BIJNI COLLEGE
ESTD. 1965

6TH EDITION, 2021

QUANTA

An Annual Departmental Magazine

PHYSICS DEPARTMENT

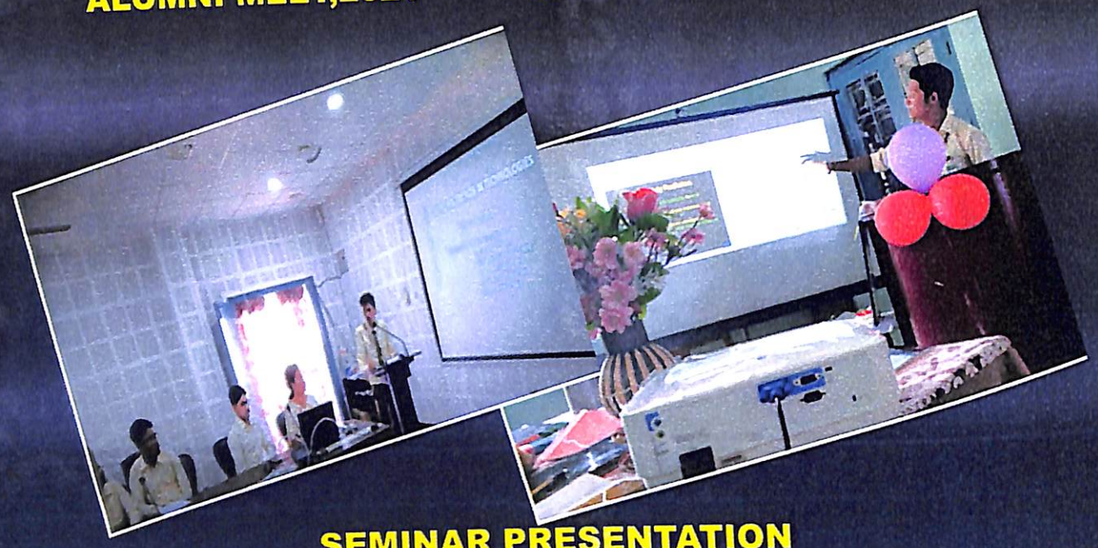
BIJNI COLLEGE, BIJNI

EDITOR

ROHIT AGARWALA

ALUMNI MEET,2021

FAREWELL OF 2017-2020 BATCH



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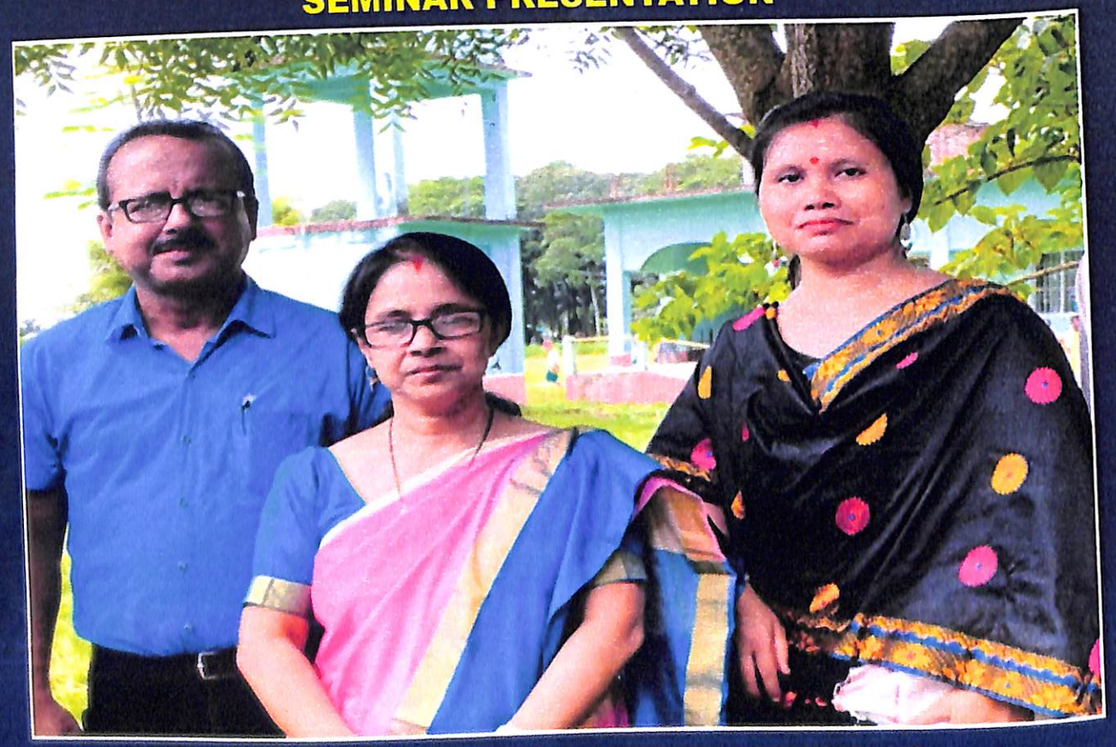

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AN ANNUAL DEPARTMENTAL MAGAZINE

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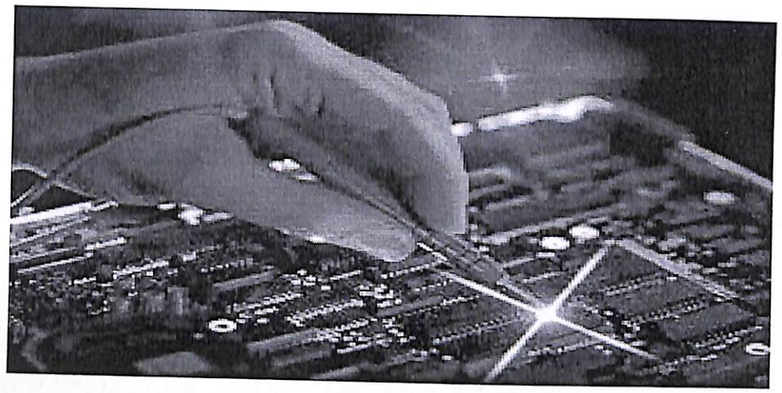
SESSION: - 2020-2021



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Message

*It is indeed a great pleasure for me to know that Bijni College Physics Department is going to bring out the 6th issue of annual departmental magazine "**QUANTA**" shortly.*

Wishing all concerned in achieving a grand success, I sincerely feel that the publication would enable the upcoming writers to express their talent pertaining to literary skill.

With best wishes.

(Dr. Birhash Giri Basumatary)
Principal,
Bijni College, Bijni

Principal
Bijni College

From Editorials desk.....

Electronics comprises the physics, engineering, technology and applications that deal with the emission, flow and control of electrons in vacuum and matter. It uses active devices to control electron flow by amplification and rectification, which distinguishes it from classical electrical engineering which uses passive effects such as resistance, capacitance and inductance to control current flow. Electronics has had a major effect on the development of modern society.The term "solid-state electronics" emerged after the first working transistor was invented by William Shockley, Walter Houser Brattain and John Bardeen at Bell Labs in 1947. The MOSFET (MOS transistor) was later invented by Mohamed Atalla and DawonKahng at Bell Labs in 1959. The MOSFET was the first truly compact transistor that could be miniaturised and mass-produced for a wide range of uses, revolutionizing the electronics industry, and playing a central role in the microelectronics revolution and Digital Revolution. Electronics is widely used in information processing, telecommunication, and signal processing. Electronics deals with electrical circuits that involve active electrical components such as vacuum tubes, transistors, diodes, integrated circuits, optoelectronics, and sensors, associated passive electrical components, and interconnection technologies. The study of semiconductor devices and related technology is considered a branch of solid-state physics.

Our department has a tradition of publishing annual departmental magazine every year. So, it is hereby our great honour and pleasure to present the annual departmental magazine "QUANTA" for the year 2020-2021.

We would like to extend our sincere thanks to Jayshri Narzary (HOD, Deptt of Physics), Sanjita Ray (Assistant Professor.) and Syed Jawahar Hussain (Assistant Professor.) for helping us with their valuable advices in publishing this magazine. This magazine is an effort to nurture the inner talents of students and help them gain confidence.

We beg your pardon for any mistakes in this publication.

Editor

Rohit Agarwala

CONTENTS

INTERNET OF THINGS

-RohitAgarwala, B.Sc. 5th Semester, Department of Physics, Bijni College, Bijni

ABSTRACT

The Internet of Thingsis defined in many different ways, and it encompasses many aspects of life from connected homes and cities to connected cars and roads. Some mention one trillion Internet connected devices will exist by 2025. Smart cities, Smart cars, Public safety, Smart Industries and Environmental Protection has been given the high intention for future protection by Internet of Things Ecosystem. For the development the government of Europe, Asia and America has considered the Internet of Things has area innovation and growth. Many visionaries have seized on the phrase Internet of Things to refer to the general idea of things, especially everyday objects, that are readable, recognizable, locatable, addressable, and/or controllable via the Internet, irrespective of the communication means (whether via Radio Frequency Identification, wireless Local area Network, wide- area networks, or other means).Radio Frequency Identification and sensor network technologies will rise to meet this new challenge, in which information and communication systems are invisibly embedded in the environment around us. This results in the generation of enormous amounts of data which have to be stored, processed and presented in a seamless, efficient, and easily interpretable form. Due to internet of things hospitals are shifting to remote self-monitoring for patients. Due self-monitoring it gives the patient greater freedom and independence for their health and free the equipment for emergency propose for patients. Internet of Things is a new revolution of the Internet.Internet of Things can be said the expansion of internet services. It provides a platform for communication between objects where objects can organize and manage themselves. It makes objects themselves recognizable. The internet of things allows everyone to be connected anytime and anywhere. Objects can be communicated between each other by using radio frequency identification, wireless sensor network, Zigbee, etc. Radio Frequency identification assigns a unique identification to the objects. Radio Frequency Identification technology is used as more secure identification for tracking/locating objects, things, vehicle etc.

KEYWORDS: Smart Cities, Smart cars, wide- area networks, Zigbee.

INTRODUCTION: Anyone who says that the Internet has fundamentally changed society may be right, but at the same time, the greatest transformation actually still lies ahead of us. Several

new technologies are now converging in a way that means the Internet is on the brink of a substantial expansion as objects large and small get connected and assume their own web identity. Following on from the Internet of computers, when our servers and personal computers were connected to a global network, and the Internet of mobile telephones, when it was the turn of telephones and other mobile units, the next phase of development is the Internet of things, when more or less anything will be connected and managed in the virtual world. This revolution will be the Net's largest enlargement ever and will have sweeping effects on every industry — and all of our everyday lives. Smart connectivity with existing networks and context-aware computation using network resources is an indispensable part of Internet of Things (IoT). With the growing presence of Wi-Fi and 4G-LTE wireless Internet access, the evolution towards ubiquitous information and communication networks is already evident. However, for the Internet of Things vision to successfully emerge, the computing paradigm will need to go beyond traditional mobile computing scenarios that use smart phones and portables, and evolve into connecting everyday existing objects and embedding intelligence into our environment. For technology to disappear from the consciousness of the user, the Internet of Things demands: a shared understanding of the situation of its users and their appliances, software architectures and pervasive communication networks to process and convey the contextual information to where it is relevant, and the analytics tools in the Internet of Things that aim for autonomous and smart behaviour. With these three fundamental grounds in place, smart connectivity and context-aware computation can be accomplished.

OBJECTIVES:

1. Tooffer new ways to research and learn.

2. To help integrate university infrastructures linking physical buildingsand their contents, such as classrooms, learning spaces, and administrative areas

3. To build inexpensive IoT devices that allow to conduct research

METHODOLOGY:

The Internet of Things or the Internet of Everything is a new and a potentially disruptive technology paradigm. It describes several technologies such as Radio Frequency Identification, short range wireless communications, and research disciplines that can connect physical objects from the real world to the internet.

DISCUSSION:

ARCHITECTURE OF INTERNET OF THINGS

Architecture of internet Of Things contains basically 4 layers:

- Application Layer
- Gateway and the network layer
- Management Service layer
- Sensor layer

APPLICATION LAYER:

- Lowest Abstraction Layer
- With sensors we are creating digital nervous system.
- Incorporated to measure physical quantities
- Interconnects the physical and digital world
- Collects and process the real time information

GATEWAY AND THE NETWORK LAYER:

- Robust and High performance network infrastructure
- Supports the communication requirements for latency, bandwidth or security
- Allows multiple organizations to share and use the same network independently

MANAGEMENT LAYER:

- Capturing of periodic sensory data
- Data Analytics (Extracts relevant information from massive amount of raw data)
- Streaming Analytics (Process real time data)
- Ensures security and privacy of data.

SENSOR LAYER:

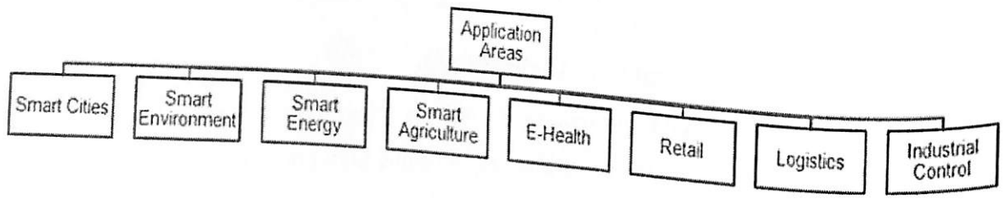
- Provides a user interface for using IoT.

- Different applications for various sectors like Transportation, Healthcare, Agriculture, Supply chains, Government, Retail etc.

APPLICATIONS:

There are several application domains which will be impacted by the emerging Internet of Things. The applications can be classified based on the type of network availability, coverage, scale, heterogeneity, repeatability, user involvement and impact. We categorize the applications into four application domains:
(1)Personal
(2)Enterprise
(3)Utilities
(4)Mobile.

There is a huge crossover in applications and the use of data between domains. For instance, the Personal and Home IoT produces electricity usage data in the house and makes it available to the electricity (utility) company which can in turn optimize the supply and demand in the Utility IoT. The internet enables sharing of data between different service providers in a seamless manner creating multiple business opportunities.



Fig(a): Applications of IOT

BENEFITS OF INTERNET OF THINGS:

- Improved citizen's quality of life
- Healthcare from anywhere
- Better safety, security and productivity
- New business opportunities.
- IoT can be used in every vertical for improving the efficiency Creates new businesses, and new and better jobs.
- Economical growth

- Billions of dollars in savings and new services
- Better environment
- Helps in creating a smart, greener and sustainable planet
- Improved competitiveness
- Competitive in providing cutting edge products/services

CONCLUSION:

The proliferation of devices with communicating–actuating capabilities is bringing closer the vision of an Internet of Things, where the sensing and actuation functions seamlessly blend into the background and new capabilities are made possible through access of rich new information sources. The evolution of the next generation mobile system will depend on the creativity of the users in designing new applications. Internet of things is an ideal emerging technology to influence this domain by providing new evolving data and the required computational resources for creating revolutionary apps.

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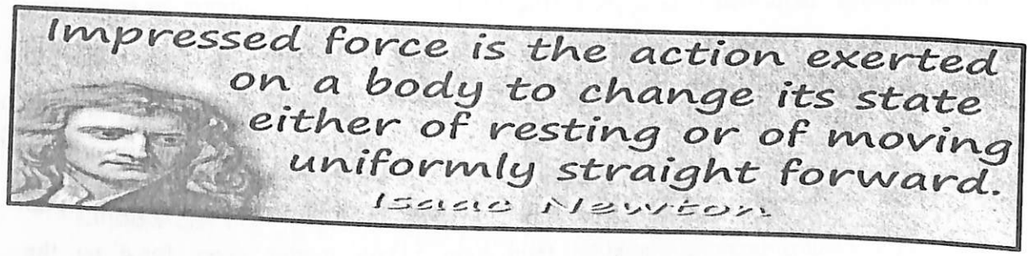

NEGATIVE MASS AND THE DARK ENERGY

-Sanjita Ray, Assistant Professor, Department of Physics, Bijni College, Bijni

ABSTRACT

The concept of mass is positive. Negative mass means opposite of positive one. As mass exerts a force, so, negative mass gives force in reverse direction i.e. when something will be pushed, actually it will be pulled with negative mass. Dark energy is thought as the cause of the expansion of the universe. $E = mc^2$. Energy is related to mass.

