Department of Electronics And Communication Engineering

E-SPARSH

Technical Magazine

JAN - JUN 2023

EDITORIAL BOARD

INSTITUTION

Vision of the Institute:
To be a premier center of learning in Engineering and Management education that evolves the youth into dynamic professionals with a social commitment

Mission of the Institute:

M1: To provide quality teaching- learning practices in engineering and management education by imparting core instruction and state-of-the-art infrastructure.

M2: To engage the faculty and students in acquiring competency in emerging technologies and research activities through Industry Institute Interaction.

M3: To foster social commitment in learners by incorporating leadership skills and ethical values through value-based education

DEPARTMENT

Vision of the Department:
To produce technically competent and research oriented Electronics and Communication Engineers to meet the Industrial and Social requirements.

Mission of the Department:

M1: To impart quality technical education in the field of Electronics and Communication Engineering through state-of-the art facilities and effective teaching learning process.

M2: To enrich the faculty and students with research and consultancy skills through Industry-Interaction and Training in Emerging areas of Electronics and Communication Engineering.

M3: To develop lifelong learning, leadership qualities and ethical values in learners to meet the societal and industrial needs.

Program Educational Objectives (PEOs)

PEO-I : Graduates will have the capabilities to analyze, design and develop innovative solutions for the problems in the field of Electronics and Communication Engineering using core competencies.

PEO-II :Graduates will have the ability to engage themselves in research and lifelong learning to achieve professional excellence.

PEO-III : Graduates will have successful career with leadership qualities, ethics and good communication skills in Electronics and Communication Engineering and related fields.

ECE PBRVITS | DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Program Outcomes (POs)

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs)

PSO-1 : Graduates will be able to design and analyze Image Processing and communication systems concepts using appropriate tools.

PSO-2 : Graduates will be able to design and develop solutions for real world problems by applying the concepts of VLSI and Embedded systems.

DEPARTMENT PROFILE

The Department of Electronics and Communication Engineering (ECE) was established in the years 1998–99 with an intake of 60 and currently running with an intake of 360. It is 25 years old now and one of the most well-established departments in our Institution. It is also offering one post graduate programme with the specialization of VLSI Design with an intake of 30 students.

The Department is known for its esteemed faculty members who are renowned for their path-breaking contributions in the field of electronics and communications. It is well equipped with laboratories, audio-visual facilities and software tools such as MultiSim, ModelSim, Lab View, HFSS, MATLAB, and Xilinx.

We offer our students an excellent educational experience that combines intellectual rigor and cross-disciplinary breadth. The course contents are periodically updated to introduce new scientific and technological developments. Electronic design, communication technologies, hands-on programming, a research focus, and entrepreneurship skills are all part of our signature educational curriculum. The ECE domain is often regarded as a challenging culmination of hardware and software. Our curriculum focuses primarily on the knowledge and skills that emerging engineers need.

PROFESSOR DESK

The Department of Electronics and Communication Engineering is committed to render- quality and professional pedagogy to pioneering engineers. The ECE department provides opportunity for the students to learn and fulfil the industry demands of Communication Engineering.

The Department has state of ail equipment, in various laboratories which is necessary to blend the theoretical & practical aspects of engineering.

The Department offers Under Graduate program in Bachelors of Technology. The Department has faculty members having expertise in wide variety of fields in Electronics & Communication. The department has a strong industry institution interaction.

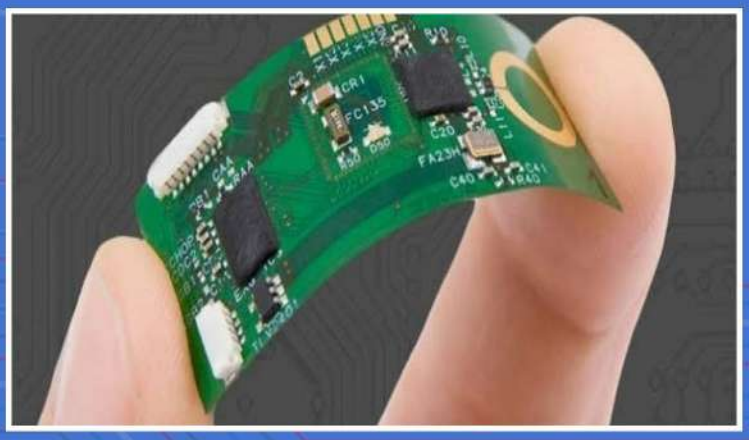
The Department technical e- magazine E-SPARSH exemplifies the voyage transverse and exhibits the technical skills of our students. Congratulations to the editorial team for their determined efforts in bringing out this edition of technical magazine. On this occasion, I convey my good wishes to the students.

Dr. R. Sravanthi
Assoc. Professor & HOD, ECE.

1. FLEXIBLE TECHNOLOGY

In software, a flexible technology solution is one that supports easy adaptation of the system to meet future requirements and changes through configuration, rather than new development. Flexible technology is underpinned by a low-code approach that allows for high levels of customization and agility without having to develop new code, which can otherwise lead to technical debt, rising costs for maintenance and an inability to adapt to business needs. Flexible technology meets the demands for highly configurable and cost- effective solutions from implementation, through to management and maintenance.

