- Research propensity will be imparted in the students to visualize and solve problems in Electrical& Electronics Engineering and apply them to innovative ends.

INNOVATIVE SOCIETY FOR ELECTRICAL ENGINEERS (ISEE)

The Electrical and Electronics Department Association, Viz;' Innovative Society For Electrical Engineers(ISEE)' was formed in the year 2015, been inaugurated by Mr.AbdulRahiman, Hon' Pro.Vice Chancellor, APJ Abdul Kalam technological university, Kerala,. The ISEE provides a platform to the students to showcase their ability in the curricular and extra-curricular activities. It regularly conducts technical events which include Faculty development programmes, workshops, training sessions for students, technical talks and seminars.

GREENERGY CLUB

A club named "GREENERGY" was formed under the Electrical and Electronics Department Association -ISEE on 12th November 2018. The club was inaugurated by Er. Rafeeque of M/s Kerala State Electricity Board Ltd. In the inaugural session he provided an expert talk on Smart Power Communication System and SCADA. Dr. P.M. Maheesan (Principal M-DIT) and Prof. K G Harshan (Vice Principal M-DIT) were also attended the session along with the faculty members and students of the department.

GO GREEN GO SMART
GREENERGY
Electrical and Electronics Engineering Club
M-DIT Kozhikode

AN OVER VIEW ON TRANSFORMER TECHNOLOGY

Dr. O. Asokan,
Professor, Dept. of Electrical Engineering

Introduction

The history of transformer goes back to the early 1880s. Due to the increase in demand for electric power, power transformers in 400 kV ratings were produced as early as 1950. In the early 1970s unit ratings as large as 1100 MVA were produced and 800 kV and even higher kV class transformers were manufactured during 1980s.

A transformer is a static piece of equipment with a complicated electromagnetic circuit inside. The energy is transferred from one electrical circuit to another through the magnetic field. In its sim¬plest form, a transformer consists of two con-

ducting coils having a mutual inductance. In an ideal case it is assumed that all the flux linked with the primary winding also links the secondary winding. But, in practice it is impossible to realize this condition as magnetic flux cannot be confined. The greater portion of the flux flows in the core while a small portion called the leakage flux links one or the other winding. Depending upon the particular application and type of connection, a transformer may have additional windings apart from the two conventional windings.

Major materials like copper, cold-rolled grain oriented silicon steel, insulating oil, press-board and paper insulation and certain ferrous and nonferrous items are essential to build a compact and trouble-free transformer. Designing an insulation system for application in higher voltage class transformer is an art and with the use of the best materials available today, it is possible to economize on size as well as produce a reliable piece of equipment. Keeping in view the transportability,

operational limitations and guaranteed technical performance of the transformer, particular type of core construction is adopted. Proper selection of transformer auxiliaries is essential for ensuring safe operation of the main equipment and provides protection under fault conditions.

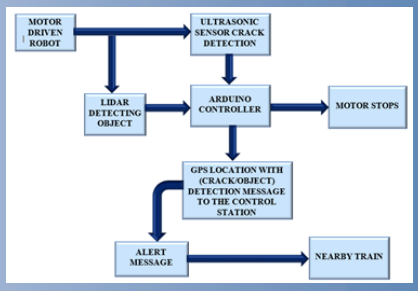
To ensure quality and conformation to design calculations, testing is an important activity in the transformer. The basic testing requirement and testing codes are set out in national and international standards. Although the transformer is a complex piece of equipment efforts on various fronts, viz. design, manufacture, vendor development process mapping and maintaining history card, etc contribute as important tools for producing a reliable piece of transformer.

continued...

RAILWAY TRACK CRACK DETECTION SYSTEM

Aiswarya T K, Athul K P, Abhiram Krishna,
IVth Year, Dept of EEE

In India the rail transport occupies a prominent position in providing the necessary transport infrastructure to sustain and quench the ever-burgeoning needs of a rapidly growing economy. Today, India possesses the fourth largest railway network in the world. However, in terms of the reliability and safety parameters, they have not yet reached truly global standards. The principal problem associated is the lack of cheap and efficient technology to detect problems in the rail tracks. The lack of proper maintenance of rails has resulted in the formation of cracks in the rails and other similar problems caused by anti-social elements which jeopardize the security of operation of rail transport. This problem has led to a number of derailments resulting in a heavy loss of life and the property. Cracks in rails have been identified to be a main muse of derailments, yet there have been no cheap automated solutions available for testing purposes. Hence, owing to the crucial repercussions of this problem, an automatedrailway crack detection has been proposed which is an efficient and cost effective solution.