KEY WORDS:negative mass, dark energy, dark matter, white dwarf, and supernova

INTRODUCTION:

The universe is expanding. It was confirmed from the observation of the type of Ia supernovae (It is a type of supernova that occurs in the binary system, two stars orbiting one another, one star is white dwarf and another may be white dwarf or any other form of star). When a white dwarf gradually accretes mass and approaches the Chandrasekhar mass [1.4 $M_\odot$($M_\odot$ - solar mass, approximately 2 x 10^{30} kg)], then it will reach the ignition temperature for carbon fusion and the substantial fraction of the matter in the white dwarf undergoes runway reaction (reaction that is an unstable reaction due to excess amount of heat generation which exceeds the rate of cooling) and huge amount of energy (1-2 x 10^{44} J) is released what is called supernova. As it has a fixed critical mass, so, it`s luminosity is constant and so these are called the standard candles and the distance of the galaxy where it stays is measured. NASA observed a type Ia supernova, KSN 2011b, in May 2015 which is approaching to be exploded. The supernova explosions shows that the universe expanding in accelerating mode. The measurements of the distance of the Supernova are the evidence of the existence of the dark energy. Dark energy is a repulsive force.

Now, F= ma ,i.e force is required for acceleration, so there must be an unseen energy which do not interact with electromagnetic radiation (sun light).Dark matter gives force on the surroundings and dark energy which is repulsive is the cause of the expanding universe. Negative mass is a exotic matter which spread out the universe. These two may be a part of unified dark fluid with negative mass. Negative mass is hypothetical one, which repel the surroundings.

OBJECTIVES:

1. To understand the expanding universe.
2. To go through the hypothetical negative mass.
3. To find the relation among negative mass and the dark energy.

METHODOLOGY:

This paper is ageneral study of dark matter, dark energy and negative mass thats have the key role for the expansion of the universe. For writing this paper different web sites ,which are mentioned below, are discussed.

DISCUSSION:

Dark means Black, invisible which cannot reflect light and so dark matters and dark energy are invisible. How the concept of these yin and yang of the cosmos has been introduced? This concept comes from the expansion of the universe, as the distance galaxies are accelerating faster. Dutch astronomer Jacobus Kapteyn first suggested the existence dark matter in 1922 using staller velocities. The total mass energy of the universe contains – 5% visible matter (baryonic matter), 27% dark matter and 68% dark energy. As it is invisible so, many experiment are going on to detect it. Dark matter is classified as cold, warm and hot according to its free streaming length. Though scientific community generally accepts it but research is going on for other causes that can explain the expanding universe.

According to the current popular concordance model of the universe, 68% of the universe is dark energy,27% dark matter and only 5% normal visible matter.Dark energy is repulsive . Einstein first said that the Universe is static. He used a cosmological constant in his famous theory but in 1929 when Hubble showed from observation that the universe is expanding, he considered the constant to zero and confessed that it was his biggest blunder i.e. he accepted the fact that the Universe is expanding.So, there must be a pushing force.

In 1918 Einstein said that the empty space takes the role of gravitating negative masses, which are distributed all over the interstellar space.

All well understood physical forces can be described through two polarities. Say Electric force - + and – charges, Magnetic force – N- pole and S- pole, quantum information (0,1) . So,

gravitational charge (said mass) must be with positive and negative. But it is taken only positive value. The understanding of mass is incomplete.

In the vast universe only 5%is visible and remaining 95% is invisible. The physical nature of this is also a mystery. Einstein gave a solution of this with negative masses that is the cause of expanding universe and this mass does not interact with electromagnetic radiation (light). So the mass in the universe gives a new concept – that is the negative mass. The particles may have the positive, zero and negative mass. Negative mass is exotic to us. Now positive mass attract the surrounding masses, so, the negative mass will be repulsive i.e. it will repel all the surrounding masses and so the expansion of the universe. If a negative mass is pushed then it will come towards the force.

Negative mass is a type of exotic matter whose mass is opposite to the normal. It is repulsive in nature. The real representative of such matter is a region of negative pressure density produced by Casimir effect (Two mirrors in vacuum will attract to each other, is the Casimir effect. It was first predicted by Dutch Physicist Hendrick Casimir in 1948 and Steve K. Lamoreaux , at Los Alamos National Laboratory, measured the force in 1996)

Physicist (Washington State University, April 17,2017) created a fluid with negative mass, which accelerates, in the opposite direction when pushed i.e accelerates backwards.

According to Newton`s 2nd law F= ma , and the matter moves in the same direction of the applied force. But with negative mass it will accelerates backward.

Physicist (WSU) Forbes and his colleagues created a condition for negative mass by cooling rubidium atoms what is known as Bose Einstein Condensate. in this state the particles move very slowly and behaves like waves.

The interstellar space is not empty, it is with invisible energy (dark energy) and it is repulsive. According to Einstein energy, $E = mc^2$. E is negative if m is negative as c^2 is always positive.

Dark energy is a hypothetical form of energy with repulsive pressure .as the mass is negative so, the force also negative and so the pressure.

Scientists observed the Type Ia Supernovae (the explosion of White Dwarfs that have approached the Chandrasekhar limit- $M_{chan} \approx 1.4\ M_{\odot}$ and are disrupted by thermonuclear fusion of carbon and oxygen.) which are accelerating , and confirmed that the Universe is expanding.

Type Ia supernova are useful probes of the structure of the universe as they all have the same luminosity. ΛCDM (Lambda cold dark matter) model is used to explain it where the negative pressure concept is accepted. Pressure P = F/A= ma/A. If mass is negative then pressure also negative.

CONCLUSION:

The universe is expanding; it is a ground breaking true. So, there must be an energy and matter behind that. . The Hubble – Lemaitre Law ($v = H_0D$, H_0 is the Hubble constant, v is recessional velocity, D proper distance which can vary over time) explained that the distance galaxies are accelerating faster and Hubble constant set the relationship between speed and the distance. Negative mass cosmology predicts that the Hubble constant vary over time which solves many cosmological crisis. Albert Einstein and Stefan Hawking considered negative masses as it provide answers of many longstanding problems in cosmology. So, the negative mass concept should be given attention.

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"Try not to become man of success, but rather try to become a man of value"

-Albert Einstein

MICROPROCESSOR

-Monish Saha , B. Sc. 5th Semester, Department of Physics, Bijni College, Bijni

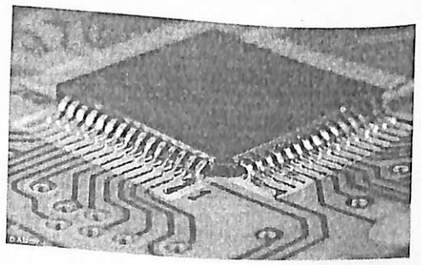
ABSTRACT

Microprocessors are applicable to a wide range of information processing tasks, ranging from general computing to real-time monitoring systems. The microprocessor facilitates new ways of communication and how to make use of the vast information available online and offline both at home and in workplace. Most electronic devices--including everything from computers, remote controls, washing machines, microwaves and cell phones to iPods and more--contain a built-in microprocessor. Microprocessors are at the core of personal computers, laptops, mobile phones and complex military and space systems. This work presents the general application of microprocessors.

KEYWORDS:CISC, RISC, Microprocessors, Microcontrollers.

INTRODUCTION:

A microprocessor is a computer processor where the data processing logic and control is included on a single integrated circuit, or a small number of integrated circuits. The microprocessor is a multipurpose, clock-driven, register-based, digital integrated circuit that accepts binary data as input, processes it according to instructions stored in its memory, and provides results (also in binary form) as output. Microprocessors contain both combinational logic and sequential digital logic. Microprocessors operate on numbers and symbols represented in the binary number system.



The integration of a whole CPU onto a single or a few integrated circuits using Very-Large-Scale Integration (VLSI) greatly reduced the cost of processing power. Integrated circuit processors are produced in large numbers by highly automated metal-oxide-semiconductor (MOS) fabrication processes, resulting in a relatively low unit price. Single-chip processors increase reliability because there are many fewer electrical connections that could fail. As microprocessor designs improve, the cost of manufacturing a chip (with smaller

components built on a semiconductor chip the same size) generally stays the same according to Rock's law.

OBJECTIVES:

- To become familiar with the architecture and the instruction set of an Intel microprocessor.
- To Assembly language programming will be studied as well as the design of various types of digital and analog interfaces.
- To understand the architecture of 8085 and 8051.

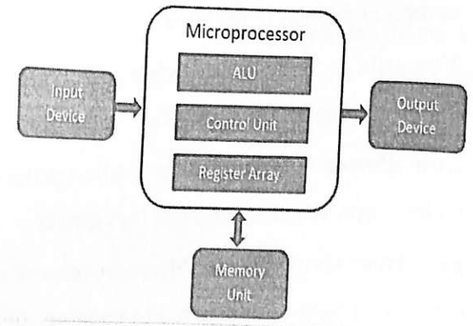
METHODOLOGY:

The microprocessor follows a sequence: Fetch, Decode, and then Execute. Initially, the instructions are stored in the memory in a sequential order. The microprocessor fetches those instructions from the memory, then decodes it and executes those instructions till STOP instruction is reached. Later, it sends the result in binary to the output port.

DISCUSSION:

Block Diagram of a Computer

Why we need a Microprocessor?



A microprocessor is similar to our human brain, it can be trained to do anything. It can be programmed to do anything we want based on it's instruction set and capabilities. Sometimes solutions are very complex, circuits also becomes very complex if we try to solve it without programming.

Here is my analogy. Imagine you want to make a big building. Usage of BRICKS will make the construction process simple and cost effective. And it will also give you the freedom to make the building in shape and size what you like. Instruction set in a microprocessor are the bricks which you can use to solve your problem. By using those instructions you can easily solve complex program.

Working of Microprocessor

The microprocessor follows a sequence to execute the instruction: Fetch, Decode, and then Execute.

Initially, the instructions are stored in the storage memory of the computer in sequential order. The microprocessor fetches those instructions from the stored area (memory), then decodes it and executes those instructions till STOP instruction is met. Then, it sends the result in binary form to the output port. Between these processes, the register stores the temporary data and ALU (Arithmetic and Logic Unit) performs the computing functions.

Features of Microprocessor

- **Low Cost** - Due to integrated circuit technology microprocessors are available at very low cost. It will reduce the cost of a computer system.
- **High Speed** - Due to the technology involved in it, the microprocessor can work at very high speed. It can execute millions of instructions per second.
- **Small Size** - A microprocessor is fabricated in a very less footprint due to very large scale and ultra large scale integration technology. Because of this, the size of the computer system is reduced.
- **Versatile** - The same chip can be used for several applications, therefore, microprocessors are versatile.
- **Low Power Consumption** - Microprocessors are using metal oxide semiconductor technology, which consumes less power.
- **Less Heat Generation** - Microprocessors uses semiconductor technology which will not emit much heat as compared to vacuum tube devices.
- **Reliable** - Since microprocessors use semiconductor technology, therefore, the failure rate is very less. Hence it is very reliable.
- **Portable** - Due to the small size and low power consumption microprocessors are portable.

ADVANTAGES:

- Microprocessor is that these are general purpose electronic processing devices which can be programmed to execute a number of tasks.
- Microprocessor is its speed, which is measured in hertz. For instance, a microprocessor with 3 GHz, shortly GHz is capable of performing 3 billion tasks per second.
- Microprocessor is that it can quickly move data between the various memory locations.

DISADVANTAGES:

- The microprocessor has a limitation on the size of data.
- Most of the microprocessor does not support floating point operations.
- The main disadvantage is it's over heating physically.
- It should not contact with the other external devices.
- The microprocessor is does not have any internal peripheral like ROM, RAM and other I/O devices.

CONCLUSION:

The microprocessor are their around for more than 20 years already. It is now comes in many forms sizes & levels of sophistication powering all the kinds of applications that they rely on control of computer.althouh the cpu of computer system it needs to interact with some other semiconductor device in order to perform functions. And devices include memory & input/output devices constitute rest of the computer system.Thus we know from where microprocessor evolutes& till where goes.

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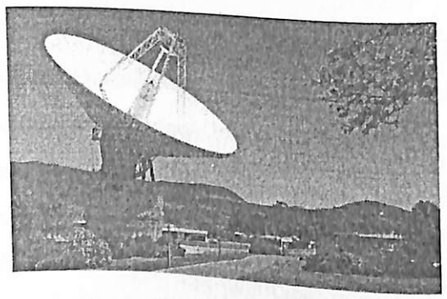
DEEP SPACE NETWORK-NASA

SushantaDaimary,B.Sc 3rdSemester,Department of Physics,BijniCollege,Bijni

ABSTRACT

The National Aeronautics and Space Administration (NASA) supports unmanned space missions through a Deep Space Network (DSN) that is developed and operated by the Jet Propulsion Laboratory (JPL) and its subcontractors. The DSN capabilities have been incrementally upgraded since its establishment in the late 50s and are delivered from three Deep Space Communications Complexes (DSCC's) near Goldstone, California, Madrid, Spain, and Canberra, Australia. At present each DSCC includes large antennas with diameters from 11 meters to 70 meters that operate largely in S-band and X-band frequencies. In addition each DSCC includes all the associated electronics to receive and process the low-level telemetry signals, and radiate the necessary command with high-power transmitters.

KEYWORDS: Radio signals, deep space mission, radio signals.



INTRODUCTION:

When it comes to making a long-distance call, it's hard to top NASA's Deep Space Network. It is the largest and most sensitive scientific telecommunications system in the world. The Deep Space Network or DSN is NASA's international array of giant radio antennas that supports interplanetary spacecraft missions, plus a few that orbit Earth. The DSN also provides radar and radio astronomy observations that improve our understanding of the solar system and t he larger universe. The DSN consists of three facilities spaced equidistant from each other approximately 120 degrees apart in longitude around the world. These sites are at Goldstone , near Barstow, California ; near Madrid, Spain; and near Canberra, Australia. The strategic placement of these sites permits constant communication with spacecraft as our planet rotates before a distant spacecraft sinks below the horizon at one DSN site.

METHODOLOGY:

The antennas of the Deep Space Network are the indispensable link to explorers venturing beyond Earth. They provide the crucial connection for commanding our spacecraft and receiving their never

before seen images and scientific information on Earth, propelling our understanding .

OBJECTIVES:

- To study how deep space objects work.
- To study functions of DSN.

Functions of Deep Space Network:

Spacecraft Command: Space mission operations teams use the DSN Command System to control the activities of their spacecraft. Commands are sent to robotic probes as coded computer files that the craft execute as a series of actions.

Tracking: The DSN Tracking System provides two-way communication between Earth-based equipment and a spacecraft, making measurements that allow flight controllers to determine the position and velocity of spacecraft with great precision.

Radio Science: DSN antennas are used by some space missions to perform science experiments using the radio signals sent between a spacecraft and Earth. Changes in radio signals between their transmission and receipt can provide lots of useful information about far off places in the solar system. Examples include probing the rings of Saturn, revealing the interior structure of planets and moons, and testing the theory of relativity.

ADVANTAGES:

1. The DSN enables powerful investigations that probe the nature of asteroids and the interiors of planets and moons.

2. The DSN Tracking System provides two-way communication between Earth-based equipment and a spacecraft, making measurements that allow flight controllers to determine the position and velocity of spacecraft with great precision.

3. It is also probing the rings of Saturn, revealing the interior structure of planets and moons, and testing the theory of relativity.

LIMITATIONS:

- The antennas must point very accurately towards the spacecraft, because an antenna can see only a tiny portion of the sky.
- The signal becomes degraded by background radio noise, or static, emitted naturally by nearly all objects in the universe, including the sun and earth.

CONCLUSION:

Over the past 48 years, the Deep Space Network and its antecedents have had to grow in terms of both capacity and capability to meet the needs of a continuously evolving and increasingly challenging mission set. Results from the latest future mission needs assessment suggest that the next 25 years will demand continued capacity and capability growth , higher fidelity observation. In the capacity realm, the DSN will likely need to support three times as many communication links in 2030 as it does today – not because the number of missions will increase that much, but because observatory-class missions will increasingly rely on multiple spacecraft to synthesize larger telescopes and interferometers and sample phenomena distributed over large spatial regions. In situ exploration, both robotic and human, will also contribute to this requirement through increased reliance on multiple surface elements working in conjunction with each other and with orbiters.

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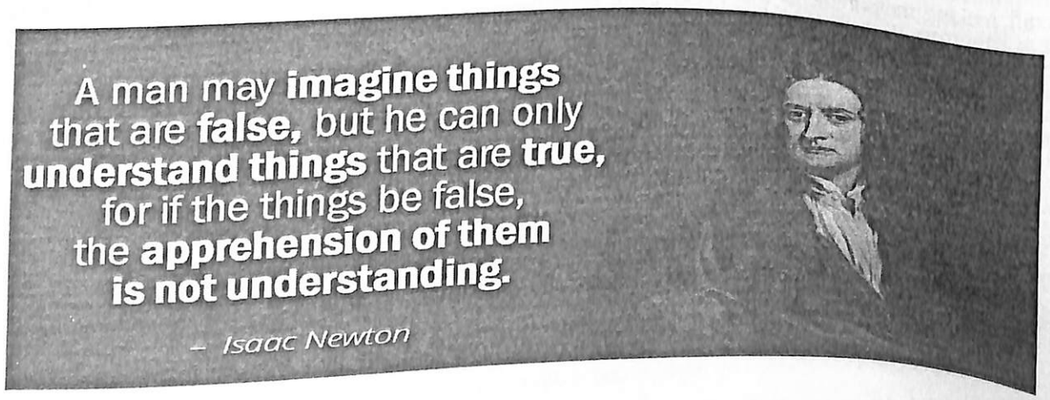

SATELLITE COMMUNICATION

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ABSTRACT

Wireless communication is simply data communication without the use of landlines. This may involve cellular telephone, two-way radio, fixed wireless (broadband wireless), laser (freespace optics) or satellite communication systems. Mobile wireless technologies are going to act as glue towards bringing together the wired and wireless to share and distribute information seamlessly across each other's areas of reference. Since from the beginning of wireless communications, there have been a number of developments in each generation. Considering the future generation of wireless communication i.e; 4G Satellite is a brand name trademark of Sanswire for a future emissions-free, high-altitude stratospheric airship that provides a stationary communications platform for various types of wireless signals usually carried by communications towers or satellites. The Satellite is a concept that has undergone several years of research and development, and is not yet commercially available; Sanswire, with its partner TAO Technologies, anticipates its current testing sequence to include the launch of a Satellite into the stratosphere.