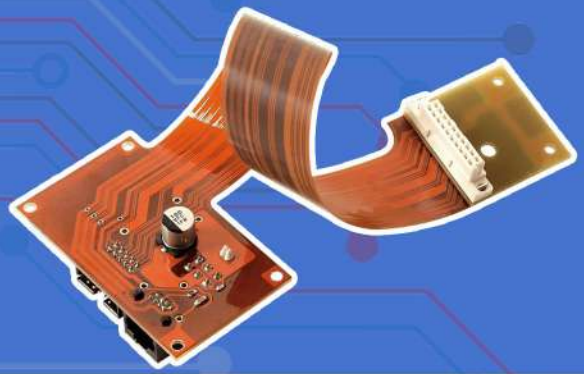
AI diagnostic tools allow tech problems to be fixed quickly rather than forcing employees to wait until IT personnel are available to help. Applying machine learning to automate IT assistance improves flexibility by giving everyone on your team more time to focus on the most important tasks. Flexible electronics describes circuits that can bend and stretch, enabling significant versatility in applications and the prospect of low-cost manufacturing processes.They represent an important technological advance, in terms of their performance characteristics and potential range of applications, ranging from medical care, packaging, lighting and signage, consumer electronics and alternative energy (especially solar energy)



AI diagnostic tools allow tech problems to be fixed quickly rather than forcing employees to wait until IT personnel are available to help. Applying machine learning to automate IT assistance improves flexibility by giving everyone on your team more time to focus on the most important tasks. Flexible electronics describes circuits that can bend and stretch, enabling significant versatility in applications and the prospect of low-cost manufacturing processes. They represent an important technological advance, in terms of their performance characteristics and potential range of applications, ranging from medical care, packaging, lighting and signage, consumer electronics and alternative energy (especially solar energy)

Among the benefits of flexible electronics (compared to traditional, rigid alternatives) are size, weight, portability, and energy efficiency. A Wien bridge oscillator is a type of electronic oscillator that generates sine waves. It can generate a large range of frequencies. The oscillator is based on a bridge circuit originally developed by Max Wien in 1891 for the measurement of impedances. The bridge comprises four resistors and two capacitors. A band pass filter that provides positive feedback. Automatic gain control, intentional nonlinearity and incidental non-linearity limit the output amplitude in various implementations of the oscillator.

The circuit shown to the right depicts a once-common implementation of the oscillator; with automatic gain control AI diagnostic tools allow tech problems to be fixed quickly rather than forcing employees to wait until IT personnel are available to help. Applying machine learning to automate IT assistance improves flexibility by giving everyone on your team more time to focus on the most important tasks. Flexible electronics describes circuits that can bend and stretch, enabling significant versatility in applications and the prospect of low-cost manufacturing processes.



They represent an important technological advance, in terms of their Performance characteristics and potential range of applications, ranging from medical care, packaging, lighting and signage, consumer electronics and alternative energy (especially solar energy). 6 Flexible Technology Wein Bridge OscillatorAbove all, they make previously impossible designs and technologies such as wearable devices) possible.

KONCHA KALYANI
(19731A04C5)

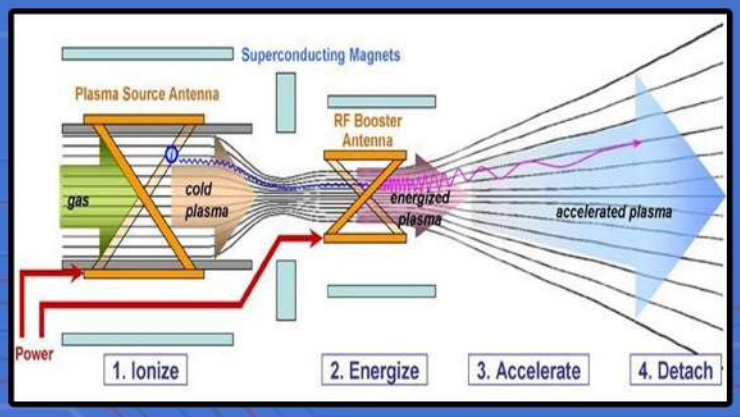
2. PLASMA ANTENNA TECHNOLOGY

The 'Plasma antenna technology' is introduced to solve the problems of radio antennas. On hearing the name 'plasma antenna' for the first time, we may get a wrong impression that it is something entirely different. But that is not the case. Plasma antenna is just another type of radio antenna which is currently under development. In this innovation, plasma is used as a replacement for the metal elements of the traditional antennas. It performs all the functions of the radio antennas. That is it can be used for transmission and reception of signals. Plasma antenna is a special type of antenna in which the metal conducting elements of a conventional antenna are replaced by plasma. It employs an ionized gas enclosed in a tube as the conducting element of antenna. When gas is electrically charged or ionized to plasma, it becomes conductive and allowing radio frequency signals to be transmitted or received. When gas is not ionized the antenna element ceases to exit. When voltage is applied to antenna electric field is produced which causes current to flow in antenna. Due to current flow, magnetic field is produced. It is more advantageous than other antenna due to ionized gas. It has higher efficiency and enhanced bandwidth.

Plasma Antennas:

On earth we live upon an island of "ordinary" matter. The different states of matter generally found on earth are solid, liquid, and gas. Sir William Crookes, an English physicist identified a fourth state of matter, now called plasma, in 1879. Plasma is by far the most common form of matter. Plasma in the stars and in the tenuous space between them makes up over 99% of the visible universe and perhaps most of that which is not visible. Important to ASI's technology, plasmas are conductive assemblies of charged and neutral particles and fields that exhibit collective effects.

Plasmas carry electrical currents and generate magnetic fields. When the Plasma Antenna Research Laboratory at ANU investigated the feasibility of plasma antennas as low radar cross-section radiating elements, red center established a network between DSTO ANU researchers, CEA Technologies, Cantica Australasia and Neo lite Neon for further development and future commercialization of this technology. The plasma antenna R & D project has proceeded over the last year at the Australian National University in response to a DSTO (Defense Science and Technology Organization) contract to develop a new antenna solution that minimizes antenna detectability by radar.



Since then, an investigation of the wider technical issues of existing antenna systems has revealed areas where plasma antennas might be useful. The project attracts the interest of the industrial groups involved in such diverse areas as fluorescent lighting, telecommunications and radar. Plasma antennas have a number of potential advantages for antenna design. When a plasma element is not energized, it is difficult to detect by radar. Even when it is energized, it is transparent to the transmissions above the plasma frequency, which falls in the microwave region. Plasma elements can be energized and de–energized in seconds, which prevents signal degradation. When a particular plasma element is not energized, its radiation does not affect nearby elements. HF CDMA Plasma antennas will have low probability of intercept (LP) and low probability of detection (LPD) in HF communications.