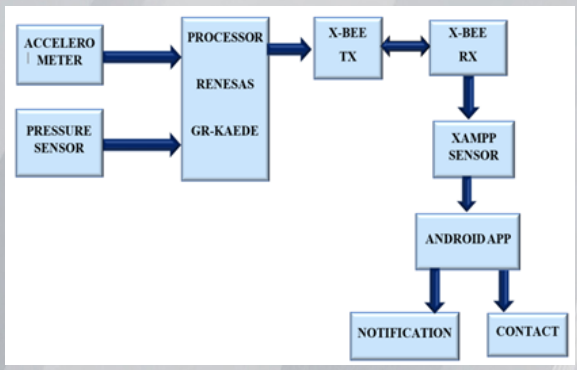


The system uses ultrasonic sensor to detect the crack in the railway track by measuring distance from track to sensor. If the distance is greater than the assigned value the microcontroller identifies there is a crack and IR sensor is used to detect the obstacle presence in the track using Arduino microcontroller. After crack detection or object detection the testing robotic vehicle stops and the longitudinal and latitudinal positions are sent via SMS to control centre and also to the nearby trains through RF Communication, for which RF Transmitter in theRobotic vehicle and RF Receiver placed on Train is made use.

REAL TIME MONITORING AND ALERT SYSTEM FOR LANDSLIDE

Avinash P K
IVth Year, Dept of EEE

Landslides have always been a major cause of concern. A landslide is the movement of rock, rubble or dirt down a slope. Complex geological and geographical conditions and changes in climatic conditions in time and space result in a landslide. They result from the failure of the constituents which make up the mountain slope and are driven by the force of gravity. The movement of slopes can either be upward and outward and it can be slow or fast. Landslides are mostly related to areas with steep slopes and mountains, but it can also occur in areas of low relief. Though the landslides cannot be detected before they occur, but we can alert the general population about any catastrophe that has occurred. This study focuses on alerting the general population along with the disaster management authorities in case of an occurrence of a landslide.



Block Diagram of proposed work

Fig. shows the block diagram of the proposed work consisting of various hardware modules such as Renasas (GR Kaede), Zigbee module and an accelerometer. The accelerometer is used for detecting any kind of change in the ground movement. The accelerometer can easily detect horizontal as well as angular movements. It would detect small as well as the abrupt changes in the area around the sensor. The 3-Axis Accelerometer (adxl335) is used here and with easy analogue interface. It works on 3.3 voltages. For determining the angle of tilt, ADC channel on the microcontroller are used which sampled the A/D values from the accelerometer. And for checking whether it is a + ve or – ve acceleration, the acceleration is compared to the zero-g offset and then values are passed to the tilt algorithm. By applying the compared value to all three axes, we can easily compute the orientation of hand in three dimensional spaces. Copper plates acts as pressure sensors and would trigger as soon as pressure is applied to it. These nodes are connected together with Renasas (GR-Kaede) processor. It is a single board microcontroller with a software for programming it. The data is transmitted to the server via Zigbee. The server is programmed using XAMPP and PHP which continuously monitors the incoming data from the Zigbee attached at the COM port. The server then transmits the data to the android application which is specifically designed for alerting the user as soon as a landslide is triggered. The user can thus take the adequate countermeasures required in that situation. The user would also be able to send a message or call the disaster management authorities in case of any kind of query. They would be able to interact with the authorities so that sufficient help could be provided to them.

SINE WAVE MICROINVERTER FOR PV PLANT

Aftab Rahiman, Rajalakshmi P, Bibin P, Sreerag, Ahsal Beeran
III[rd] Year, Dept of EEE

The energy resources can be classified in to three categories namely nuclear resources, fossil fuels and renewable resources, of which renewable energy sources are accepted as clean energy sources of future. Solar energy is popular among other renewable energy sources in all over the world. Inverter is the most important power converter section of photovoltaic systems in terms of efficiency. This study focus on the design and analysis of a micro inverter for PV systems. The proposed micro inverter is designed by using MATLAB Simulink software.