KEYWORDS: Wire communication and Wireless communication.

INTRODUCTION:

A communications satellite is an artificial satellite that relays and amplifies radio telecommunication signals via a transponder; it creates a communication channel between a source transmitter and a receiver at different locations on Earth. Communications satellites are used for television, telephone, radio, internet, and military applications. As of 1 August 2020, there are 2,787 artificial satellites in Earth's orbit, with 1,364 of these being communications satellites, used by both private and government organizations. Most communications satellites are in geostationary orbit 22,236 miles (35,785 km) above the equator, so that the satellite appears stationary at the same point in the sky; therefore the satellite dish antennas of ground stations can be aimed permanently at that spot and do not have to move to track the satellite.

The high frequency radio waves used for telecommunications links travel by line of sight and so are obstructed by the curve of the Earth. The purpose of communications satellites is to relay the signal around the curve of the Earth allowing communication between widely separated geographical points. Communications satellites use a wide range of radio and microwave frequencies. To avoid signal interference, international organizations have regulations for which frequency ranges or "bands" certain organizations are allowed to use. This allocation of bands minimizes the risk of signal interference.

METHODOLOGY:

Once a Satellite network is in place, it will provide a national broadband wireless network that will provide voice, video, and broadband internet access to all parts of the country. By linking several Satellites together they can provide a wireless broadband network that will cover thousands of miles. With a Satellite network, subscribers will be able to sit in their homes and be connected on their laptops to the internet at high speed. If subscribers need to go to the office, across town, or even to another city, they can close their laptop and take off, reopening the laptop at their new destination and still be connected to the internet. This would allow subscribers the ease of not having to find local access numbers, tie up phone lines, deal with modem hassles, and more importantly, slow speeds. In addition to internet use, "proposed telecommunications uses include cellular, 3G/4G mobile, MMDS, fixed wireless telephony, HDTV, real-time surveillance and others

ADVANTAGES

1.Through satellite transmission, coverage over geographical area is quite large mainly for sparsely populated areas.

2.High bandwidth.

3.Wireless and mobile communication applications can be easily established by satellite communication independent of location.

4.It is used in wide variety of applications such as global mobile communication, private business networks, Long distance telephone transmission, weather forecasting, radio/TV signal

broadcasting, gathering intelligence in military, navigation of ships and air crafts, connecting remote areas, television distribution etc.

5.Security in satellite transmission is usually provided by the coding and decoding equipment.

6. Service from one single provider is easy to obtain and uniform service is available.

7.Over long distances, it can be cheaper.

8.The laying and maintenance is easy and cheap in satellite communication therefore it is best alternative.

9.During critical condition, each Earth Station may be removed relatively quickly from a location and reinstalled somewhere else.

10.Ground station sites are easy to install and maintain.

DISADVANTAGES:

1.Design, development, investment and insurance of satellite requires higher cost.

2.To reach the satellite from Earth, time can vary between 270 milliseconds and return again to 320 milliseconds. This propagation delay can cause an echo over telephone connections

3.Satellites are not easy to repair and maintain.

4.Some circumstances like weather or sunspots affect the satellite's signal and can cause interference and make proper operation of the satellite very difficult.

5.It requires to be monitored and controlled on regular periods so that it remains in the orbit, once it has been launched.

CONCLUSION:

Satellites provide the required facilities of wireless communication more efficiently than the ordinary towers. The satellite will allow subscribers to easily communicate in 'both directions' using readily available wireless technology." They minimise the cost of communication. Satellites present a mobile, low-cost, high-capacity alternative to satellite relays and cell towers. Once the defects of Satellites have been overcome and become more reliable, they play a vital role in the future generation wireless communication.

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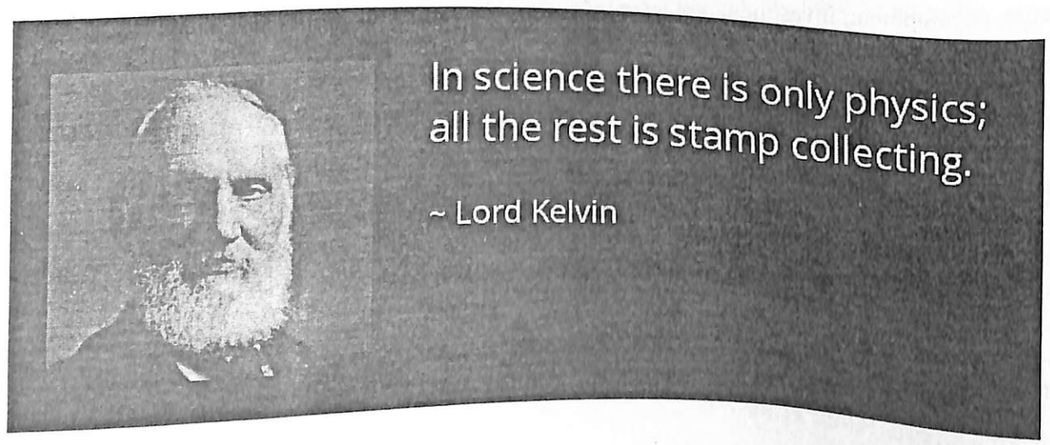

PHYSICS QUIZ

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1. Which one of the following remains constant while throwing a ball upward?

A. Velocity B. Displacement C. Acceleration D. Kinetic energy

2. Which one among the following radiations carries maximum energy?

A. Gamma rays B. X–rays C. Infra-red rays D. Ultraviolet rays

3. Which one of the following is the unit of activity of a radioactive source?

A. Siemens B. Lux C. Tesla D. Becquerel

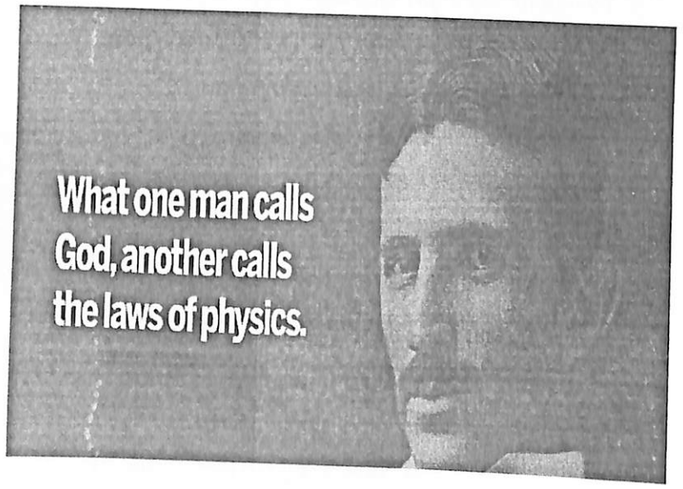
4. Which one of the following common devices works on the basis of the principle of mutual induction?

A. LED B. Transformer C. Photodiode D. Tube light

5. Nuclear sizes are expressed in a unit named

A. Fermi B. Angstrom C. Newton D. Tesla

ANSWERL: 1.(C), 2.(A), 3.(D), 4.(B), 5.(A).



A PROBLEM IN DYNAMICS

Rima Ghosh, B Sc3rd Semester, Department of Physics, Bijni College, Bijni

An inextensible heavy chain
Lies on a smooth horizontal plane,
An impulsive force is applied at A,
Required the initial motion of K.

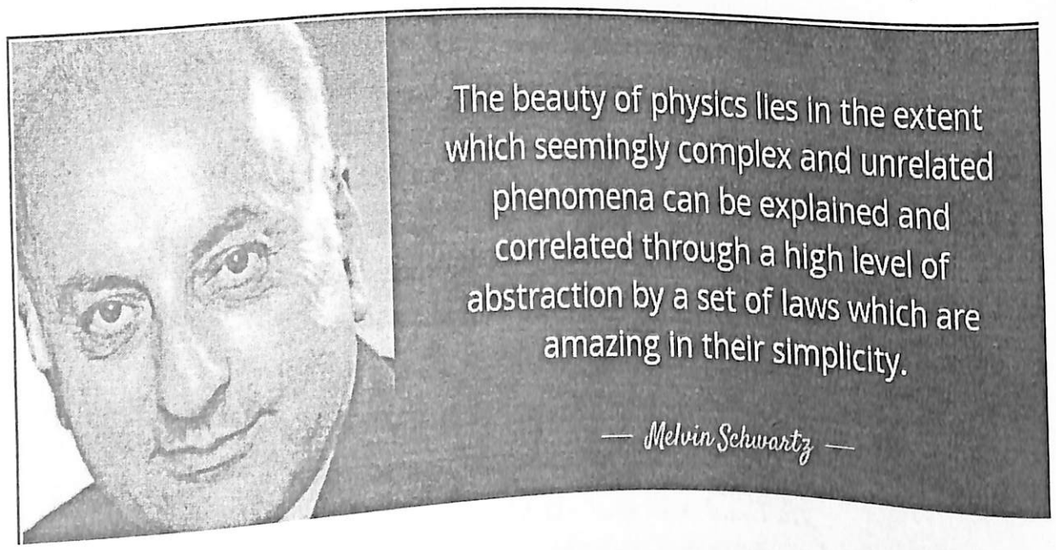
Let ds be the infinitesimal link,
Of which for the present we've only to think;
Let T be the tension, and T + dT
The same for the end that is nearest to B.
Let a be put, by a common convention,
For the angle at M 'twixt OX and the tension;
Let Vt and Vn be ds's velocities,
Of which Vt along and Vn across it is;
Then Vn/Vt the tangent will equal,
Of the angle of starting worked out in the sequel.

In working the problem the first thing of course is
To equate the impressed and effectual forces.
K is tugged by two tensions, whose difference dT
Must equal the element's mass into Vt.
Vn must be due to the force perpendicular
To ds's direction, which shows the particular
Advantage of using da to serve at your
Pleasure to estimate ds's curvature.
For Vn into mass of a unit of chain
Must equal the curvature into the strain.

Thus managing cause and effect to discriminate,
The student must fruitlessly try to eliminate,
And painfully learn, that in order to do it, he
Must find the Equation of Continuity.
The reason is this, that the tough little element,
Which the force of impulsion to beat to a jelly meant,
Was endowed with a property incomprehensible,
And was "given," in the language of Shop, "inexten-sible."
It therefore with such pertinacity odd defied
The force which the length of the chain should have modified,
That its stubborn example may possibly yet recall
These overgrown rhymes to their prosody metrical.
The condition is got by resolving again,
According to axes assumed in the plane.
If then you reduce to the tangent and normal,
You will find the equation more neat tho' less formal.
The condition thus found after these preparations,
When duly combined with the former equations,
Will give you another, in which differentials
(When the chain forms a circle), become in essentials
No harder than those that we easily solve
In the time a T totum would take to revolve.

Now joyfully leaving ds to itself, a-
Ttend to the values of T and of a.
The chain undergoes a distorting convulsion,
Produced first at A by the force of impulsion.
In magnitude R, in direction tangential,
Equating this R to the form exponential,
Obtained for the tension when a is zero,
It will measure the tug, such a tug as the "hero
Plume-waving" experienced, tied to the chariot.

But when dragged by the heels his grim head could not carry aught,
So give a its due at the end of the chain,
And the tension ought there to be zero again.
From these two conditions we get three equations,
Which serve to determine the proper relations
Between the first impulse and each coefficient
In the form for the tension, and this is sufficient
To work out the problem, and then, if you choose,
You may turn it and twist it the Dons to amuse.



THREE AXIS GIMBAL

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ABSTRACT

Nowadays everyone is trying to record the moment everywhere and wants it to be perfect. Beyond resolution, there is a desire to get steady shots regardless of the environmental conditions. The gimbal stabilization system ensures a stable image by blocking motion-related vibrations before they are transferred to the camera lens axes. Thanks to the Three Axis Gimbal, perfect images can be achieved by minimizing the vibrations while jogging, climbing or coming down stairs, cycling, or using any kind of vehicle. In short, a three-axis gimbal can be integrated everywhere a fixed image is needed. It is envisaged that gimbal stabilization system will be needed in many scientific studies in the following periods. The aim of this study is to present the Three Axis Gimbal mechanism. Three separate brushless servo motors are installed on each axis for absorbing unwanted movements. The gimbal is also equipped with an inertial measurement unit consisting of a gyroscope and accelerometer close to the camera mount point.

KEYWORDS: Inertial Measurement Unit, Brushless Servo Motor, Gimbal System, PID Controller.

INTRODUCTION:

Gimbal is the system used to prevent the shaking, one of the biggest problems in video recordings. Figure 1 illustrates a simple block diagram of the gimbal assembly. There are two or three engines on the systems called as gimbal and they aim to prevent or eliminate vibration. The basic logic of this system which can minimize the vibration in video recording devices is to create a reverse motion in the opposite direction of the vibration. This reverse motion isprovided by the Inertial Measuring Unit (IMU)Sensor which is placed on the camera. The IMU Sensor detects the camera movements and reports motion to three brushless servo motors positioned in line with the camera lens. Thesensor detects the relative position of the camera according to the ground. Based on the predetermined optimum position, it is detected how much the optimum position defined in each movement of the camera deteriorates. The main aim is to protect this optimum position. The information received from the sensor is processed on the

electronic board and transmitted as a command to the brushless servo motors, which provide smooth motion. Thus, the brushless servo motor that produces the opposite movement of the camera

allows to obtain a smooth image.

Thanks to the Three Axis Gimbal; a cameraman shooting on the baseline of the field in a football match can record smooth images while running in order not to miss the event.

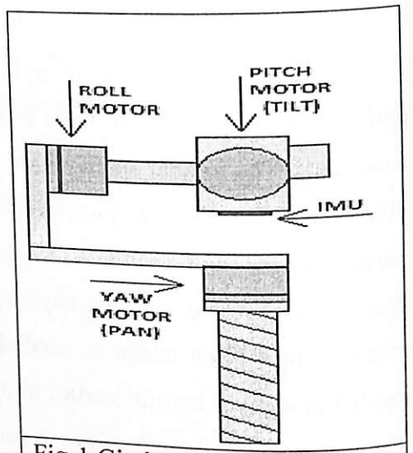


Fig-1 Gimbal block diagram

METHODOLOGY:

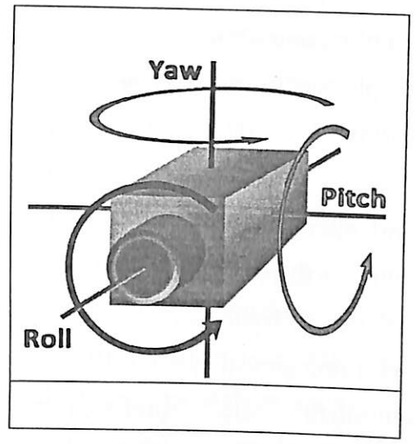
The control system for this *gimbal* is developed using various control *methods* and algorithms to provide better and efficient performance with flexibility, better stability and accuracy.

Mechanical design:

The frame carrying the system should be enduring enough to carry thecamera and light enough to provide ease of use. Carbon fiber pipe is the material qualified for the conditions that we are looking for. A six-axis IMU sensor card (which is often used in robotic projects) which has a three-axis gyroscope and a three-axis angular accelerometer is often needed to detect camera movements. Thus, we can obtain the information such as orientation, speed, and position from a single unit.

The three axes mentioned in the Three-Axis Gimbal are shown in Figure 2. These three axes are called pitch, yaw, and roll, which carry the same name as the axes of the movement of a plane. In order to absorb the unwanted movements of these three axes, three separate brushless servo motors are mounted on these axes corresponding to the camera lens. The brushless servo motor mounted on the pitch axis absorbs the unwanted up-down movement of the camera lens, undesired right-left motion is absorbed by the brushless servo motor camera lens mounted on the yaw axis, and undesired rolling motion from one edge to the other is absorbed by the

brushless servo motor mounted on the roll axis. The biaxial gimbal does not have yaw axis, so that the recorded videos are shakier than the three-axis gimbal. Because, there is no absorption in the sudden and involuntary turns towards right or left.