Plasma Antenna Technology: Since the discovery of radio frequency ("RF") transmission, antenna design has been an integral part of virtually every communication and radar application. Technology has advanced to provide unique antenna designs for applications ranging from general broadcast of radio frequency signals for public use to complex weapon systems. In its most common form, an antenna represents a conducting metal surface that is sized to emit radiation at one or more selected frequencies. Antennas must be efficient so the maximum amount of signal strength is expended in the propagated wave and not wasted in antenna reflection.

Plasma antenna technology employs ionized gas enclosed in a tube (or other enclosure) as the conducting element of an antenna. This is a fundamental change from traditional antenna design that generally employs solid metal wires as the conducting element. Ionized gas is an efficient conducting element with a number of important advantages.

Since the gas is ionized only for the time of transmission or reception, "ringing" and associated effects of solid wire antenna design are eliminated. The design allows for extremely short pulses, important to many forms of digital communication and radars. The design further provides the opportunity to construct an antenna that can be compact and dynamically reconfigured for frequency, direction, bandwidth, gain and beam width. Plasma antenna technology will enable antennas to be designed that are efficient, low in weight and smaller in size than traditional solid wire antennas.

When gas is electrically charged, or ionized to a plasma state it becomes conductive, allowing radio frequency (RF) signals to be transmitted or received. We employ ionized gas enclosed in a tube as the conducting element of an antenna. When the gas is not ionized, the antenna element ceases to exist. This is a fundamental change from traditional antenna design that generally employs solid metal wires as the conducting element. We believe our plasma antenna offers numerous advantages including stealth for military applications and higher digital performance in commercial applications.

KAKANI PAVITHRA
(19731A04K8)

3. ARTIFICIAL SKIN

Artificial skin is skin grown in a laboratory. It can be used as skin replacement for people who have suffered skin trauma, such as severe burns or skin diseases, or robotic applications. A skin work similar to that of the human skin and also it is embedded with several sensations or the sense of touch acting on the skin. This skin is already being stitched together. It consists of millions of embedded electronic measuring devices: thermostats, pressure gauges, pollution detectors, cameras, microphones, glucose sensors, EKGs, electronic holographs. This device would enhance the new technology which is emerging and would greatly increase the usefulness of robotic probes in areas where the human cannot venture. Main objective of artificial skin is to sense heat, pressure, touch, airflow and whatever which human skin sense. It is replacement for prosthetic limbs and robotic arms. Artificial skin is skin grown in a laboratory.

There are various names of artificial skin in biomedical field it is called as artificial skin, electronic skin, sensitive skin, synthetic skin, some fake skin. Such different names are available but application is same it is skin replacement for people who have suffered skin trauma, such as severe burns or skin diseases, or robotic applications & so on. An artificial skin has also been recently demonstrated at the University of Cincinnati for in-vitro sweat simulation and testing, capable of skin-like texture, wetting, sweat pore-density, and sweat rates.

Fabrication of e-Skin:

U.S. and Chinese Scientists used zinc oxide vertical nano wires to generate sensitivity. According to experts, the artificial skin is "smarter and similar to human skin." It also offers greater sensitivity. To achieve greater sensitivity, researchers created a sort of flexible and transparent electronics sheet of about eight thousand transistors using vertical nanowires of zinc oxide. Each transistor can directly convert mechanical motion and touch into signals that are controlled electronically, the creators explained. Any mechanical movement, like the movement of an arm or fingers of a robot, can be converted into control signals.
This technology could make smarter artificial skin similar to human skin.

It provides greater sensitivity and resolution. The system is based on piezoelectricity, a phenomenon that occurs when materials such as zinc oxide are pressed. Changes in the electrical polarization of the mass can be captured and translated into electrical signals thereby creating an artificial touch feeling.

VEERALA HARI KRISHNA
(19731A04N3)

4. NANO ELECTRONICS

Nano electronics refers to the use of nanotechnology in electronic components. The term covers a diverse set of devices and materials, with the common characteristic that they are so small that inter-atomic interactions and quantum mechanical properties need to be studied extensively. Some of these candidates include: hybrid molecular/semiconductor in the electronics, One-Dimensional Nanotubes / Nanowires (e.g. silicon nanowires or carbon nanotubes) or advanced molecular electronics.

Nano electronic devices have critical dimensions with a size range between 1 nm and 100 nm. Recent silicon MOSFET (metal–oxide–semiconductor field-effect transistor, or MOS transistor) technology generations are already within this regime, including 22 nanometers CMOS (complementary MOS) nodes and succeeding 14 nm, 10 nm and 7 nm Fin FET (fin field-effect transistor) generations. Nano electronics is sometimes considered as disruptive technology because present candidates are significantly different from traditional transistors.

PATAN VASIHA
(20735A0408)

5. GI-FI TECHNOLOGY

Gi-Fi will help to push wireless communications to faster drive. For many years cables ruled the world. Optical fibers played a dominant role for its higher bit rates and faster transmission. But the installation of cables caused a greater difficulty and thus led to wireless access. The foremost of this is Bluetooth which can cover 9- 1Omts. Wi-Fi followed it having coverage area of 91 mts. No doubt, introduction of Wi-Fi wireless networks has proved a revolutionary solution to "last mile" problem. However, the standard's original limitations for data exchange rate and range, number of changes, high cost of the infrastructure have not yet made it possible for Wi-Fi to become a total threat to cellular networks on the one hand, and hard-wire networks, on the other. But the man's continuous quest for even better technology despite the substantial advantages of present technologies led to the introduction of new, more up-to-date standards for data exchange rate i.e., Gi-Fi.

Gi-Fi or Gigabit Wireless is the world's first transceiver integrated on a single chip that operates at 60GHz on the CMOS process. It will allow wireless transfer of audio and video data up to 5 gigabits per second, ten times the current maximum wireless transfer rate, at one tenth of the cost, usually within a range of 10 meters. It utilizes a 5mm square chip and a 1 mm wide antenna burning less than 2m watts of power to transmit data wirelessly over short distance, much like Bluetooth.