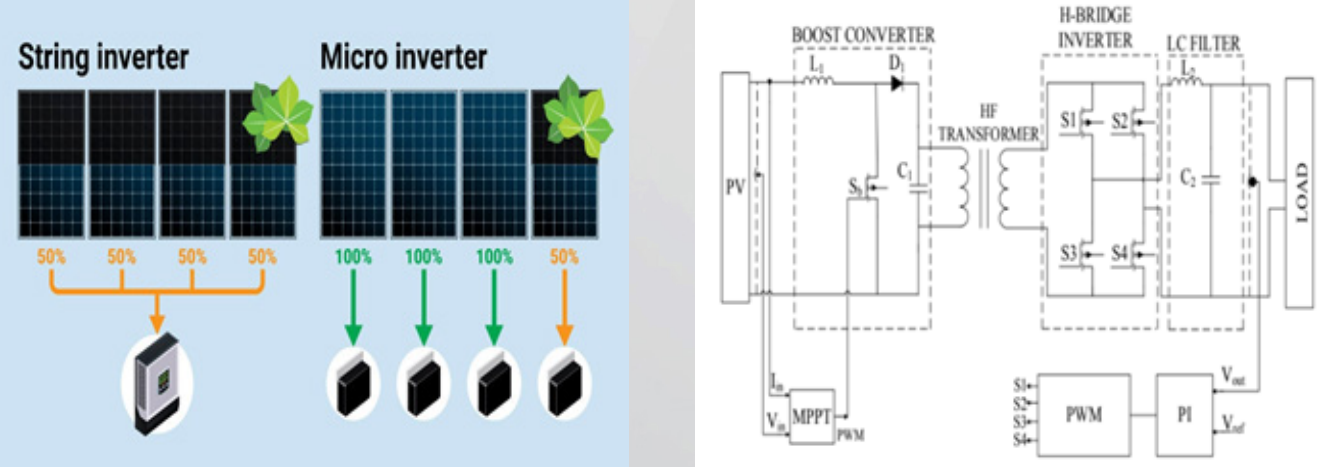


Fig.: The structure of micro inverter

The micro inverter which is shown in Fig. consists of 2 stage convertors, where the first stage is composed of boost convertor with maximum power point tracker (MPPT) and the second stage is composed of inverter with PI controller. The dc-dc convertor is quiet important in PV system since the generated voltage from the PV panel is not adequate to meet the load requirements. The switching device of the boost convertor in a MOSFET. It is controlled by MPPT. There are many MPPT algorithm such as fractional short circuit voltage, fractional short circuit , perturb and observe (P&O), incremental conductance method etc. The converter and inverter section are isolated by a HF transformer. The sine wave micro inverter consist of four MOSFETs controlled by PMW (pulse width modulation) with PI controller. The harmonic filter circuit is placed at the output of the inverter to reduce harmonics and to generate pure sine wave. Despite of increasing or decreasing solar irradiance, the output voltage of the inverter does not change and is acquired as pure sine waveform.

ABOUT A SCIENTIST

Rajalakshmi P, Bibin P, Navaneeth D R
III[rd] Year, Dept of EEE

BENJAMIN FRANKLIN

BenjaminFranklin–Polymathof18thCentury

The 18th century is known for French revolution which resulted in unprecedented period of piece, economic expansion which is the bright side, while fear of losing power is another. Amidst these political and economical situations, philosophy and science increased in prominence. Let's take a look at the field of electricity, a branch of science.

The history of electricity begins with William Gilbert, a physician of England in 1600. From then electricity became an intriguing term. On 6th January 1706 in Boston, New England, a baby named Benjamin franklin was born who took electrical fluid into a new level. His father Josiah Franklin who married twice had seventeen children and Benjamin was the child of Abiah Folger. Franklin was a leading author, printer, political theorist, president, scientist, inventor and the list goes on. As on inventor is well known for the invention "The Lighting Rod".

He first explored the field of electricity in 1746. He was the first to label "resinous" and "vitreous" as negative and positive respectively where resinous and vitreous are considered as types of electrical fluid as electricity was called then. He also proposed the principle of conservation of charge and constructed electric battery in 1750. He anticipated and proved that lighting is the electricity by "kite and key" equipment.

He came across this idea while he was observing lighting striking a rod on a building. Rods are dangerous as they conduct quickly. He demonstrated his idea by the kite and key equipment. Benjamin along with his son performed this by fastening an iron spike to a silken kite and holding the end of the kite string by an iron key.

It could have been used to create an electric current by filling it with an acidic solution, like vinegar. No one knows what the device was used for, but it sheds some light on the fact that people may have been learning about electricity long before Benjamin Franklin.

Due to involvement in politics, franklin was not able to develop his inventions. He passed away at an age of 84 on 17th April 1790. In honor of his name the C.G.S unit of electric charge is named after him as 1 franklin which is equal to 1statcolumb. He was a polymath who exemplified "well done is better than well said" and projected the saying "write something worth the reading or do something worth writing". Ben in his auto biography elocutes to young minds **"As we enjoy advantages from the inventions of others we should be glad of an opportunity to serve others by any invention of others and we should do freely and generously."**

ANCIENT ELECTRICITY

Supriya K
Asst. Professor, Dept of EEE

BABYLON BATTERY

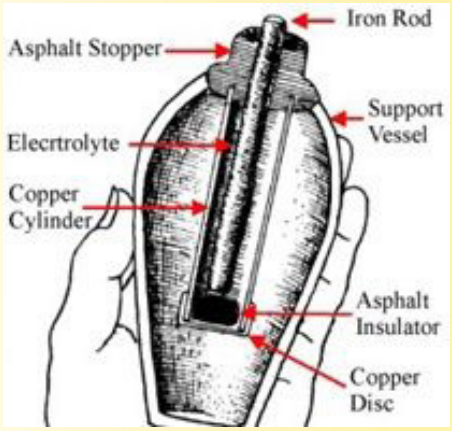
In 1938, Dr. Wilhelm Kong an Austrian archaeologist rummaging through the basement of the museum, made a find that was to drastically alter all our concepts of "ancient knowledge."