Motors mounted in the line with the camera lens receive feedback from the sensor and are used to provide a rotational motion in the opposite direction of the movement to keep the camera lens steady. In this study, a brushless servo motor is preferred because of its ability to tolerate the fault quickly and smoothly.

SOFTWARE DESIGN:

IMU Data Fusing:

Gyros filter out accelerometer outputs to make a more accurate measurement. There are various algorithms for filtering. One of the most commonly used is the Kalmanfilter . But it has a complicated algorithm. It makes a calculation by variable weighted average ratio and can use many different methods to calculate this ratio, but it is difficult to understand. The system works to predict new outputs by using previous outputs and measurements. In sum, the Kalman filter predicts the best value of the next output by monitoring the constantly changing inputs of the system. This filter is used in many areas such as image processing, orientation, motion tracking.Block diagram of the Complementary Filter is illustrated in Figure 3.

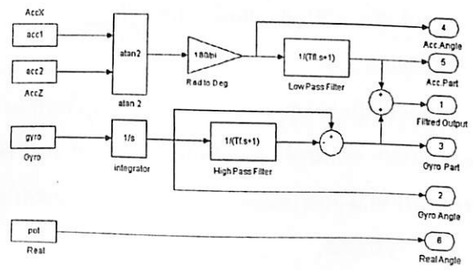


Fig-3Complementary filter block diagram.

This filter is a method of taking averages of the reference data with a constant weighted average ratio . It is the simplest algorithm. It is generally used for hobby purposes and in the applications to understand the operating logic. It simultaneously manages both high-pass and low-pass filters. Low pass filter filters high frequency signals (such as accelerometer in the case of vibration) and low frequency signals (such as gyroscope drift). By combining these filters with a complementary filter, a good signal can be obtained without the complications of the Kalman Filter. Consequently, the Complementary Filter can be used instead of the Kalman Filter.

Smoothing is better, and its algorithm is much simpler than Kalman. Therefore, The Complementary Filter is preferred in this study. An example of how the system is used with the Complementary Filter is shown in Figure 4

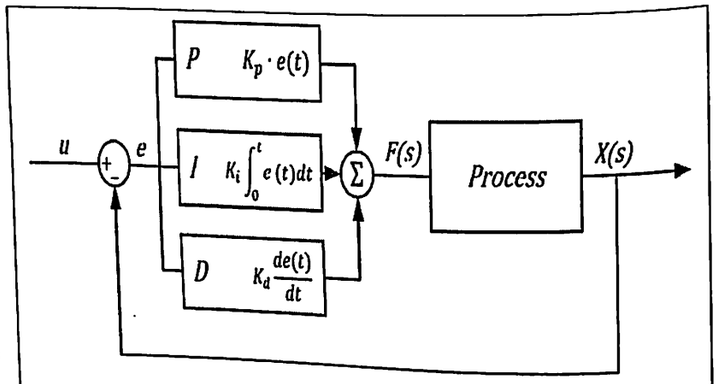


Fig-5 PID block schema.

Controller Design:

Although there are a variety of modern techniques for controlling gimbal systems, PID controllers are preferred because of their low cost, ease of implementation and high performance.

The block diagram in Figure 5 is a feedback mechanism controller commonly used in PID (Proportional-Integral-Derivative) industrial control systems.

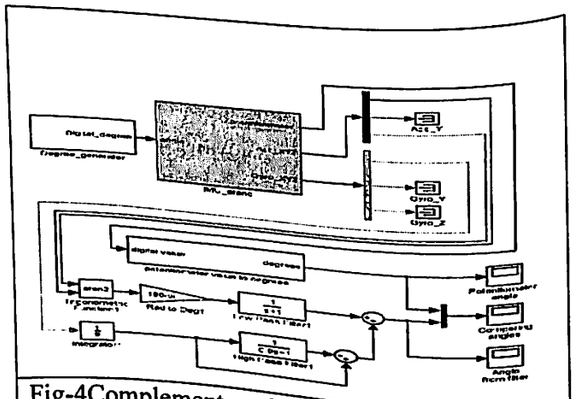


Fig-4Complementary filter with IMU.

In 1942, Ziegler and Nichols presented two classical methods for determining the parameters of the PID controller. These methods are still widely used in the original form or in some modifications. The methods are based on determining some properties of the process dynamics.

The PID control system continuously calculates the error value as the difference between the desired value and the measured process variable. The controller tries to minimize the error over time. In doing so, sets a new value (determined by a weighted sum) for a control variable, such as power fed to a control valve, a dashpot, or a heating element.

As shown in Table 1, the proportional gain (Kp) reduces the rise time and the steady-state error (but never removes it). The integral gain (Ki) removes the steady-state error but can worsen the transient response. Derivative gain (Kd) increases the stability of the system, reduces overshoot and improves the transient response.

CONCLUSION:

In this study, three-axis gimbal system is introduced. Under the title of mechanical design, the basic elements of the gimbal system are introduced. Under the software design title, gimbal control system, sensors and sensor information filtering are mentioned. PID control is used to stabilize three axes of this platform model. PID control is often preferred because of its high performance, but control methods such as PI, PI2, optimal control, and compensator can also be used in two-axis and three-axis gimbal systems. Brushless servo motors are used in the system as motion providers. Step motor or servo motor may be preferred instead of brushless servo motor. The error signal is detected by using the IMU sensor while the Complementary Filter is preferred for sensor filtering. Besides Complementary and Kalman filters; the MahonyMadwick Filter, which is used to calculate the quaternion with the information received from the sensor, may also be preferred.

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SPACE ROCKET TECHNOLOGY

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ABSTRACT

Rockets are used to launch satellites and space shuttles into space. Their powerful engines allow spacecraft to be blasted into space at incredible speeds putting them into the correct orbit. With the launch of Sputnik in 1957 and the subsequent beginning of the space age, the progression of Space Technologies has, on the one hand, led to the development of hundreds of applications that use satellite data, including devices for everyday use, from satellite televisions to the Satnav in our cars. On the other, it has underpinned scientific progress in Earth and Atmospheric Sciences as well as in Astronomy and Astrophysics. Just to recall some of the highest public profile contributions from the field, satellite measurements showed the extent of the ozone layer depletion in the atmosphere and the existence of exoplanets and black holes have been confirmed, among many other scientific advances. The rapid progress made in Space Technology led to extraordinary accomplishments for the whole human race, such as the Moon landing. Although the spectacular progress in Space Technologies slowed down toward the end of the past century, together with that of the whole Aerospace sector, very important achievements continued to be made. These include the development of the International Space Station and the robotic exploration of other planets and celestial bodies, including landing on a comet.

KEYWORDS: Rockets, launch vehicles, space technology, space debris.

INTRODUCTION:

Rocket Technology focuses on the dynamics, technologies, aerodynamics, ballistics, theory of servomechanisms, principles of navigation instruments, and electronics involved in rocket technology. The publication first takes a look at the basic relationships in the theory of reactive motion; types of jet propelled aircraft and their basic construction; and types of reaction motors and their construction. Discussions focus on air breathing motors, anti-aircraft rockets, long range bombardment rockets, surface to surface, short range bombardment missiles, thrust of a rocket motor, and operating efficiency of a rocket motor. The text then examines rocket motor fuels and processes in the combustion chamber of a rocket motor. The manuscript ponders on

the flow of combustion products through the nozzle of a rocket motor and forces and moments acting on the rocket in flight. Topics include stabilizing and damping moments, steering forces, aerodynamic forces, properties of supersonic nozzle, gas flow in a supersonic nozzle, cooling of liquid rocket motors, and basic laws of gas flow. The book then elaborates on rocket flight trajectory, basic principles of stabilization and steering, and ground equipment and launching devices. The publication is a valuable source of information for engineers and researchers interested in rocket technology.

Under the name of "New Space"1, there is an ongoing "revolution" in the space sector with new players/commercial entrepreneurs/businesses (Hall, 2020) entering a domain traditionally occupied by institutional players to exploit the new opportunities opening in front of them. These could include new services, offered through applications of space data to more futuristic opportunities. The issue of the overcrowded radio-frequency spectrum, as well as the sustainability of the space environment which is threatened by the growing amount of space debris, have to be tackled. Solutions that are acceptable to the various stakeholders have to be found and, most importantly, implemented. All major space organizations (NASA, ESA, etc.) have given some attention to this issue (Office of Audits, 2014) [ESA Asteroid Impact Mission (AIM) and NASA Double Asteroid Redirection Test (DART)], and the United Nations have taken good steps to improve coordination, establishing the International Asteroid Warning Network and the Space Mission Planning Advisory Group (SMPAG).

METHODOLOGY:

This brings us to the opportunities offered by robotic in-orbit servicing and the development of flexible technologies that can support multipurpose missions. These opportunities include the servicing and potential repairing of current satellites, to active debris removal. These are not new concepts, as in 1984 the Space Shuttle Discovery mission STS-51-A, brought back to Earth two old satellites no longer functioning (probably the first example of Active Debris Removal), and similarly the mission of the shuttle endeavor in 1993 (and other following missions) provided essential fixes and services to the Hubble Space Telescope. However, the opportunity here is to develop robotic technologies able to perform these type of missions at a fraction of the cost. The non-cooperative nature of the target, which could be tumbling, presents the first challenge to any approaching vehicle that has to rendezvous with this object. Techniques to stabilize the target and devices to safely grasp it have to be developed (and

standardized) as well as improvements made in the relative navigation (vision-based navigation), hardware, and software. Some progress has been made and some devices tested in-orbit, but we are still far from a real capability to perform Active Debris Removal or in-orbit servicing with sufficient confidence and at an affordable price.

ADVANTAGE:

1. Inventions resulting from space research.
2. Understanding of natural world.
3. Development space program new generation.

DISADVANTAGE:

1 Pollution of outer space.
2 Dangers of astronauts.
3 Cost of funding space program

CONCLUSION:

Rockets work more efficiently in space than in an atmosphere multistage rockets are capable of attaining escape velocity from earth and therefore can achieve ultimate maximum altitude. Compared with air breathing engines rockets are lightweight and powerful and capable of generating large acceleration. New rockets are being developed today. They will launch astronauts on future missions. The new rockets will not look like the space shuttle. These rockets will look more like earlier ones. They will be tall and round and thin. These rockets will take astronauts into space. They will take supplies to the International Space Station. NASA also is working on a powerful new rocket called a heavy lift vehicle. This rocket will be able to take big loads into space. Together, these new rockets will make it possible to explore other worlds. Someday they may send humans to Mars.

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BLACK HOLES

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ABSTRACT

Black holes are perhaps the most strange and fascinating objects known to exist in the universe. Our understanding of space and time is pushed to its limits by the extreme conditions found in these objects. They can be used as natural laboratories to test the behavior of matter in very strong gravitational field

KEYWORDS: Gravitational field, universe.

INTRODUCTION:

A black hole is super dense region of spacetime that exhibits such strong gravitational effects that nothing—not even light—can escape. A black hole's gravitational force is so strong because black holes are so dense. Black holes come in various sizes and many have masses similar to that of ordinary stars. Most black holes are formed from the collapsed remnants of a star that was at least thirty times the mass of the sun. To form a black hole, the collapsed star will shrink down to an infinitely dense point called a singularity.Around the singularity, there is an imaginary line called the event horizon. Beyond the event horizon all light is turned black by the force of its own gravity. Einstein proved that not only can gravity capture light, it can also distort time and space. Inside the event horizon the entire. Concept of time and space completely breaks down

METHODOLOGY:

One possible mechanism for the formation of supermassive black holes involves a chain reaction of collisions of stars in compact star clusters that results in the buildup of extremely massive stars, which then collapse to form intermediate-mass black holes.

DISCUSSION:

TYPE OF BLACK HOLES:

There are several different types of black holes, which come in various sizes. Many have masses similar to that of an ordinary star.

MICRO BLACK HOLES:

Some scientists theorize that there may be micro black holes that were formed shortly after the Big Bang. These scientists believe that these micro black holes are still scattered around our galaxy today. None of these micro black holes have been observed yet, however, so their existence remains purely theoretical. These black holes are theorized to be as small as an atom, but with a mass rivaling that of a large mountain.

STELLER BLACK HOLES:

Stellar black holes are formed by the gravitational collapse of a massive star. They have a mass up to 20 times more than the mass of the sun. There are likely many stellar mass black holes in the Milky Way (the galaxy where Earth is located).

SUPERMASSIVE BLACK HOLE:

The largest type of black holes are supermassive black holes. These black holes are more massive than 1 million of our suns. Every large galaxy has a supermassive black hole at its center. The supermassive black hole at the center of our galaxy is called Sagittarius A.

Supermassive black holes can continue to become more massive over time. A supermassive black hole at the center of a galaxy can grow by accretion of matter as well as by merging with other black holes.

ADVANTAGES OF BLACK HOLES:

1. Indeed, black holes produce enormous amounts of raw energy.
2. it would certainly be advantageous for human beings to harness some of that energy.
3. which could be converted to electricity to power homes, offices, public buildings, and even cars and ships.

DISADVANTAGES OF BLACK HOLES:

1.Just before the sudden escape of information, a very small black hole must be able to store an arbitrary amount of information, which violates the Bekenstein bound.

2. Information is stored in a Planck-sized remnant.

CONCLUSION:

The black hole, because of its incredibly strong density, curves the spacetime a lot, until a point where there is no more space and time. There is a singularity. Like our experiment shows, the biggest the star is, the more the spacetime curves itself. But we don't know a lot of things about black holes, a lot are just theoric.

We have information on only 3 of their properties: their mass, their electric charge and their cinetic moment (if they are in rotation or not). We also know that the entropy of a black hole is infinite. The entropy is a measure of the numbers of possible configurations of the microscopic elements. the global entropy augments with the time because the surface of the black hole gets bigger. This really strong entropy would come from the transition of a complex object, the original object (like a star), to an object so 'simple' that it is characterised by only 3 factors. There are a lot of different theories in the world about the inside of this unknown celest body. There are also theories about the spacetime going in the other way on the other side of the black hole. That would mean that the spacetime curves in the other direction.

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PHYSICS QUIZ

Mwkthang Goyary, B.Sc5th Semester, Department of Physics, Bijni College, Bijni

1. Which of the following is a physical quantity that has a magnitude but no direction?

A. VectorB. Frame of referenceC. ResultantD. Scalar

2. Which of the following is the motion of objects moving in two dimensions under the influence of gravity?

A. Vertical velocityB. Horizontal velocityC. DirectrixD. Projectile motion

3.The atomic weight of an element is approximately determined by

A. The number of neutrons.B. The number of protons.C. The number of neutrons plus the number of protons.D. The number of electrons.

4. The volt is the standard unit of

A. Current.B. Charge.C. Electromotive force.D. Resistance.

5. Visible light is converted into electricity

A. In a dry cell.B. In a wet cell.C. In an incandescent bulb.D. In a photovoltaic cell.

ANSWER: 1. (D), 2.(B), 3.(C), 4.(C), 5.(D)

FAMOUS SCIENTISTS AND THEIR INVENTIONS

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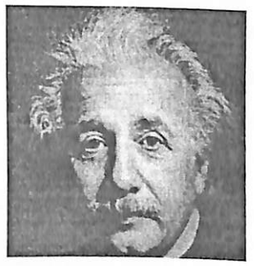
INTRODUCTION:

Some famous scientists and their most remarkable inventions and discoveries

About 2.3 million years ago our ancestors invented their first primitive tool, the split stone, which they used for cutting and scraping. Modern humans first appeared about 200,000 years ago. About 50,000 years ago they (or should that be we?) began to use language, symbols, and more complex tools. As inventions and discoveries added to one another, human civilization, technology, and science advanced and evolved.

Albert Einstein (1879 - 1955): One of the greatest scientists of the 20th century is the creator of numerous inventions and theories that transformed a lot of concepts linked to space and time, with the most important discovery being the theory of relativity. Other discoveries of Einstein include the photoelectric effect and the Einstein calculator.



Albert Einstein, born March 14, 1879, Ulm, Württemberg, Germany—died April 18, 1955, Princeton, New Jersey, U.S.), German-born physicist who developed the special and general theories of relativity and won the NobelPrize for Physics in 1921 for his explanation of the photoelectriceffect.

Inventions and Discoveries:

As a physicist, Einstein had many discoveries, but he is perhaps best known for his theory of relativity and the equation E=MC2, which foreshadowed the development of atomic power and the atomic bomb.

Death: Einstein died on April 18, 1955, at age 76 at the University Medical Center at Princeton. The previous day, while working on a speech to honour Israel's seventh anniversary, Einstein suffered an abdominal aortic aneurysm. He was taken to the hospital for treatment but refused surgery, believing that he had lived his life and was content to accept his fate. "I want to go

when I want," he stated at the time. "It is tasteless to prolong life artificially. I have done my share, it is time to go. I will do it elegantly."