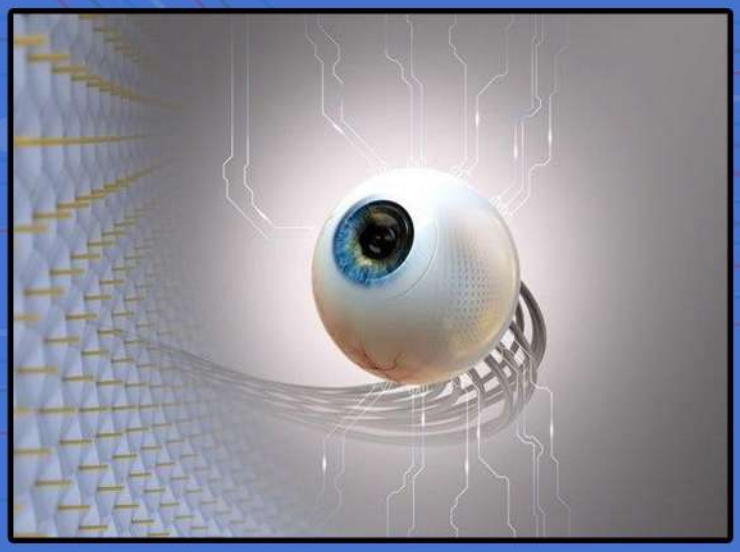
The development will enable the truly wireless office and home of the future. As the integrated transceiver is extremely small, it can be embedded into devices. The breakthrough will mean the networking of office and home equipment without wires will finally become a reality. A low cost, low power and high broadband chip, which will be vital in enabling the digital economy of the future.

MENTA SNEHITHA
(20735A0413)

6. ARTIFICIAL EYE

The human eye is a sophisticated instrument: images enter through a curved lens at the front of the sphere and pass through its gooey, vitreous liquid before reaching the light-sensitive retina—which relays the signal to the optic nerve that carries the picture to the brain. Engineers have attempted to replicate this structure for about a decade.

Now a new artificial eye successfully mimics the natural instrument's spherical shape. Researchers hope this achievement could lead to sharper robotic vision and prosthetic devices. Paper on the development was published on Wednesday in Nature.



The research built on the fact that perovskite, a conductive and light-sensitive material used in solar cells can be used to create extremely thin nanowires several thousandths of a millimeter in length. These wires mimic the structure of the eye's long, thin photoreceptor cells, says study co-author Ziyang Fan, an electronic and computer engineer at the Hong Kong University of Science and Technology. "But the difficulty is: How can we fabricate an array of the nanowires in a hemispherical substrate to form this hemispherical retina?" he adds. Constructing a curved retina is important because light only hits it after passing through a curved lens. "When you try to image something, the image that forms after the lens is actually curved," says Hongrui Jiang, an electrical engineer at the University of Wisconsin–Madison, who reviewed the new paper but was not directly involved in the work. "If you have a flat sensor, then the image cannot be focused very sharply." The retina is curved, but electronic light sensors are rigid and flat.

KEERTHI GUNNAM
(19731A0492)

7. H 323 TECHNOLOGY

The H.323 standard provides a foundation for audio, video, and data communications across IP-based networks, including the Internet. By complying with H.323, multimedia products and applications from multiple vendors can interoperate, allowing users to communicate without concern for compatibility.

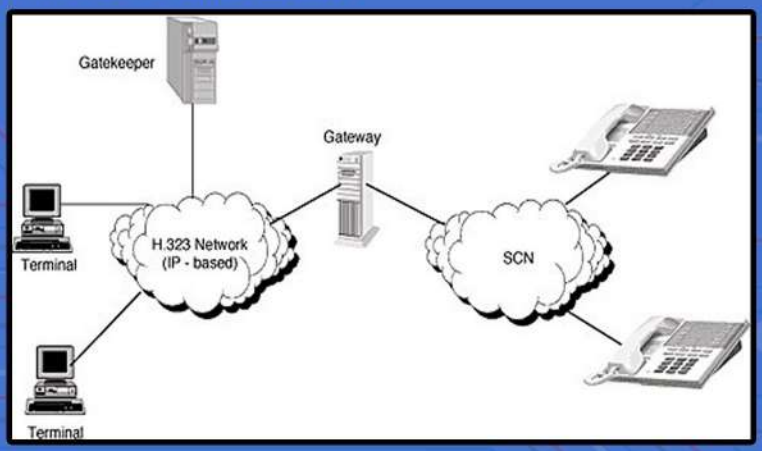
H.323 will be the keystone for LAN-based products for consumer, business, entertainment, and professional applications.

H.323 is an umbrella recommendation from the International Telecommunications Union (ITU) that sets standards for multimedia communications over Local Area Networks (LANs) that do not provide a guaranteed Quality of Service (QoS). These networks dominate today's corporate desktops and include packet-switched TCP/IP and IPX over Ethernet, Fast Ethernet and Token Ring network technologies. Therefore, the H.323 standards are important building blocks for a broad new range of collaborative, LAN-based applications for multimedia communications.

The H.323 specification was approved in 1996 by the ITU's Study Group 16. Version 2 was approved in January 1998. The standard is broad in scope and includes both stand-alone devices and embedded personal computer technology as well as point- to- point and multipoint conferences. H.323 also addresses call control, multimedia management, and bandwidth management as well as interfaces between LANs and other networks. H.323 is part of a larger series of communications standards that enable videoconferencing across a range of networks. Known as H.32X, this series includes H.320 and H.324, which address ISDN and PSTN communications, respectively.