A 6-inch-high pot of bright yellow clay dating back two millennia contained a cylinder of sheet-copper 5 inches by 1.5 inches. The edge of the copper cylinder was soldered with a 60- 40 lead-tin alloy comparable to today's solder. The bottom of the cylinder was capped with a crimped-in copper disk and sealed with bitumen or asphalt. Another insulating layer of asphalt sealed the top and also held in place an iron rod suspended into the center of the copper cylinder.

The ancient battery in the Baghdad Museum, as well as those others which were unearthed in Iraq, are all dated from the Parthian occupation between 248 BCE and 226 BCE. However, Dr.Konig also found copper vases plated with silver in the Baghdad Museum, excavated from Sumerian sites in southern Iraq, dating back to at least 2500 BCE.

When the vases were lightly tapped, a blue patina or film separated from the surface, which is characteristic of silver electroplated onto copper base. It would appear then that the Parthians inherited their batteries from one of the earliest known civilizations.

Several years ago, a theory was proposed that electrolyte-crushed wine grapes may have been used. It was put to the test with a positive result - a replica of the Baghdad cell generated 0.87V. Several cells, in serial arrangement, were sufficient

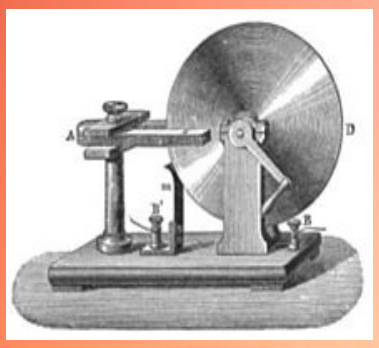


for the electroplating of small objects.

It also seems that the use of similar batteries can be safely placed into ancient Egypt, where several objects with traces of electroplated precious metals have been found at different locations. There are several anomalous finds from other regions, which suggests use of electricity on a grander scale.

One of them is the girdle from the tomb of Chinese general Chu (265-316 CE), which is made from an alloy of 85% aluminum with 10% copper and 5% manganese. The only viable method of production of aluminum from bauxite is electrolytic process, after alumina (aluminum chloride component of the ore) is dissolved in molten cryolite, patented in the middle of last century. Needless to say, the Baghdad type of batteries would not suffice, for quite a substantial dynamo-generated current is needed.

FIRST INVENTION MODEL

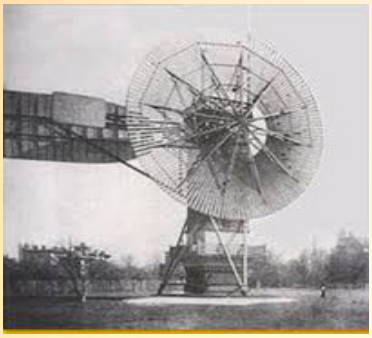


ELECTRIC GENERATOR
1831 BY BRISH MICHAEL FARADAY

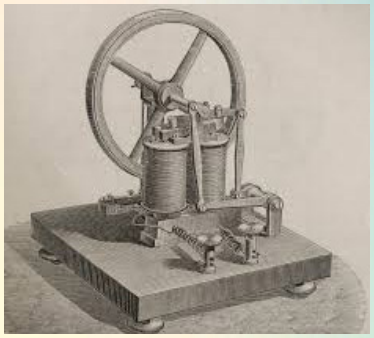
TRANSFORMER
(1886)

TRANSMISSION LINES
1902 NAYAGRA POWER CORPORATION(11KV)

POWER PLANT
1882
PEARL SREET STATION



WIND TURBINE
1887 BY S COTTISH ACAEMAL



ELECTRICAL MOTOR
1845 BY AUL GUSTAVE FROMENT

OBNINSK NUCLEAR POWER PLANT, RUSSIA
1954 JUNE 27

THOMAS ALVA EDISON BULB
(OCT 14 1878)

HYDROELECTRIC POWER PLANT, FOX RIVER AT APPLETON USA, 30 SEP 1882

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2015-2019 Batch

FDP On Sustainable Energy Processes

16/01/2020- 18/01/2020

We are honoured to be a part of this venture.
We hope that you enjoyed reading this
magazine as much as we enjoyed compiling it.

M.Dasan Institute Of Technology (M-DIT)
Ulliyeri P.O,Kozhikode Dist, Kerala
www.mdit.ac.in / hodeee@mdit.ac.in