Robert Bunsen(1811 – 1899) : Robert Wilhelm Eberhard Bunsen was born on March 30, 1811, in Göttingen, Germany. He was the youngest of four sons. His father was Christian Bunsen, professor of modern languages and head librarian at the University of Göttingen. His mother came from a military family. Bunsen once recalled that he had been a wayward child at times, but his motherkept him in line

Invention and Discoveries: In 1864, Bunsen and his research student Henry Enfield Roscoe invented flash photography when they used the intense, bright light from burning magnesium as a light source to allow photographs to be taken in poor ambient light.In 1841 Bunsen invented the zinc-carbon cell – often called the Bunsen battery. He saw this as an improvement on the expensive Grove cell, which was used, for example, to power telegraph lines. The Grove cell was a zinc-platinum cell. The platinum in it made it very expensive. Bunsen combined his zinc-carbon cells into large batteries, which he used to isolate metals from their ores. He was the first person to produce large scale samples of pure magnesium metal. His replacement of expensive platinum with cheap carbon also allowed other researchers who had been deterred by costs to carry out work in electrochemistry.

DEATH :

Robert Bunsen died aged 88 on August 16, 1899 in Heidelberg.

Isaac Newton(1642 - 1727):

Isaac Newton, in full **Sir Isaac Newton**, (born December 25, 1642 [January 4, 1643, New Style], Woolsthorpe, Lincolnshire, England—died March 20 [March 31], 1727, London), English physicist and mathematician, who was the culminating figure of the Scientific Revolution of the 17th century. In optics, his discovery of the composition of white light integrated the phenomena of colours into the science of light and laid the foundation for modern physical optics. In mechanics, his three laws of motion, the basic principles of

modern physics, resulted in the formulation of the law of universal gravitation. In mathematics, he was the original discoverer of the infinitesimal calculus. Newton's *Philosophiae Naturalis Principia Mathematica* (*Mathematical Principles of Natural Philosophy*, 1687) was one of the most important single works in the history of modern science

Invention and Discoveries:

Isaac Newton's discoveries created a launchpad for future developments in science. His most noteworthy innovations were as follows:

- Newton's three laws of motion set the foundation for modern classical mechanics.
- The discovery of gravitational force gave us the ability to predict the movement of heavenly bodies.
- His discovery of the calculus gave us a potent mathematical tool, aiding the precise analytical treatment of the physical world.

Isaac Newton is one of the greatest mathematicians and physicists of all time, and his inventions and discoveries widened the reach of human thoughts.

DEATH: Newton was also an ardent student of history and religious doctrines, and his writings on those subjects were compiled into multiple books that were published posthumously. Having never married, Newton spent his later years living with his niece at Cranbury Park near Winchester, England. He died in his sleep on March 31, 1727, and was buried in Westminster Abbey.

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EXPLODING NEWTON

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Issac Newton controls the world,

With laws of his invention and proof.

Unless something arrives to change it,

Newtonian physics stays put.

Along came artificial intelligence(A.l)

And superior algorithms.

The force of the algorithm on Newton is

Equal to its computational simplicity

Times computer-enabled power.

When Newton physics meet AI

It is blown away, and the algorithm

Replaces it.

RADIO WAVE

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ABSTRACT

Radio waves are a type of electromagnetic radiation with wavelengths in the electromagnetic spectrum longer than infrared light. Radio waves have frequencies as high as 300 gigahertz (GHz) to as low as 30 hertz (Hz).

KEYWORDS: Electromagnetic spectrum, Radio waveTransmission

INTRODUCTION:

Radio waves have the longest wavelengths in the electromagnetic spectrum. ... You can tune a radio to a specific wavelength or frequency and listen to your favourite music. The radio "receives" these electromagnetic radio waves and converts them to mechanical vibrations in the speaker to create the sound waves you can hear.This paper comprises a review of the present state of knowledge of the speed of transmission of radio waves under the practical conditions of certain applications in which such knowledge is important. It is shown first that, for radio waves in a vacuum, their speed of transmission is equal to the velocity of light (299,775 km/s), to within the limits of experimental error. When waves of frequencies in the neighbourhood of 100 kc/s are propagated at a height of a fraction of a wavelength above the earth's surface, their speed is reduced by an amount dependent upon the electrical conductivity of the earth. For overland transmission, the speed is about 299,250 km/s. For higher frequencies propagated at a height of several wavelengths, the speed of the waves is determined by the refractive index of the air, rather than by the properties of the ground. Since the refractive index decreases with the height of transmission, so does the speed of the waves increase toward the velocity of light? For example, centimetre waves propagated at heights of a few hundred feet have been observed to travel at a speed of about 299,690 km/s. When the waves are transmitted between ground and aircraft flying at a height of 30,000 feet (9,800 meters) this speed is increased to about 299,750 km/s. **METHODOLOGY:**

The mode of propagation of electromagnetic waves in the atmosphere and in free space may be divided into the following three categories: The line of sight (LOS) propagation. Ground wave propagation. Skywave propagation.

DISCUSSION

Discovery and exploitation:

Radio waves were first predicted by mathematical work done in 1867 by Scottish mathematical physicist James Clerk Maxwell. His mathematical theory, now called Maxwell's equations, predicted that a coupled electric and magnetic field could travel through space as an "electromagnetic wave". Maxwell proposed that light consisted of electromagnetic waves of very short wavelength. In 1887, German physicist Heinrich Hertz demonstrated the reality of Maxwell's electromagnetic waves by experimentally generating radio waves in his laboratory, showing that they exhibited the same wave properties as light: standing waves, refraction, diffraction, and polarization. Italian inventor Guglielmo Marconi developed the first practical radio transmitters and receivers around 1894–1895. He received the 1909 Nobel Prize in physics for his radio work. Radio communication began to be used commercially around 1900. The modern term "radio wave" replaced the original name "Hertzian wave" around 1912.

Radio communication:

In radio communication systems, information is transported across space using radio waves. At the sending end, the information to be sent, in the form of a time-varying electrical signal, is applied to a radio transmitter. The information, called the modulation signal, can be an audio signal representing sound from a microphone, a video signal representing moving images from a video camera, or a digital signal representing data from a computer. In the transmitter, an electronic oscillator generates an alternating current oscillating at a radio frequency, called the carrier wave because it creates the radio waves that "carry" the information through the air. The information signal is used to modulate the carrier, altering some aspect of it, "piggybacking" the information on the carrier. The modulated carrier is amplified and applied to an antenna. The oscillating current pushes the electrons in the antenna back and forth, creating oscillating electric and magnetic fields, which radiate the energy away from the antenna as radio waves. The radio waves carry the information to the receiver location. At the receiver, the oscillating electric and magnetic fields of the incoming radio wave push the electrons in the receiving antenna back and forth, creating a tiny oscillating voltage which is a weaker replica of the current in the transmitting antenna. This voltage is applied to the radio receiver, which extracts the information signal. The receiver first uses a bandpass filter to separate the desired radio station's radio signal

from all the other radio signals picked up by the antenna, then amplifies the signal so it is stronger, then finally extracts the information-bearing modulation signal in a demodulator. The recovered signal is sent to a loudspeaker or earphone to produce sound, or a television display screen to produce a visible image, or other devices. A digital data signal is applied to a computer or microprocessor, which interacts with a human user. The interfering with each other. They can be separated in the receiver because each transmitter's radio waves oscillate at a different rate, in other words each transmitter has a different frequency, measured in kilohertz (kHz), megahertz (MHz) or gigahertz (GHz). The bandpass filter in the receiver consists of a tuned circuit which acts like a resonator, similarly to a tuning fork it has a natural resonant frequency at which it oscillates. The resonant frequency is set equal to the frequency of the desired radio station. The oscillating radio signal from the desired station causes the tuned circuit to oscillate in sympathy, and it passes the signal on to the rest of the receiver. Radio signals at other frequencies are blocked by the tuned circuit and not passed on.

Biological and environmental effects :

Radio waves are nonionizing radiation, which means they do not have enough energy to separate electrons from atoms or molecules, ionizing them, or break chemical bonds, causing chemical reactions or DNA damage. The main effect of absorption of radio waves by materials is to heat them, similarly to the infrared waves radiated by sources of heat such as a space heater or wood fire. The oscillating electric field of the wave causes polar molecules to vibrate back and forth, increasing the temperature; this is how a microwave oven cooks food. However, unlike infrared waves, which are mainly absorbed at the surface of objects and cause surface heating, radio waves are able to penetrate the surface and deposit their energy inside materials and biological tissues. The depth to which radio waves penetrate decreases with their frequency, and also depends on the material's resistivity and permittivity; it is given by a parameter called the skin depth of the material, which is the depth within which 63% of the energy is deposited. For example, the 2.45 GHz radio waves (microwaves) in a microwave oven penetrate most foods approximately 2.5 to 3.8 cm (1 to 1.5 inches). Radio waves have been applied to the body for 100 years in the medical therapy of diathermy for deep heating of body tissue, to promote increased blood flow and healing. More recently they have been used to create higher temperatures in hyperthermia treatment and to kill cancer cells. Looking into a source of radio waves at close range, such as the waveguide of a working radio transmitter, can cause damage to

the lens of the eye by heating. A strong enough beam of radio waves can penetrate the eye and heat the lens enough to cause cataracts. Since the heating effect is in principle no different from other sources of heat, most research into possible health hazards of exposure to radio waves has focused on "nonthermal" effects; whether radio waves have any effect on tissues besides that caused by heating. Radiofrequency electromagnetic fields have been classified by the International Agency for Research on Cancer (IARC) as having "limited evidence" for its effects on humans and animals. There is weak mechanistic evidence of cancer risk via personal exposure to RF-EMF from mobile telephones. Radio waves can be shielded against by a conductive metal sheet or screen, an enclosure of sheet or screen is called a Faraday cage. A metal screen shields against radio waves as well as a solid sheet as long as the holes in the screen are smaller than about 1/20 of wavelength of the waves.

GENERATION AND RECEPTION:

Radio waves are radiated by charged particles when they are accelerated. They are produced artificially by time-varying electric currents, consisting of electrons flowing back and forth in a specially-shaped metal conductor called an antenna. An electronic device called a radio transmitter applies oscillating electric current to the antenna, and the antenna radiates the power as radio waves. Radio waves are received by another antenna attached to a radio receiver. When radio waves strike the receiving antenna they push the electrons in the metal back and forth, creating tiny oscillating currents which are detected by the receiver. From quantum mechanics, like other electromagnetic radiation such as light, radio waves can alternatively be regarded as streams of uncharged elementary particles called photons. In an antenna transmitting radio waves, the electrons in the antenna emit the energy in discrete packets called radio photons, while in a receiving antenna the electrons absorb radio photons. An antenna is a coherent emitter of photons, like a laser, so the radio photons are all in phase. However, from Planck's relation {\displaystyle E=h\nu}$E=h\nu$ the energy of individual radio photons is extremely small, from 10−22 to 10−30 joules. It is so small that, except for certain molecular electron transition processes such as atoms in a maser emitting microwave photons, radio wave emission and absorption is usually regarded as a continuous classical process, governed by Maxwell's equations.

ADVANTAGES:

Radio waves are used for communication such as television and radio. Radio waves are transmitted easily through air. They do not cause damage if absorbed by the human body, and they can be reflected and refracted to change their direction. These properties make them ideal for communications.

DISADVANTAGE:

One of the disadvantages of radio waves is that they cannot transmit a lot of data simultaneously because they're low frequency. In addition, continued exposure to large amounts of radio waves can cause health disorders like leukemia and cancer.

CONCLUSION

Radio waves have become a big part of our society, they make our lives easier and keep us connected with each other, whether that be through the ever increasing connected world wide web through social networking, or directly to each other with a mobile phone call.

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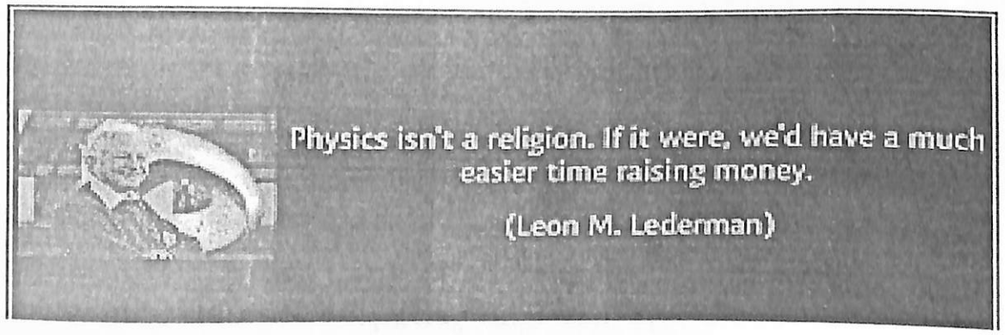


AHIMSA

Mrinmayee Singha ,Alumni, Department of Physics, Bijni college

We, who we are,

What we want to be?

Miles away, from humanity,

Will we get a better life?

Will we be able to survive?

Will we make a joy-ride?

No peace breadth will be taken here

. Until it doesn't get over,

Next generation is far away,

Present environ is hard to stay,

Innovate, a new life,

Innovate, a stilly night,

Join the hands, with the glue of peace,

Gloomy my life, paint with joyful gifts,

And make a beautiful wish,

Pain in my soul,

And my heart knap,

When I walk in my colony,

And feels like anonymous map,

Red drops,

Like dust of wind,

Tears of sole,

Or living in thrill,

High with the bless of god,

And let, no war exist,

For castes, religions,

We hate, fight, and cheat.

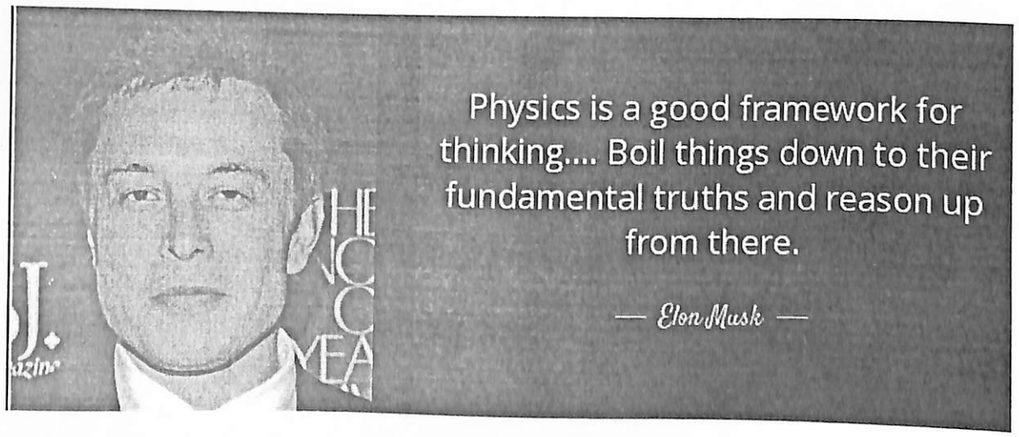
But, the religion Mother Nature gave,

Shows us,

The harmony of Pinkster,

We called…

AHIMSA



মাতালৰ বক্তৃতা

LochanKoushik , Ex- Student, Department of Physics, Bijni College

মাজ ৰাতি চুলাই ঘাটিৰ পৰা ওলাই আহোঁ

প্রত্যোক টোনলা আৰু গঁড়ালৰ ভিতৰৰ পৰা

কুকুৰাবোৰে বিদ্রোহৰ চিঞৰেৰে

পাখিবোৰ মেলি মোক চালাম দিয়ে

মোৰ চুলাইৰ গোন্ধত ডুবযোৱা উশাহে

আজি, প্রচণ্ড ধুমুহাৰ ৰূপ লৈছে

এতিয়া,

এতিয়া যুদ্ধৰ সময়।

আজি মোৰ প্রতিটো খোজত এটা-এটা ভূমিকম্প।

আজি মোৰ প্রতিটো অনুভৱত এটা-এটা জ্বালামুখী।

উদগীৰ নহোৱালৈ সাজু হৈ উঠিছে।

অত' বছৰ কিদৰে জীয়াই আছিলো,

খোজ এটাও আৰিব নোৱাৰা

ভগ্নপ্রায় এই সংকীর্ণ ঘৰবোৰত।

মই, দুঃখিত,

পৃথিৱীৰ অস্বাস্থ্যকৰ ঘৰবোৰত

স্ব-পৰাজিত মানুহবোৰ

এতিয়াও শুইআছে ক্রীমিৰদৰে মেৰখাই।

আৰু, এতিয়া

আজি মোৰ বিশালতাত

এই পথ ডুবযায় ,

মোৰ চুলাইৰ উশাহৰ গোন্ধত

সেই একেইউশাহ, গোটেই দেশেলয়।

আৰু, পথৰ মাজেৰে খোজকাঢ়িলে

মানুহে মোক মাতাল কয়,

-বাওঁপিনে ৰেখো জকাঢ়িব লাগে।

-সোঁপিনেৰে খোজ কাঢ়িব লাগে।

গগন চুম্বী আট্টালিকাৰ

মেহগনি পালেঙৰে সজ্জিত কোঠাবোৰত

ৰাতিৰ পিছত ৰাতি জ্বলি থাকে

নীলা-নীলা পোহৰ,

ফেঁচাৰ চকুবোৰ,

ইয়াত ফেঁচাবোৰে চকুৰে দেখে

ইয়াত ফেঁচাবোৰে ৰাতি ৰপিছত ৰাতি সিহঁতলৈ বাটচায়!