Importance of H.323:

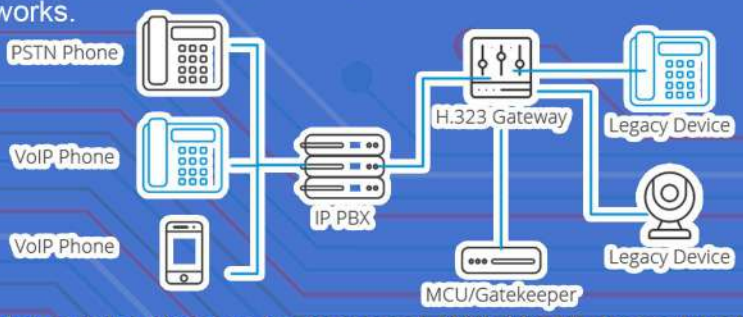
The H.323 Recommendation is comprehensive, yet flexible, and can be applied to voice-only handset sand full multimedia video-conferencing stations, among others.
H.323 applications are set to grow into the mainstream market for several reasons.



H.323 sets multimedia standards for the existing infrastructure (i.e. IP-based networks). Designed to compensate for the effect of highly variable LA latency, H.323 allows customers to use multimedia applications without changing their network infrastructure. IP LANs are becoming more powerful. Ethernet bandwidth is migrating from 10 Mbps to 100 Mbps, and Gigabit Ethernet is making headway into the market.

By providing device-to-device, application to-application, and vendor-to-vendor interoperability, H.323 allows customer products to interoperate with other H.323- compliant products.

PCs are becoming more powerful multimedia platforms due to faster processors, enhanced instruction sets, and powerful multimedia accelerator chips. H.323 provides standards for interoperability between LANs and other networks.



Network loading can be managed. With H.323, the network manager can restrict the amount of network bandwidth available for conferencing. Multicast support also reduces bandwidth requirements. H.323 has the support of many computing and communications companies and organizations, including Intel, Microsoft, Cisco, and IBM. The efforts of these companies will generate a higher level of awareness in the market.

VENIGANDLA VINEELA
(20731A0458)

8. LI-FI TECHNOLOGY

Li Fi is a wireless technology holds the key to solving challenges faced by 5G. Li Fi can transmit at multiple gigabits, is more reliable, virtually interference free and uniquely more secure than radio technology such as Wi-Fi or cellular.

Li Fi is a mobile wireless technology that uses light rather than radio frequencies to transmit data. The technology is supported by a global ecosystem of companies driving the adoption of Li Fi, the next generation of wireless that is ready for seamless integration into the 5G core.

Global Light Communication Standard the objective is to extend 802.11 to include the light medium. A standard with input across the Wi-Fi ecosystems 802.11 bb TG aiming to deliver standard by mid-2021 Radio frequency communication requires radio circuits, antennas and complex receivers. Li Fi (light fidelity) is a bidirectional wireless system that transmits data via LED or infrared light. It was first unveiled in 2011 and, unlike Wi Fi, which uses radio frequency; Li Fi technology only needs a light source with a chip to transmit an internet signal through light waves.

This is an extraordinary advance over today's wireless networks. Li Fi multiplies the speed and bandwidth of Wi Fi, 3G and 4G. The latter have a limited capacity and become saturated when the number of users surfing increases, causing them to crash, reducing speeds and even interrupting the connection.

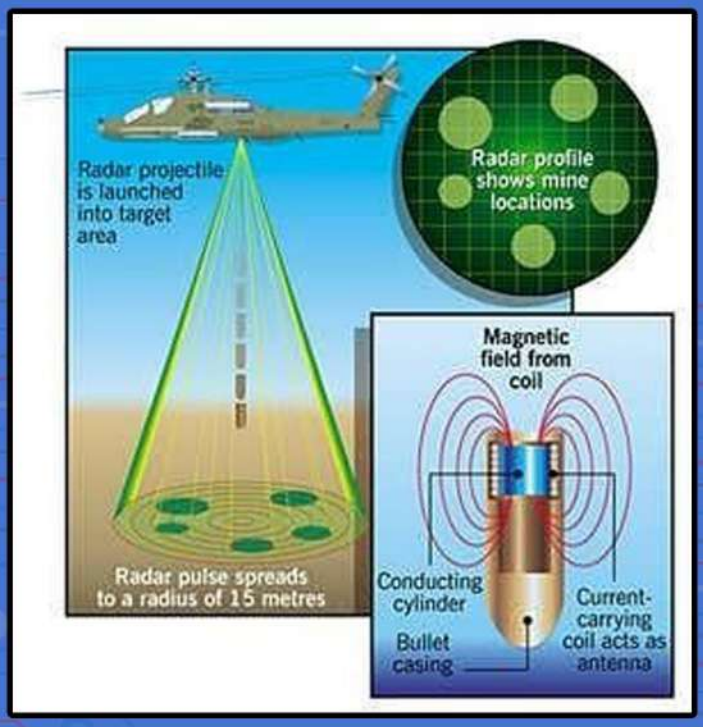
With Li Fi, however, its band frequency of 200,000 GHz, versus the maximum 5 GHz of the Wi Fi, is 100 times faster and can transmit much more information per second. A 2017 study by the University of Eindhoven obtained a download rate of 42.8 Gbit/s with infrared light with a radius of 2.5 meters, when the best Wi Fi would barely reach 300 Mbit/s.

YADLAPALLI MANEESHA
(20731A0460)

9. RADAR BULLET

A land mine is an explosive device that designed to destroy or disable enemy and hided under or on the surface of ground, especially in mine-affected countries like Afghanistan and Iraq. The mines which are implanted during the war time may remain undetected. As the name suggests detection is done using Radar Bullets and hence can be done further away from the mine carefully.

Bullets fire from helicopter emits radar pulses as it grinds to the halt these radar pulses reflect from landed mines due to that reflection landmines can be estimated approximately. This is the method in which special type of radar bullet are used to find landmines without setting foot into the ground offering safe and efficient way of landmine detection. There are some methods for detection of land mines, such Metal detector method, biological method and mechanical method. These methods are dangerous and risk is involved to life of solider. A safe method for detecting land mines is "mine detection using radar bullets".



ANNAREDDY MOUNIKA
(20731A0463)

10. MOBILE PHONE CLONING

Cell phone cloning refers to the act of copying the identity of one mobile telephone to another. This is usually done to make fraudulent telephone calls. The bills for the calls go to the legitimate subscriber. This made cloning very popular in areas with large immigrant populations, where the cost to "call home" was very steep. The cloner is also able to make effectively anonymous calls, which attracts another group of interested law breakers. Cell phone cloning started with Motorola "bag" phones and reached its peak in the mid 90's with a commonly available modification for Motorola "brick" phones such as the Classic, the Ultra Classic, and the Model 8000.