ৰাতি হলেই

কান্ধত ওলমিথ কামগজ

মগজতও লমিথকা আখৰবোৰ

বুকুত ওলমিথ কাঅফিচৰ ঘড়ীৰ কাঁটাবোৰলৈ

মুখ নথকা মানুহবোৰে

এন্ধাৰৰ ভৰিত চুঁচৰিচুঁ চৰি

এই পথেৰে আহে।

আৰু আজি পথবোৰ সংকীৰ্ণহে আহিছে

কবি সকলে শুনক

ইতিহাসৰ প্রতিটো আন্দোলনে শুনক

আজি পথবোৰ সংকীর্ণ হৈ আহিছে

মানুহ এজনে এই মাত্র

আপোনালোকৰ মূৰৰ উপৰেৰে খোজকাঢ়ি গ'ল।

আশাৰ চাকি

- চিনু তালুকদাৰ (প্রাক্তন ছাত্রী)

হে ধুমুহা নুমুৰাই নিদিবা মোৰ

সযতনে ৰখা আশাৰ চাকি গছি।

হে বৰষুণ তুমিও আহি নুমুৰাই নিদিবা মোৰ

জীৱনযুদ্ধৰ এই আশাৰ চাকি গছি।

এতিয়া ভয় লাগে কিজানিবা কোন ধুমুহাই

আহি নুমুৰাই দিয়ে নেকি মোৰ এই আশাৰ চাকি গছি।

ভাগৰি পৰিছো তোমাক নুমাই নোযোৱাৰ পৰা সুৰক্ষা দি দি।

তথাপিও হাৰ নামানো জীৱন থকালৈকে

মোৰ এই চাকি গছি জ্বলাই ৰাখিবলৈ।

NUCLEAR POWER

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ABSTRACT

Nuclear power is a proven technology which currently makes a large contribution to the electricity supply in a number of countries and, to a much lesser extent, to heat supply in some countries. Nuclear power is economically competitive with fossil fuels for base load electricity generation in many countries, and is one of the commercially proven energy supply options that could be expanded in the future to reduce environmental burdens, especially greenhouse gas emissions, from the electricity sector. Over the past five decades, nearly ten thousand reactor-years of operating experience have been accumulated with current nuclear power plants. Building upon this background of success and applying lessons learned from the experience of operating plants, new generations of nuclear power plants have been, or are being developed. Improvements incorporated into these advance designs include features that will allow operators more time to perform equipment protection and safety actions in response to equipment failures and other off normal operating conditions, and that will reduce and simplify the actions required. Great attention is also paid to making new plants simpler to operate, inspect, maintain and repair, thus increasing their overall cost efficiency and their compatibility with the infrastructure of developing countries.

KEYWORDS: Nuclear power, Nuclear Fission and Nuclear Reactor.

INTRODUCTION:

Nuclear power is the use of nuclear reactions that release nuclear energy to generate heat, which most frequently is then used in steam turbines to produce electricity in a nuclear power plant. Nuclear power can be obtained from nuclear fusion presently the vast majority of electricity from nuclear power is produced by nuclear fission of elements in the actinide series of the periodic table. Nuclear decay processes are used in the niche applications such as radioisotope thermoelectric generators. The possibility of generating electricity from nuclear fission is still at a research phase with no commercial application. This article mostly deals with nuclear power fission for electricity generation.

DISCUSSION:

Nuclear body, electricity generated by power plants that derive their heat from fission in a nuclear reactor. Except for the reactor, which plays the role of a boiler in a fossil-fuel power plant, a nuclear power plant is similar to a large coal-fired power plant, with pumps, valves, steam generators, turbines, electric generators, condensers, and associated equipment. Nuclear power provides almost 15 percent of the world's electricity. The first nuclear power plants, which were small demonstration facilities, were built in the 1960s. These prototype provided "proof-of-concept" and laid the groundwork for the development of the higher-power reactors that followed.

The nuclear power industry went through a period of remarkable growth until about 1990, when the portion of electricity generated by nuclear power reached a high of 17 percent. That percentage remained stable through the 1990s and began to decline slowly around the turn of the 21st century, primarily because of the fact that total electricity generation grew faster than electricity from nuclear power while other sources of energy (particularly coal and natural gas) were able to grow more quickly to meet the rising demand. This trend appears likely to continue well into the 21st century. The Energy Information Administration (EIA), a statistical arm of the U.S Department of Energy, has projected that world electricity generation between 2005 and 2035 will roughly double (from more than 15,000 terawatt-hours to 35,000 terawatt-hours) and that generation from all energy sources except petroleum will continue to grow. In 2012 more than 400 nuclear reactors were in operation in 30 countries around the world, and more than 60 were under construction. The United States has the largest nuclear power industry, with more than 100 reactors; it is followed by France, which has more than 50. Of the top 15 electricity-producing countries in the world, all but two, Italy and Australia, utilize nuclear power to generate some of their electricity. The overwhelming majority of nuclear reactor generating capacity is concentrated in North America, Europe, and Asia. The early period of the nuclear power industry was dominated by North America (the United States and Canada), but in the 1980s that lead was overtaken by Europe. The EIA projects that Asia will have the largest nuclear capacity by 2035, mainly because of an ambitious building program in China. A typical nuclear power plant has a generating capacity of approximately one gigawatt (GW; one billion watts) of electricity. At this capacity, a power plant that operates about 90 percent of the time (the U.S. industry average) will generate about eight terawatt-hours of electricity per year. The

predominant types of power reactors are pressurized water reactors (PWRs) and boiling water reactors (BWRs), both of which are categorized as light water reactors (LWRs) because they use ordinary (light) water as a moderator and coolant. LWRs make up more than 80 percent of the world's nuclear reactors, and more than three-quarters of the LWRs

Issues Affecting Nuclear Power: Countries may have a number of motives for deploying nuclear power plants, including a lack of indigenous energy resources, a desire for energy independence, and a goal to limit greenhouse effect emissions by using a carbon-free source of electricity. The benefits of applying nuclear power to these needs are substantial, but they are tempered by a number of issues that need to be considered, including the safety of nuclear reactors, their cost, the disposal of radioactive waste, and a potential for the nuclear fuel cycle to be diverted to the development of nuclear weapons. All of these concerns are discussed below.

SAFETY: The safety of nuclear reactors has become paramount since the Fukushima accident of 2011. The lessons learned from that disaster included the need to (1) adopt risk-informed regulation, (2) strengthen management systems so that decisions made in the event of a severe accident are based on safety and not cost or political repercussion, (3) periodically assess new information on risks posed by natural hazards such as earthquakes and associated tsunamis, and (4) take steps to mitigate the possible consequences of a station blackout.

The four reactors involved in the Fukushima accident were first-generation BWRs designed in the 1960s. Newer Generation III designs, on the other hand, incorporate improved safety systems and rely more on so-called passive safety designs (i.e., directing cooling water by gravity rather than moving it by pumps) in order to keep the plants safe in the event of a severe accident or station blackout. For instance, in the Westinghouse AP1000 design, residual heat would be removed from the reactor by water circulating under the influence of gravity from reservoirs located inside the reactor's containment structure. Active and passive safety systems are incorporated into the European Pressurized Water Reactor (EPR) as well.

Traditionally, enhanced safety systems have resulted in higher construction costs, but passive safety designs, by requiring the installation of far fewer pumps, valves, and associated piping, may actually yield a cost saving.

ADVANTAGES:The advantages of nuclear power are:

1) It also has one of the smallest carbon footprints.
2) It's one of the answers to the energy gap.
3) It is essential to our response to climate change and greenhouse gas emissions.
4) Reliable and cost-effective.

DISADVANTAGES:

The disadvantages of nuclear

1) Nuclear is a bad match for renewables.
2) Building nuclear power stations is very expensive
3) There are huge costs beyond simply constructing the power Stations.
4) Nuclear power stations take at least a decade to build.
5) Nuclear power makes us reliant on a small number of sites.

CONCLUSION:

If nuclear power is to expand significantly, nuclear facilities will have to be made extremely safe from attacks that could release massive quantities of radioactivity.

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ENGINES

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ABSTRACT

As science has developed ,invented and discovered different mediums which are very useful for our everyday life and time and distance have been conquered and traveling has become a pleasure through the means of vehicles and aircrafts both of which uses motor or engines to convert one form of energy into mechanical energy to run .In this paper, we study the engine or motor , its types ,its workings and its uses .Engines can be classified into Thermal engines ,Electric engines and Physical engines.

KEYWORDS: Thermal engines, Electric engines and Physical engines.

INTRODUCTION:

Engines are machines that convert a source of energy into physical work .If you need something to move around, an engine is just the thing to slap onto it. But not all engines are made the same and different types of engines don't work the same. Probably the most intuitive way to differentiate between them is the type of energy each engine uses for power. So, engines are mainly classified into Thermal engines, Electric engines and Physical engines.

METHODOLOGY:

Thermal engines: In the broadest definition possible, these engines require a source of heat to convert into motion. Depending on how they generate said heat, these can be combustive (that burn stuff) or non-combustive engines. They function either through direct combustion of a propellant or through the transformation of a fluid to generate work. As such, most thermal engines also see some overlap with chemical drive systems. They can be air breathing engines (that take oxidizer such as oxygen from the atmosphere) or non-airbreathing engines (that have oxidizers chemically tied in the fuel).They are further classified into Internal combustion engines ,External combustion engines and Reaction engines.

An internal combustion engine is a thermal engine in which the combustion of a fuel occurs with an oxidizer (usually air) in a combustion chamber that is an integral part of the

working fluid flow circuit .IC engines derive energy from fuel burned inside a specialized area of the system called a combustion chamber. The process of combustion generates reaction products (exhaust) with a much greater total volume than that of the reactants combined (fuel and oxidizer). Heat is only a by-product of combustion and represents a wasted part of the fuel's energy store, because it doesn't actually provide any physical work. The first commercially successful internal combustion engine was created in by Etienne Lenir around 1860 and the first modern internal combustion engine was created in 1876 by Nicolaus Otto. They are usually used to power cars, lawnmowers, helicopters, and so on.

An external combustion engine is a thermal engine where the working fluid ,contained internally ,is heated by combustion in an external source , through the engine wall or a heat exchanger .The fluid is then dumped(open cycle) , or cooled ,compressed and reused (closed cycle).In this types of engines , the combustion is primarily used as a heat source , and the engine can work equally well with other heat sources. EC engines use fluids that undergo thermal dilation-contraction or a shift in phase, but whose chemical composition remains unaltered. The fluid used can either be gaseous (as in the Stirling engine), liquid (the Organic Rankine cycle engine), or undergo a change of phase (as in the steam engine).The steam engine is an example of external combustion engine.

Reaction engines, colloquially known as jet engines, generate thrust by expelling reactionary mass. The basic principle behind a reactionary engine is Newton's Third Law — basically, if you blow something with enough force through the back end of the engine, it will push the front end forward. And jet engines are really good at doing that .These engines are mostly used in aircrafts and rockets.

Electrical engines: There are three types of classical electrical engines - magnetic, piezoelectric and electrostatic. The magnetic electric type engine is the most commonly used out of the three .It relies on the interaction between a magnetic field and electric flow to generate work .It functions on the same principle a dynamo uses to generate electricity, but in reverse.

Piezoelectric drives are types of engines that harness some material's property of generating ultrasonic vibrations when subjected to a flow of electricity in order to create work. Electrostatic engines use like-charges to repulse each other and generate rotation in the rotor.

Since the first uses expensive materials and the second requires comparatively high voltages to run, they're not as common as magnetic drives.

Classical electrical engines have some of the highest energy efficiency of all the engines out there, converting up to 90% of energy into work.

Ion drives: They are kind of a mix between a jet engine and an electrostatic one . This class of drives accelerates ions (plasma) using an electrical charge to generate propulsion. They don't function if there are ions already around the craft, so they're useless outside of the vacuum of space .They also have a very limited power output. However, since they only use electricity and individual particles of gas as fuel they've been studied extensively for use in spaceships. Deep Space 1 and Dawn have successfully used ion drives. Still , the technology seems best suited for small crafts and satellites since the electron trail left by these drives negatively impacts their overall performance.

EM/Cannae drives: They use electromagnetic radiation contained in a microwave cavity to generate trust. It's probably the most peculiar among all types of engines. It's even been referred to as the 'impossible' drive since it's a no reactionary drive — meaning it doesn't produce any discharge to generate thrust, seemingly bypassing the Third Law. There was a lot of debate on whether this type of engine actually works or not, but NASA tests have confirmed it's functionally sound. It's even getting an upgrade in the future. Since it uses only electrical power to generate thrust, albeit in tiny amounts, it seems to be the best-suited drive for space exploration.

Physical engines: These engines rely on stored mechanical energy to function. Clockwork engines, pneumatic, and hydraulic engines are all physical drives.

They are not terribly efficient. They usually can't call upon large energy reserves either. Clockwork engines for example store elastic energy in springs, and need to be wound each day. Pneumatic and hydraulic types of engines have to carry hefty tubes of compressed fluids around, which generally don't last very long.

Still, physical drives were probably the first ever used. Catapults, trebuchets, or battering rams all rely on this type of engines. So too are man or beast powered cranes — all of which have been in use long before any other kind of engines.

CONCLUSION:

Engines are among the most important engineering applications .Most of every day to day things uses engines to run e.g. vehicles,boats, ships , airplanes, trains etc. Each type of engine has some advantages over the other one .Thus the selection of the appropriate engine requires determining the condition of the application.

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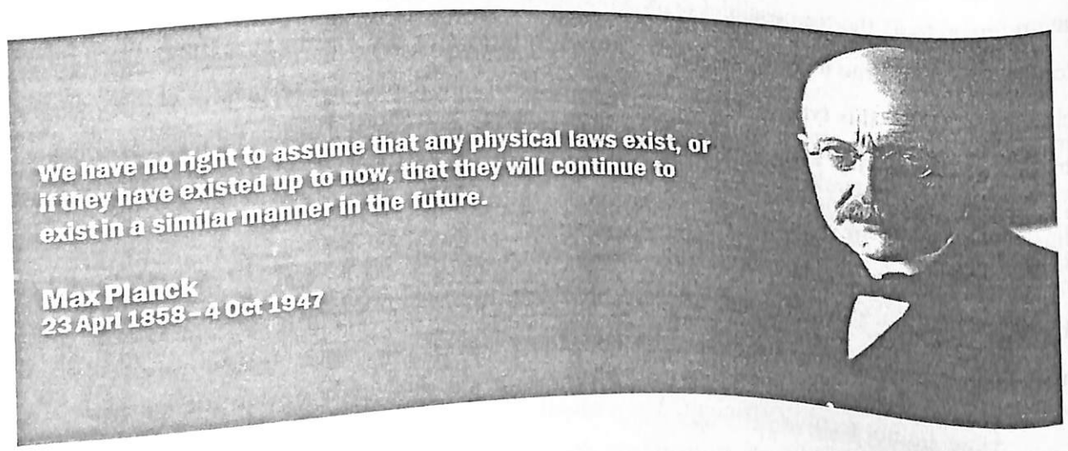

SOLAR ENERGY

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ABSTRACT

the Solar Energy is produced by a non-vanishing renewable source of energy which is free from eco- friendly . it is inexhaustible, freely available and clean source of energy generation . Solar energy is renewable and pollution-free energy. When sunlight falls on a photovoltaic cell it generates electricity by an electronic process and the electric energy stores in the batteries in the chemical process .In today's generation we needed Electricity every hour .This Solar Energy is generated by as per applications like industrial, commercial, and residential .it can easily energy draw from direct sunlight. so it is very efficiency and free environment pollution for surrounding In this artical , we have reviewed about the solar energy from sunlight and discussed about their future trends aspects This article also tries to discussed Working solar panel, emphasize the various applications and methods to promote the benefits of solar energy.

KEYWORDS: Solar system, Solar Panels, CSP, Photovoltaic (PV), Solar Battery, Solar cell.

INTRODUCTION:

The energy we get from the sun is called solar energy. Solar energy is the energy which we get from the sun and converted into thermal or electrical energy with the help of photovoltaic cell. Solar energy is a renewable energy because it will never end as long as the sun remains. Solar energy also a pollution-free energy because there are no harmful gases, chemicals, fly ash produced during the production of solar energy. When sunlight comes to earth and falls on a photovoltaic cell it generates electricity by an electronic process and the electric energy stores in the batteries in chemical process and can be used to supply power anything from a small electronic gadget such as calculators and road signs up to homes and large commercial businesses. solar energy do not produce greenhouse gasses while generating electricity because solar energy directly come from sunlight . Solar energy is inexhaustible, freely available and clean source of energy generation.

ADVANTAGES:

Solar Energy is the energy in the form of light and heat from the sun. It has been and is still used by the humans in a number of ways such as drying clothes, heating water etc. Not only humans, plants also use solar energy to make their food and indirectly animals are dependent upon solar energy as they eat the plants and the plant products. Use of solar energy is becoming popular these days as it has a number of advantages: it is free of cost, clean and pollution free. The solar energy is used to boil water which is used to provide power, that is termed as solar power. This solar power energy is used to generate electricity with the help of photovoltaic(PV) cells. This electricity can be used as it is available or can be stored in the battery which can be used at night. These Solar Photovoltaic (SPV) cells i.e. Solar Photovoltaic energy can be used for water pumping, in traffic lights, railway signals etc. Solar power can be used where there is no easy way to get electricity to the remote areas. It is also used to power lighthouses. These days, small solar panels are available in the markets to charge the mobile phones. Many other solar energy products are also available. The solar energy can also be used to cook food using solar cookers, heat water using solar water heaters. It is an effective way to reduce your home energy bills. Solar energy does not produce any green house gases or pollution and keeps the air around us pure and clean. Solar cells are long-lasting and require very little maintenance. They last a long time. Solar energy house is also being constucted to trap the energy of the sun. Solar energy is a renewable and infinite resource.

DISADVANTAGES:

But it has few disadvantages too. Such as:It does not work at night or in sunny weather. The initial cost of installing a solar energy system is quite high because of the high cost of the semi-conducting materials used in building it.

But all in all, there are a number of solar energy advantages which overshadow its disadvantages. So, solar energy resources are a good alternative to the fossil fuels which takes millions of years to be formed and solar energy is cheap and pollution free environment friendly resource. Hence, we should try to use environment friendly solar energy in our daily life and help in making our environment free of pollution.

CONCLUSION:

Solar Energy is a major renewable energy source and use of this energy is free, does not create pollution, and if used wisely can help up become less dependent on other more costly and damaging forms of power. Solar energy is clean, mildly affordable and has been used by human for long time. It might not produce as much electricity as nuclear, but in the long run solar will cost less and isn't harmful to the environment like nuclear is. However, it will play an important role in the future in saving the world, helping people socially and economically

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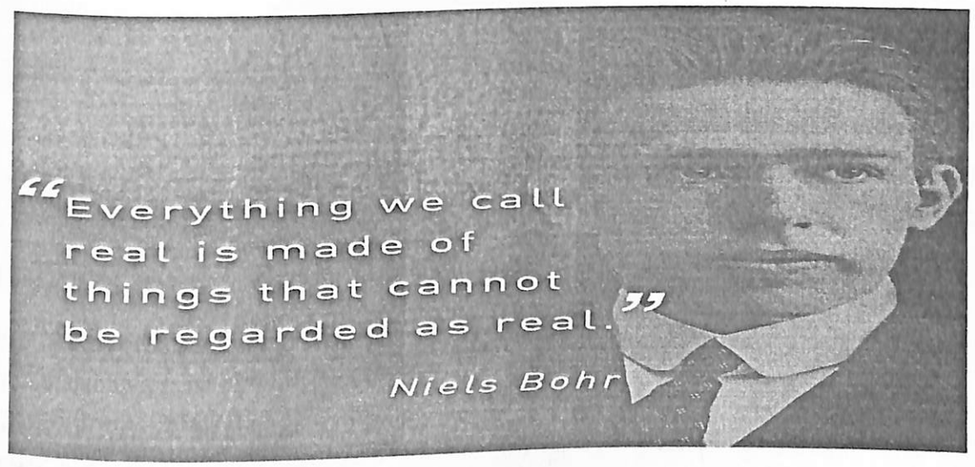

THE ENGINEERING OF PERSEVERANCE ROVER: FROM CURIOSITY TO PERSEVERANCE

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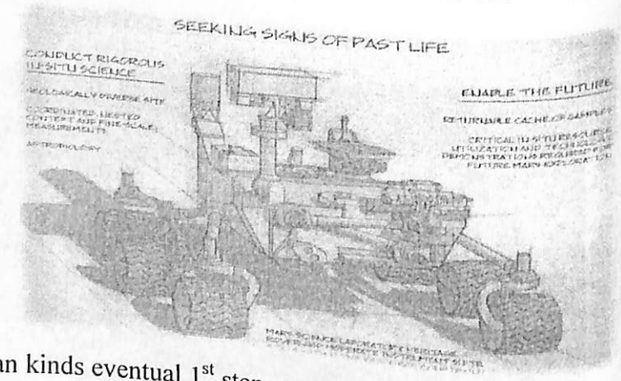
'Do not go gentle into that good night,

For Old age should burn and rave at close of day

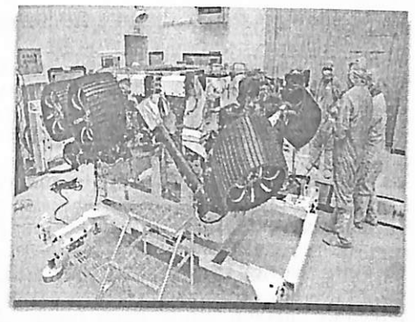
Rage, rage against the dying light.'

-Dylan Thomas

On july 30th 2020 a ULA (united launch alliance) rocket atlas 5 lifted up from cape Connecticut florida,carrying the next gen mars exploration vehicle the perseverance rover and along with it the ingenuity helicopter .The perseverance rover is the largest and heaviest rover sent to the red planet mars. It is heavier than the curiosity rover by 126 kg and with the extra weight comes a whole host of new gadgets. The engineering of perseverance is benefitting from almost 10 yrs of advancement of technology .Its packed with fascinating and novel technologies that will form a stepping stone in human kinds eventual 1st step on martian surface.Perseverance embarked on its journey equipped with seven instruments in total, among them an advanced pair of "eyes" for surveying the Martian surface and a suite of environmental sensors. Two zoom able cameras, known as Mastcam-Z, mounted on the rover's "head", will provide key visual data to allow scientists to select which rocks to study. The rover's operators who pre-plan each driving route and movement of its robotic arm will view these stereo images through 3D goggles that will let them survey the Martian topography in detail. The rover will also play host to the Mars Oxygen In-Situ Resource Utilization Experiment (MOXIE), a demonstration project that aims to produce oxygen from Martian atmospheric CO2. If it's successful, MOXIE's technology



could one day be used by astronauts on Mars to burn rocket fuel for the journey home to Earth. While much of Perseverance's scientific hardware is new and novel, its fundamental design owes a lot to its predecessor: the Curiosity rover, launched in 2011. At roughly 10 feet long, 9 feet wide and 7 feet tall, the new vehicle shares the approximate dimensions of its older counterpart, although, at 1,025kg, Perseverance is 126kg heavier than Curiosity.



MORE ROBUST WHEELS

The engineers of the perseverance have learnt a lot from the struggles of its predecessor curiosity rover. Witnessing the various problems faced by the tyres of the curiosity rover on the Martian surface the engineers of perseverance started the redesign process by 3D printing, around 70 different tyre designs, each with different tread (or grouser) properties. It took roughly a year and a half for engineers to figure out the optimum tread configuration: 48 gently curved grousers in place of Curiosity's 24 chevron-patterned ones. Next, the prototypes had to undergo rigorous durability testing.The six wheels now fixed on Perseverance are made of flight-grade aluminium and measure 52.5cm in diameter.

The wheel of perseverance has a greater diameter and thickness than that of the curiosity rover and it has a smaller width. Engineers incorporated sturdier treads on wheels than curiosity's sharp corner treads. There is a new software upgrades in the perseverance like the algorithms of when to open the parachute.

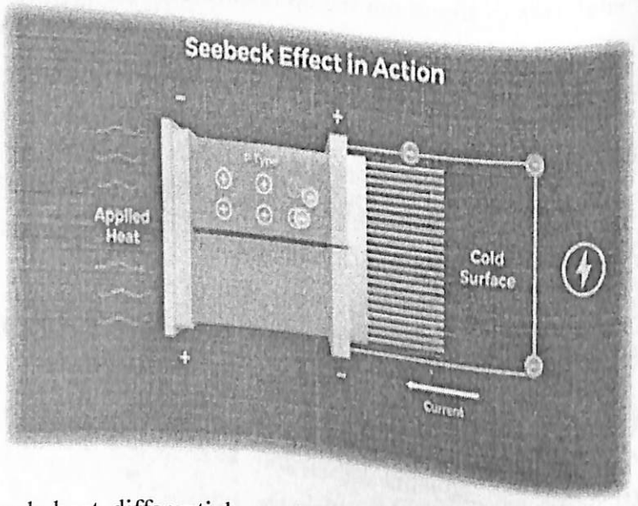
NAVIGATION SYSTEM

Perseverance's ground navigation system has also been significantly upgraded with its optical sensors feeding data to a machine learning vision algorithm allowing perseverance to find its own path through the rough terrain of mars. Another of Curiosity's quirks is its slightly overcautious

autonomous navigation system. If, for instance, the rover sees two rocks that it identifies as perilous, it will only choose to move between them if it has more than adequate space. Algorithms allow the robotic explorer to analyse the images it captures during a drive to calculate a safe passage for itself. This means that it can rove around beyond the area that human route planners on Earth have evaluated ahead of time.

Curiosity's designers treated the rover as a disc and created a 2.5m radius around the rover. That's a 5m diameter circle in which there can be no hazards which is very conservative. While in the perseverance the engineers have overhauled algorithm so it's more aggressive compared to Curiosity.While each piece of Perseverance's software and hardware has undergone a thorough series of tests here on Earth, there will always be some unknown factors lurking on the Martian surface.While each piece of Perseverance's software and hardware has undergone a thorough series of tests here on Earth, there will always be some unknown factors lurking on the Martian surface.

RTGs



The perseverance rover features the same radioactive isotope thermal electric generator as the curiosity rover. RTGs work by converting heat from natural decay of radioactive into thermal electricity. It uses simple effect called the seebeck effect to generate electricity. The see beck effect essentially allows to generate electricity through heat differential, as charge carriers both electrons and holes will move from hot to cold, so if we have two semi-conductors ,one with electons as the charge carriers and one with holes as the carriers then potential difference between the two semiconductors will form when heat gradient is applied , this potential causes a flow of electric current in the external circuit. These two semiconductor need to be thermally insulating to ensure the heat gradient is maximized and also strictly conducting to maximize the current.

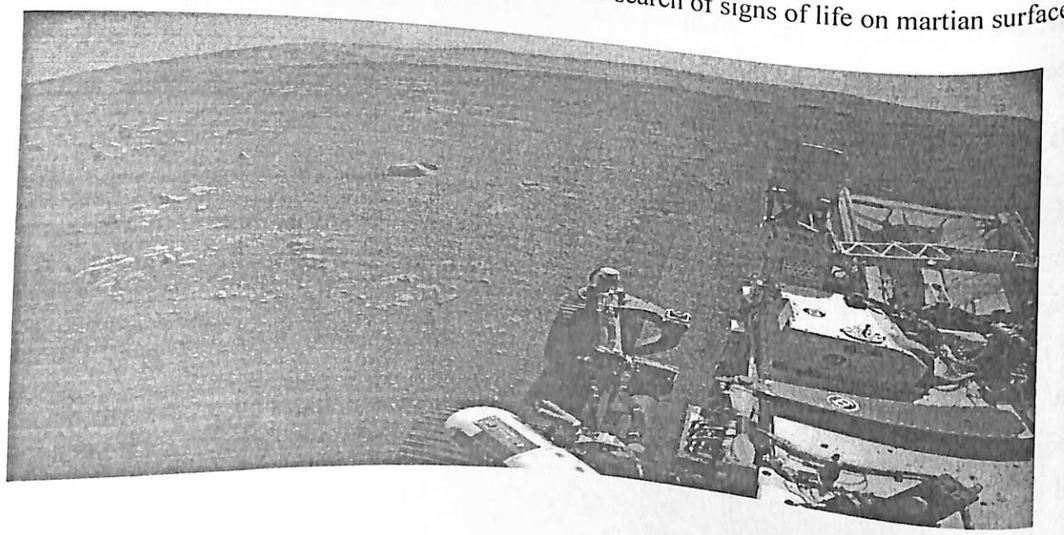
Copper is both electric and heat conductor while iron is a poor electric and heat conductor. Having a material thats a good electric conductor and poor heat conductors extremely rare for this reason two unique materials are used for the p and n- type semiconductor. Lead tellurium as n- type and alloy of tellurium,antimony,germiniun and silver as p-tpe using this now we just need a constant heat supply, the radioactive decay generates heat. the perseverane rover uses plutonium dioxide as heat source these radioactive material produces alpha wave which is essential as this form of radiation is most efficiently converted to heat in a compact space while plutonium-238 also releases minimal beta and gamma radiations, decreasing the weight of shielding needed to protect the electronic on board ,from these more powerful kind of ionizing radiation and essential characterstics for a light weight spacecraft. The plutonium-238 also formable into ceramic light material that would break into large chunks rather than being vaporized and spread in the wind in case of launch failure. The electric y that this unit will provide will gradually degrade from maximum of 110 watt at launch as its plutonium naturally decays .These will power all the instruments on board like the MOXIE.

MOXIE

MOXIE is a new oxygen generator device that will create a vital technology for any future human mission to mars. One might wonder how this oxygen generation is different from the one which is there at the space station. There is obviously a limited supply of oxygen there. Why do we need to test this technology in mars when we already have a tested oxygen generation method. In the international space station oxygen is generated by electrolysis of water. It produces hydrogen and oxygen. Hydrogen is reacted with carbondioxide to produce methane and water methane is then simply exhausted into space while water is fed back into the system. The space station requires regular resupply of water as we are losing two hydrogen atoms for evey oxygen molecule we create. Water is a pretty heavy material to be transported to mars so perseverance is testing a new mechanism of oxygen creation using MOXIE, which will use solid oxide electrolysis tool instead the plenty full carbondioxide in the martian surface. Its operation is really simple, air will be taken in through a dust filter designed as a scroll compressor. These form a perfect air pump for perseverance rover. The pump feeds the carbondioxide fled air through the shells stack it consists of a cathode ceramic electrolyte and an anode, as air passes over the cathode which operates at 800 degree celsius carbon dioxide is separated into carbonmonoxide and oxygen ion. According to this reaction the oxygen ion passes through the

solid electrolyte to the anode where it is oxidized combining with second oxygen atom to form gaseous oxygen which is then passed out through the anode cavity and tested for the purity . MOXIE can produce 20 gram of oxygen per hour. In total MOXIE system needs 168 watt which is actually more than the 110 watt that an RTG can provide at one moment so this operation will need to be supported by two lithium batteries that are included on board to make up for the low power RTG allowing it to store more power in down time .This is actually a scale down prototype of te full size version that NASA intends to sends to mars along with an empty rocket. The full scale version will produce above two kilograms per hour which will gradually be stored inside the awaiting rocket over the course of a year and a half proving light sustaining year for any future human mission ant the oxydizer needed for the right home.

Finally after a seventh month long journey the perseverance rover landed on the surface of mars on 18th February 2021 and has begun its quest for the search of signs of life on martian surface.



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ELECTRICITY

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ABSTRACT

Before the invention of electricity, people had to make energy wherever and whenever they needed it. Thus, they had to makewood or coal fires to heat their homes or cook food. The invention of electricity changed all that. It meant energy could be made in one place then supplied over long distances to wherever it was needed. People no longer had to worry about making energy for heating or cooking: all they had to do was plug in and switch on—and the energy was there as soon as they wanted it.

INTRODUCTION

Electricity, phenomenon associated with stationary or moving electric charges. Electric charge is a fundamental property of matter and is borne by elementary particles. In electricity the particle involved is the electron, which carries a charge designated, by convention, as negative. Thus, the various manifestations of electricity are the result of the accumulation or motion of numbers of electrons.

Types of Electricity or Methodology:

Static Electricity: Static electricity often happens when you rub things together. If you rub a balloon against your pullover 20 or 30 times, you'll find the balloon sticks to you. This happens because rubbing the balloon gives it an electric charge (a small amount of electricity). The charge makes it stick to your pullover like a magnet, because your pullover gains an opposite electric charge. So your pullover and the balloon attract one another like the opposite ends of two magnets.

Current Electricity: When electrons move, they carry electrical energy from one place to another. This is called current electricity or an electric current. A lightning bolt is one example of an electric current, although it does not last very long. Electric currents are also involved in

powering all the electrical appliances that you use, from washing machines to flashlights and from telephones to MP3 players. These electric currents last much longer.