Cloning involved modifying or replacing the EPROM in the phone with a new chip, which would allow one to configure an ESN (Electronic Serial Number) via software

The MIN (Mobile Identification Number) would also have to be changed. Cloning still works under the AMPS/NAMPS system, but has fallen in popularity as older phones that can be cloned are more difficult to find and newer phones have not been successfully reverse engineered.

Cloning has been successfully demonstrated under GSM, but the process is not easy and currently remains in the realm of serious hobbyists and researchers. Furthermore, cloning as a means of escaping the law is difficult because of the additional feature of a radio fingerprint that is present in every mobile phone's transmission signal. This fingerprint remains the same even if the ESN or MIN is changed. Mobile phone companies can use the mismatch in the fingerprints and the ESN and MIN to identify fraud cases.

MALLE ANUSHA
(20731A0493)

11. ELECTRIC VEHICLE

World is too big for an individual to change it on their own but each one of us can change what we can; our environment, our space, our people then we can change the world. There are several ways to change the world one of them is by switching to Electric Vehicles (EV). Do Electric Vehicles really help the environment? Yes it does. Because regular cars run on gasoline and pumps CO2 directly into the atmosphere where as EV's run on electricity they don't burn gasoline at all. So, no gas, no CO2. The main reason why everyone must shift towards EV's is because of the increased versatility. EV's use coal to power it. And also, it can use nuclear, or waste, or wind, or solar, or any other method of producing electricity. With gas cars, you just have gas.

The switch to electric cars gives us the option to switch to better ways of producing electricity, rather than being stuck with what we got. Recently to tackle air pollution the Delhi Cabinet has approved a policy on EV's. And the Indian government is also supporting switch to EV's by announcing 1.5lakh income tax deduction on interest paid on loans for the purchase of electric vehicles. There are number of great benefits to EV's, these are cheaper to run, cheaper to maintain, health benefits, and also reduces the petroleum import bill. Norway is the world leader in the adoption of electric cars and other nations like France and UK announcing the plan to ban the sales of gas and diesel cars by 2040.

The EV's are actually nothing new; they started in 1832 well before the first gasoline vehicles. In fact, the first EV's were faster than 100 km / hr was in 1899 called 'JAMAIS CONTENTE'. People were apparently satisfied with electric cars by 1910 they were almost twice as common on American roads as internal combustion engines. But then came Model T which at $ 650 was significantly cheaper than the electric car's, and then these gas stations popped up all over the country.

There are many types of EV'S

I. Plug in EV's these are any vehicles that can be recharged from an external source of electricity.
II. Hybrid EV's these are the type of hybrid vehicles that combines conventional combustion engine system with electric propulsion system
III. Rail borne EVs the fixed nature of a rail line makes it relatively easy to power EVs through permanent overhead lines or electrified third rails, eliminating the need for heavy onboard batteries.
IV. Space rover vehicles: - Related to space exploration, like Manned and unmanned
vehicles have been used to explore the Moon and other planets
V. Airborne EV's: - related to aircrafts, currently flying electric aircraft include manned and unmanned aerial vehicles.
VI. Seaborne EV's: - Electric motors can and have also been used in sailboats instead of traditional diesel engines.
VII. Electrically powered spacecraft: - The power sources used for spacecraft are batteries,
solar panels and nuclear power.
VIII. Electric motors don't require oxygen, unlike internal combustion engines; this is useful for submarines and for space rovers.

Recently Tesla has revealed its new model named Tesla Cyber truck. This is an all- electric battery-powered light commercial vehicle, with range estimates of 250–500 miles (400–800 km) and an estimated 0–60 mph time of 2. Major auto companies have invested heavily in this technology. Tesla has plans to build 1 million EVs by 2020. EVs will soon become a reality for many drivers, auto companies and transport sector companies, and the impact of EVs on the environment will help create a greener future.

MOCHARLA BHARGAVI
(20731A0497)

12. HUMANOID ROBOTS

A Humanoid may be defined as something that resembles or looks like a human and having characteristics like opposable thumb, ability to walk in upright position, etc. These robots are called Humanoid Robots or may be simply "HUMANOIDS". In general Humanoid robots have a torso with a head, two arms and two legs, although some forms of humanoid robots may model only part of the body, for example, from the waist up. Some humanoid robots may also have a 'face', with 'eyes' and 'mouth'.

The features of Humanoid robots are self-maintenance, autonomous learning, avoiding harmful situations to people, property, and itself, and safe interfacing with human beings and the environment. This concept explains the dynamic balance of humanoids during walking which requires information about the contact forces and the current and desired direction of motion.

As per the ZMP theory, the pressure under supporting foot can be replaced by the appropriate reaction force acting at a certain point of the mechanism's foot. Since the sum of all moments of active forces with respect to this point is equal to zero, it is termed as the Zero. Moment Point (ZMP). Through the technology has advanced much in field of Humanoid Robotics, there are still several problems which need attention. The technological brilliance of the humanoids is required to be sharpened more and the shortcomings in the results must be dealt with properly.

Planning in robots is the process of planning out motions and trajectories for the robot to carry out. Control is the actual execution of these planned motions and trajectories. In humanoid robots, the planning must carry out biped motions, meaning that robots should plan motions similar to a human. Since one of the main uses of humanoid robots is to interact with humans, it is important for the planning and control mechanisms of humanoid robots to work in a variety of terrain and environments.

To maintain dynamic balance during the walk, robot needs information about contact force and its current and desired motion.

The solution to this problem relies on a major concept, the Zero Moment Point (ZMP). Humanoid robots can be used as test subjects for the practice and development of personalized healthcare aids, essentially performing as robotic nurses for demographics such as the elderly Humanoids are also suitable for some procedurally-based vocations, such as reception-desk administrators and automotive manufacturing line workers.