DISCUSSION:

Electric circuits For an electric current to happen, there must be a circuit. A circuit is a closed path or loop around which an electric current flows. A circuit is usually made by linking electrical components together with pieces of wire cable. Thus, in a flashlight, there is a simple circuit with a switch, a lamp, and a battery linked together by a few short pieces of copper wire. When you turn the switch on, electricity flows around the circuit. If there is a break anywhere in the circuit, electricity cannot flow. If one of the wires is broken, for example, the lamp will not light. Similarly, if the switch is turned off, no electricity can flow. This is why a switch is sometimes called a circuit breaker.

Electromagnetic: Electricity and magnetism are closely related. You might have seen giant steel electromagnets working in a scrapyard. An electromagnet is a magnet that can be switched on and off with electricity. When the current flows, it works like a magnet; when the current stops, it goes back to being an ordinary, unmagnetized piece of steel. Scrapyard cranes pick up bits of metal junk by switching the magnet on. To release the junk, they switch the magnet off again.

Electromagnets show that electricity can make magnetism, but how do they work? When electricity flows through a wire, it creates an invisible pattern of magnetism all around it. If you put a compass needle near an electric cable, and switch the electricity on or off, you can see the needle move because of the magnetism the cable generates. The magnetism is caused by the changing electricity when you switch the current on or off.This is how an electric motor works. An electric motor is a machine that turns electricity into mechanical energy. In other words, electric power makes the motor spin around—and the motor can drive machinery. In a clothes washing machine, an electric motor spins the drum; in an electric drill, an electric motor makes the drill bit spin at high speed and bite into the material you're drilling. An electric motor is a cylinder packed with magnets around its edge. In the middle, there's a core made of iron wire wrapped around many times. When electricity flows into the iron core, it creates magnetism.

The magnetism created in the core pushes against the magnetism in the outer cylinder and makes the core of the motor spin around. Read more in our main article on electric motors.

CONCLUSION

Electricity can be dangerous, especially aroundwater because water is a form of good conductor as it has impurities likesalt in it. Salt can help electricity flow. Since the nineteenth century, electricity has been used in every part of our lives. Until then, it was just a curiosity seen in the lightning of athunderstorm.Electrical energy arrives at homes throughwires from the places where it is made. It is used byelectric lamps, electricheaters, etc. Manyappliances such aswashing machines and electric cookers use electricity. In factories, electrical energy powersmachines. People who deal with electricity and electrical devices in our homes and factories are called "electricians".

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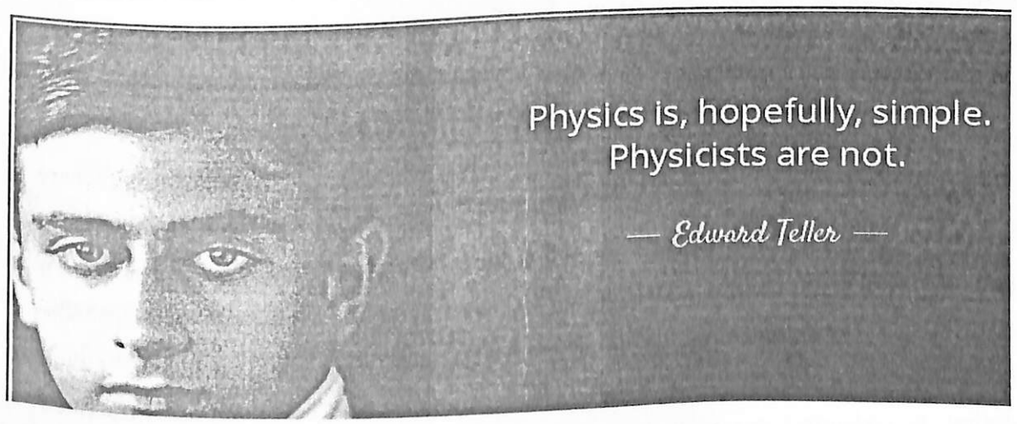

BASICPROPERTIESOFFLUIDMECHANICS

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ABSTRACT

This paper discusses on the basic properties of Fluid Mechanics, its anisotropic and isotopic properties, shear stress & strain, viscosity, difference between liquid and gases etc.

KEYWORDS: Fluid Mechanics

INTRODUCTION:

Fluid mechanics is the study of fluid behavior (liquids, gases, blood, and plasmas) at rest and in motion. Itisabranch ofclassical physics withapplication ofgreat importancein hydraulicand aeronauticalengineering, chemical engineering,meteorology andzoology.Themost familiarfluid isof coursewater andan encyclopediaof the19th century probablywouldhave dealtwith thesubject underthe separateheading ofhydrostatic, the scienceof wateratrest andhydrodynamic, thescience ofwater inmotion. Fluidmechanicsisasubject withalmost endlessramificationsand theaccount thatfollowsis necessarilyincomplete.That'swhy someknowledge ofbasic propertiesare needed [1]

DISCUSSION:

Fluidsarenot strictlycontinuous mediain theway thatallthe successorsof Eulerand Bernoullihaveassumed, fortheyare composedofdiscrete molecules.Themolecules,however,are so smalland, except ingases at verylow pressures, the numberofmoleculesper milliliteris so enormousthat they neednot be viewedas individual entities.Therearea fewliquids, known asliquid crystals, inwhich the moleculesare packed togetherin sucha way asto makethe properties ofthe mediumlocally anisotropic,butthevast majorityof fluids(including airand water)are isotropic.In fluidmechanics,thestate ofan isotropic fluidmay be completelydescribed bydefining its meanmass per unitvolume,or density(ρ),its temperature(T),and itsvelocity(v) ateverypoint inspace,andjust whatthe connectionis betweenthese macroscopicproperties andthe positions andvelocities of individualmolecules isof no directrelevance.

Aword perhapsis needed aboutthe differencebetweengasesand liquids. In gases themolecules are

sufficientlyfar apartto movealmost independentlyof oneanother, andgases tend toexpand tofill any volumeavailable tothem. In liquidsthe molecules aremore orless in contact,and the short-rangeattractiveforces betweenthem makethem cohere;the moleculesaremoving toofastto settledowninto theordered arraysthatare characteristicof solids,butnot so fastthatthey canfly apart.Thus, samplesof liquidcanexist asdrops oras jetswith free surfaces,or theycan sit inbeakers constrainedonly by gravity,in a waythat samplesofgascannot. Such samplesmay evaporate intime, as moieculesone by onepick up enoughspeed to escapeacross the freesurface and arenot replaced.[1]

Distinction between a solid & a fluid is made on the basis of substance's ability to resist an applied shear (tangential) stress that tends to change its shape. A shape whereas a fluid deforms continuously under the influence of shear stress, no matter how small is its shape. In fluids, stress is proportional to 'strain rate.'

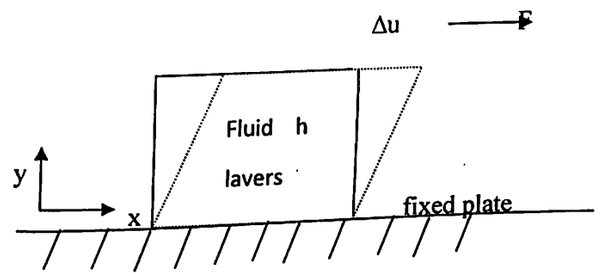

Fig: 1.1 illustration of fluid deformation

Referring fig: 1.1 the coefficient of viscosity (μ) for fluid can be defined as

$$\mu = \frac{\text{Shear stress } (F/A)}{\text{Shear strain rate } (\Delta u/h)}$$

Here, the shear force(F) is acting on the certain cross-sectional area(A) h is the height between two adjacent layer of the fluid element, Δu is the velocity gradient between two adjacent layers of the fluid [2]

Bydefinition,yield toshear stressesnomatter howsmall thesestresses maybe.They dosoatarate determinedbythe fluid'sviscosity.This propertyisa measureof the frictionthat arises whenadjacent layers offluid slipover oneanother. It followsthat theshear stressesare everywhere zeroina fluidatrest andin equilibrium,and fromthis itfollows thatthe pressure(thatis, forceper unitarea) actingperpendicular to allplanes in thefluid isthe same irrespectiveof their

Orientation(Pascal's law).Foran isotropicfluid inequilibrium thereis onlyone valueofthelocalpressure(p) consistentwiththe statedvaluesforpandT.Thesethreequantities arelinkedtogether bywhat iscalled theequationof statefor thefluid.

Forgases atlow pressuresthe equationof stateis simpleand wellknown. Itis

$$P = (RT/M)\rho \ldots\ldots\ldots\ldots\ldots\ldots\ldots (1.1)$$

WhereR isthe universal gasconstant (8.3joules per degreeCelsius permole) andM is themolar mass, oran average molar massif the gasisa mixture; forair, the appropriateaverageis about29×10−3 kilogramper mole.For otherfluidsknowledge oftheequationofstateisoften incomplete.Exceptunderveryextremeconditions,however,allone needs to know is howthe density changes when the pressure ischanged bya smallamount, andthisis describedby thecompressibility ofthe fluid—eitherthe isothermalcompressibility,βT,ortheadiabaticcompressibility,βS,according to circumstance. Whenanelement offluid iscompressed,the workdone onittends toheat itup.If the heathas timeto drainaway tothe surroundingsand the temperatureof thefluid remains essentiallyunchangedthroughout,thenβTistherelevantquantity.Ifvirtually noneofthe heatescapes, as ismore commonly the casein flow problemsbecause the thermal conductivityofmost fluidsis poor,then theflow issaid tobe adiabatic,and βSis needed instead.(TheSrefers toentropy,which remainsconstantin anadiabaticprocess providedthat ittakes place slowlyenough to betreated as"reversible" in the thermodynamicsense.)For gasesthat obeyequation (1.1) itis evidentthatpandρ are proportionaltooneanotherß inanisothermalprocess,and

$$\beta_T = \rho^{-1}(\delta\rho/\delta p)_T = p^{-1} \ldots\ldots\ldots\ldots\ldots (1.2)$$

Inreversible adiabaticprocesses forsuch gases,however, the temperaturerises on compressionataratesuchthat

$$T\propto \rho^{(\gamma-1)},\ p \propto \rho^{\gamma} \ldots\ldots\ldots\ldots\ldots (1.3)$$

And

$$\beta s = \rho^{-1}(\delta\rho/\delta p)_s = (\gamma p)^{-1} = \beta_T/\gamma, \ldots\ldots\ldots\ldots\ldots (1.4)$$

Whereγ isabout 1.4 forair and takessimilar values forother common gases.For liquids theratio betweentheisothermal andadiabatic compressibilityis muchcloser tounity.Forliquids,however, bothcompressibility arenormallymuch lessthan p−1,and the simplifyingassumptionthattheyare zeroisoftenjustified.

Thefactorγ isnot onlytheratio betweentwo compressibility;it isalsothe ratiobetween

twoprincipalspecific heats.The molarspecific heatisthe amountofheatrequiredto raisethe temperatureof onemole throughone degree.This isgreater ifthe substanceis allowedtoexpand asit isheated, andtherefore todo work,than ifits volumeis fixed.The principalmolarspecific heats,CPand CV,refer toheatingat constantpressureand constantvolume,respectively,and Equation.Forair,CPisabout3.5R [1]

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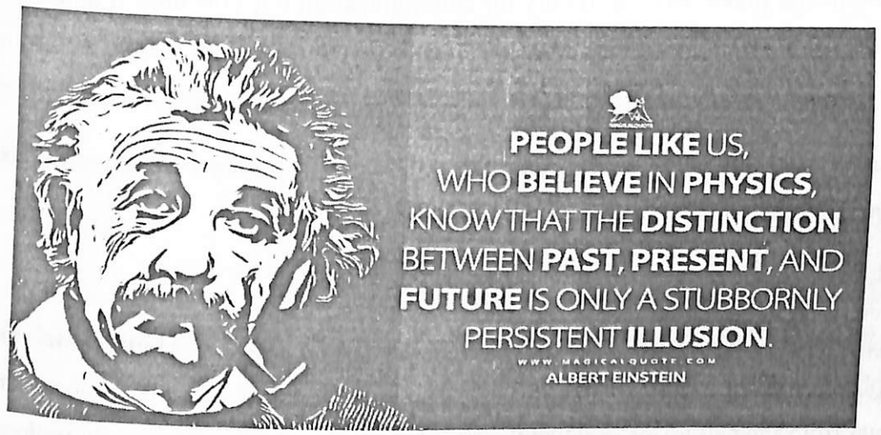

CELL PHONE

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ABSTRACT

Now a days, technology is getting really advanced and it is becoming an essential part of life. The most rapidly growing technologies in the world is cell phone. Cell phone is also called as a mobile phone. Today cell phones are the devices which provide all the facilities what a user need in his/her daily life, such as email, notebook, Bluetooth, high resolution camera applications, video call and many others computerized applications that a human being can just think of like everything has a positive and negative side.

KEYWORD: Mobile phone and cell phone work

INTRODUCTION:

A cell phone is a device used for various purposes. The mobile phone can be used to communicate over long distances without wire. Another name for cell phone is mobile phone in earlier times mobile phone were used only for communication but now days it is used for various purposes. It is a multipurpose device. We can communicate with people all around the world using various mobile applications.

A phone with access to a cellular radio system so it can be used over a wide area, without a physical connection to a network, a mobile phone.

METHODOLOGY:

A cell phone is a two way wireless communication device and needs both the inbound signal (reception) and the outbound signal (transmission) to work. The magnitude of the received signal from the cell tower is called the signal strength, which is commonly indicated by the bars on phone. The connectivity between a cell and its cellular network depends on both signals and is affected by many factors, such as the distance between the phone and the nearest cell tower, the number of impediment between them and the wireless technology.

A cell phone is essentially a two way radio consisting of a radio transmitter and a radio receiver. Cell phones used radio waves to communicate. Radio waves transport digitized voice or data in the form of oscillating electric and magnetic fields, called the

electromagnetic field (EMF). The rate of oscillation is called frequency. Radio waves carry the information and travel in air at the speed of light. Cell phones transmit radio waves in all direction. The waves can be absorbed and reflected by surrounding objects before they reach the nearest cell tower.

ADVANTAGES:

1. Cell phone keep us connected. We can call anyone in the world easily. Moreover we can make video calls too with cell phone.

2. We can access internet with our cell phone. We can gain a lot knowledge from website and YouTube channel.

3. We can store a lot of information on a cell phone. Images, video and text files can be saved.

4. It is also used in marketing purpose. We can store a lot of business document.

DISADVANTAGES:

1. People are mostly interacting with others through phone call and social media.

2. Cell phone cause isolation in people.

3. The cell phone radiation can bring an adverse effects on human health.

4. Cell phones are one of main reason for road accident.

CONCLUSION:

Cell phones have brought on a whole new age of technology and they do make life more convenient in terms of communication. However, the side effects of cell phones and the distractions that they are cause many dangerous and unhealthy situations to occur. Cell phones cause brain damage, car accidents and are distractions at school. On top of that, they are also huge threats to the environment. When comparing the health of ourselves and our world to convenience, our world is more important.

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INTERNET

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INTRODUCTION

It's no secret that more and more the internet is becoming an integral part of our everyday lives. But if you are new to the online experience, it may be a bit overwhelming.

INTERNET TODAY

In the early days, most people just used the internet to search for information. Today's internet is a constantlyevolving tool that not only contains an amazing variety of information, but also provides new ways of accessing, interacting and connecting with people and content. As a result, new terms are constantlyappearing as new technologies are introduced.

WHAT IS INTERNET

The internet is the largest computer network in the world, connecting millions of computers. A network is agroup of two or more computer systems linked together.

TYPES OF COMPUTER NETWORKS:

Local Area Network (LAN): A LAN is two or more connected computers sharing certain resources in arelatively small geographic location, often in the same building. Examples include home networks and officenetworks.

Wide Area Network (WAN):-A WAN is typically consist of two or moreLANs.The computers are further apart and are linked by telephone lines. The internet is the largest wide area network (WAN) in existence.

SERVERS AND CLIENTS

The World Wide Web (WWW)

When most people think of the internet, the first thing they think about is the World Wide Web. Nowadays, theterms "internet" and "World Wide Web" are often used interchangeably—but they're actually not the same thing.

1. The internet is the physical network of computers all over the world.

2. The World Wide Web is a virtual network of web sites connected by hyperlinks (or "links"). Web sites are stored on servers on the internet, so the World Wide Web is a part of the internet.

HTML: The backbone of the World Wide Web is made of HTML files, which are specially-formatted documents that can contain links, as well as images and other media. All web browsers can read HTML files. In addition to HTML, it's also very common for websites to use technologies like CSS (Cascading Style Sheets) and JavaScript to-do more advanced things.

URL: To get to a web page, you can type the URL (Uniform Resource Locator) in a browser. The URL, also knowns the web address, tells the browser exactly where to find the page. However, most of the time, people get to aweb page by following a link from a different page or by searching for the page with a search engine.

CONCLUSION

Hence the conclusion is that internet has made our live and day today tasks so easy as compared to our past lives. And we use internet in many uses in our day today live. But it has its benefits and side effects too.

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