PATAN MOHASEENA
(20731A04A5)

13. 3D-INTERNET

3D Internet is the next generation after the stream 2d internet. 3D Internet includes interconnected services, displayed as virtual worlds. The objective of 3D Internet is to pass interactive real-time 3D graphics over the internet. It is also a provocation of a 2D webpage in real-life graphics.

3D Internet uses artificial intelligence, 3d eyewear, implements 6th sense technology and uses sensors and holographic image projections. 3D internet can be used in all walks of life. 3D internet can be used for subjects such as Chemistry and English where more personalization is needed than traditional distance learning.

Applications of 3D Internet:

There are various applications of 3D Internet which are as follows –

Education:

By using the 3D Internet in education, people can have a better recognition of the subject. They can view the address and analysis in a 3D manner that will support them to understand more efficiently than the traditional methods.

Real Estate:
The 3D Internet can extremely change the real estate market. Users can view the property they are interested in online with a stereoscopic aspect. They will receive a basic concept of the area and locality they are going to live in even before its entire construction. This will ease the selection procedure of property to a high extent.

Social Interaction:
The modern generation has a much more active online social life as distinguished from real life. The inclusion of 3D in social networking can transform our digital world. Video calls can be more mutual and attractive. 3D conversation areas can be introduced to social media. Personal communication won't be defined in the real world.

Tourism:
It is necessary to choose the right destination to provide holidays which can be easier after the execution of 3D Internet. Tourists can have as ample 3D view of the acquired locations and next decide which destination has to be inspected.

Entertainment:
Online 3D games, 3D movies, etc. won't be a vision any more. All this can be produced using the 3DInternet. Users won't be forced to go to a multiplex for recognizing a 3D movie. Gamers can enjoy 3Donline games at home and can simply be linked with their friends.

Religion:
Religious organizations can develop the use of the3D Internet to open virtual conference places with in particularized areas.

Arts:
The modeling in 3D Internet can enable the artists to generate new forms of art, that in several methods are not possible in real life because of physical constraints or high associated values. In 3D Internet, artists can show their works to an audience across the globe. This has generated a whole artistic culture on its own where some residents who purchase or develop homes can shop or artwork in the area there.

LEKKALA SUMASRI
(21731A0427)

14. E-TEXTILE

Electronic textiles or e-textiles are fabrics that enable electronic components such as batteries, lights, sensors, and microcontrollers to be embedded in them. They are not to be confused with smart textiles, which are fabrics that have been developed with new technologies that provide added value. Many smart clothing, wearable technology, and wearable computing projects involve the use of e-textiles. Electronic textiles are distinct from wearable computing because the emphasis is placed on the seamless integration of textiles with electronic elements like microcontrollers, sensors, and actuators.

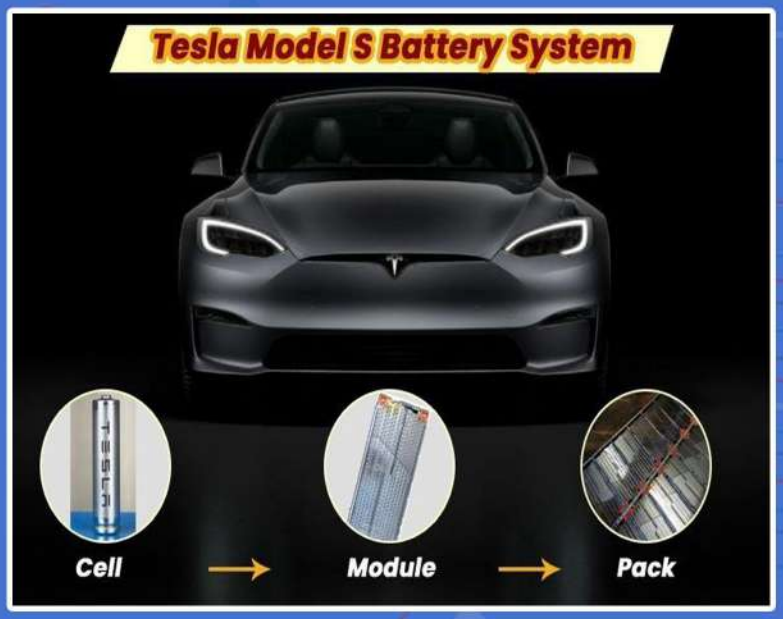
Furthermore, e-textiles need not be wearable. For instance, e-textiles are also found in interior design. The related field of firetrucks explores how electronic and computational functionality can be integrated into textile fibers. Distinct Generations of the Technology Cientifica Research examines the markets for textile-based wearable technologies, the companies producing them, and the enabling technologies. Based on their report, the wearables identify into three distinct generations of textile wearable technologies: 1. "First-generation" attach a sensor to apparel. This approach is currently taken by sportswear brands such as Adidas, Nike, and Under Armour 2. "Second-generation" products embed the sensor in the garment, as demonstrated by current products from Samsung, Alphabet, Ralph Lauren, and Flex. 3. In "third-generation" wearables, the garment is the sensor. A growing number of companies are creating pressure, strain, and temperature sensors for this purpose.

UPPALA DEEPIKA
(21731A0459)

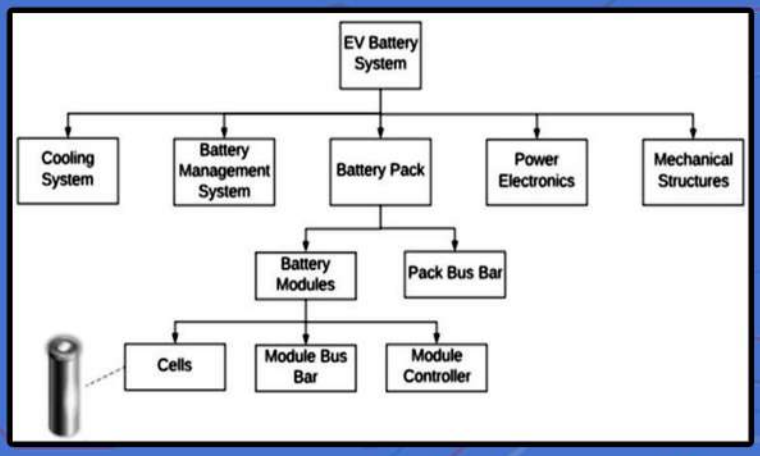
15. TESLA MODELS BATTERY SYSTEM AN ENGINEER'S PERSPECTIVE

Tesla makes a highly modular battery pack with high efficiency, reliability, and safety features. As explained above, the battery pack is made up of up to 16 modules connected together in a series. The voltage of a Tesla's battery pack is around 400 Volts and it is the single heaviest component, and all the different versions of the same cars might have a different battery pack, thus changing the weight and capacity of energy storage. For example he Model S P85's battery pack has a capacity of 90 kWh and weighs over 530 kgs. It contains 16 modules, which are 7104, 18650 cells.

The battery pack has a central bus bar that connects each battery module with a contactor that feeds both the front and rear electric motors. Since each module is 5.5 kWh and we have 16 of those in a 90KWh Tesla battery. Thus making it an 84kWh module.



A battery system in an EV is the main energy storage system and the main constituents of it are cells. The design of an EV battery system requires knowledge and specialization of electrical, mechanical, and thermal engineering apart from material science and other domains. The flow diagram of an EV's battery system is shown below:

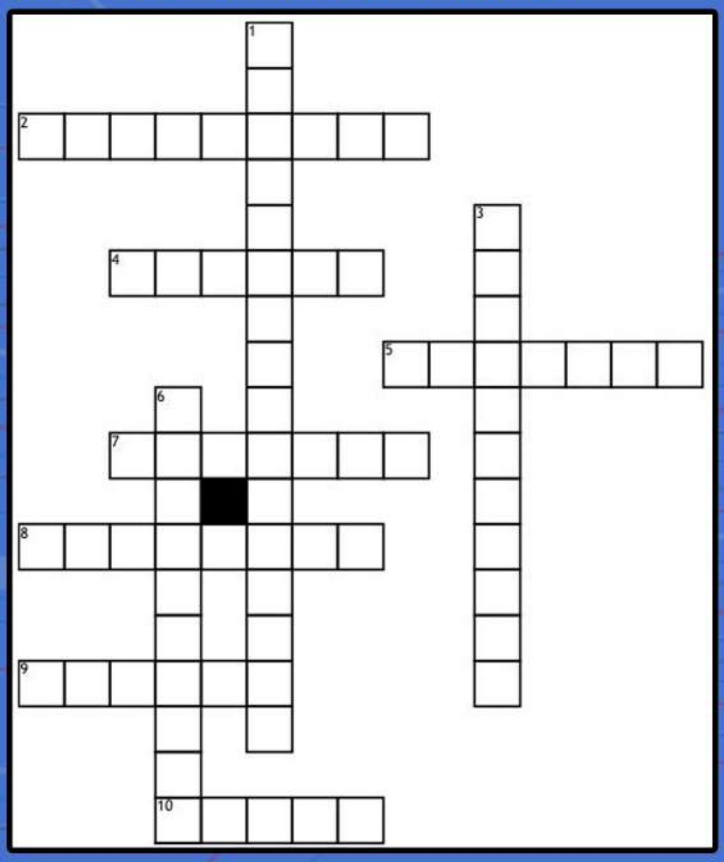


Advantages of Wire Bond Technique

- No heat is introduced to the cell during cell connection
- Wire act as a fuse
- If join fails, it doesn't impact cells
- Improves manufacturability

RACHAPUTI VYSHNAVI
(21731A0449)

ELECTRONIC CROSS WORDS



ACROSS

2. A small video camera that can be held easily in one hand.
4. TO make a recording go back towards the beginning.
5. US and Australian spelling of programme.
7. Synonym for remove (phrasal verb).
8. A very small computer that you can carry with you easily.
9. AN object or machine that has been invented for a particular purpose.
10. Someone who knows a lot about computers or other electronic equipment.

DOWN

1. A device that is fixed inside a computer and is used to store programmers and information.
3. A small electronic device with screen that allows you to read books in an electronic form.
6. TV services that are broadcast to customers using satellites.

MUKKALA PHANI SAI TEJA
(19731A0499)

TECHNICAL QUIZ

1. The approximate input impedance of the OPAMP circuit which has Ri=10k, Rf=100k, RL=10k
A) ∞
B)120k
C)110k
D)10k

2. A change in the value of the emitter resistance Re in a differential amplifier
A) Affects the difference mode gain Ad
B) Affects the common mode gain Ac
C) Affects both Ad and Ac
D) Does not affect either Ad and Ac

3. A differential amplifier is invariably used in the i/p stage of all OP-Amps. This is dome basically to provide the OP- AMPS with a very high
A) CMRR
B)Bandwidth
C) Slew rate
D) open-loop gain

4. The effective channel length of a MOSFET in a saturation decreases with increase in
A) Gate voltage
B) Drain voltage
C)Source voltage
D) Body voltage

5. The term heterodyning refers to
A) Frequency conversion
B) Frequency mixing
C) Frequency conversion & mixing
D) None of the mentioned

6. Thermal noise in the communication system due to thermal electrons
A) Can be eliminated
B) Cannot be eliminated
C) Can be avoided up to some extent
D) None of the mentioned

7. The first geostationary satellite launched in 1965 was called
A) ANIK
B) EARLY BIRD
C) WESTAR
D) MOLNIYA

8. Rotation of a geosynchronous satellite means its
A) Drift from stationary position
B) Wobbling
C) Three-axis stabilization
D) Three-dimensional stabilization

9. The present total cost per watt of power generation in geosynchronous orbit is nearly Rs.
A) 20
B) 50
C)100
D) 5

10.Noise temperature of Sun is more than °K.
A 1000
B)5000
C)100000
D)500

B. MADHU SUDHAN REDDY
(20735A0413)