

# ***ELECTRAZINE***



***ELEVENTH EDITION-DECEMBER 2020***

***DEPARTMENT OF ELECTRICAL ENGINEERING***



***NIT AGARTALA***

TECHNICAL



ENGLISH



## FROM THE EDITOR

It is a pleasure that the eleventh issue of Electrazine is being published in spite of the devastating global pandemic situation owing to COVID19, a virus that has not only caused severe causality to human life but has also forced us to restrain ourselves completely in our homes. It has gravely affected every sphere of life and we the teachers are no exception to this. We have to spend hours with our mobile, laptop, tablet etc allowing only virtual interaction with our students. In spite of all these odds, I am really happy to let you know that our esteemed faculty members and beloved students have enthusiastically and promptly responded to my call for contributions towards this edition of Electrazine. I am very much thankful to all of them.

I am confident that this magazine would find warm appreciation and welcome from all.

**Sumita Deb**  
Chief Editor

## EDITOR IN CHIEF

Sumita Deb

## DESIGN TEAM

Moumita Saha

Jaya Saha



“DESIGN IS A WAY OF LIFE, A POINT OF VIEW. IT INVOLVES THE WHOLE COMPLEX OF VISUAL COMMUNICATIONS: TALENT, CREATIVE ABILITY, MANUAL SKILL AND TECHNICAL KNOWLEDGE. AESTHETICS AND ECONOMIS, TECHNOLOGY AND PSYCHOLOGY AND INTRINSICALLY RELATED TO THE PROCESS.”

- ANONYMOUS

*The Department of Electrical Engineering was established at NJT Agartala (then Tripura Engineering College) in 1965. Over the last few decades, our graduates have been serving the society in key positions and have made tremendous contributions to the development of India in its evolution from an industrial based to knowledge-based company.*

*The field of Electrical Engineering encompasses many exciting technologies: Microelectronics, HV Transmission, Power Generation etc, which have been the fastest growing and most challenging technologies that enable the development of the modern information-based society.*

*Our department provides tremendous opportunities for cross-interaction both in terms of teaching and research. The department has a wide range of research activities and has been recently accredited by NBA for a period of 2 years.*

*Thus I feel very happy in presenting ELECTRAFINE on the eve of X-mass and HAPPY NEW YEAR. In a subtle sense it is the celebration of joy and rejuvenates us to struggle harder in our lives. This magazine brings us an opportunity to the students to celebrate their individuality by showcasing their hidden talent and helps them to unleash their potential.*

*I hope this magazine will enjoyed by all of us as before.*

*Dr. Priya Nath Das*

*HOD, Electrical Engineering*

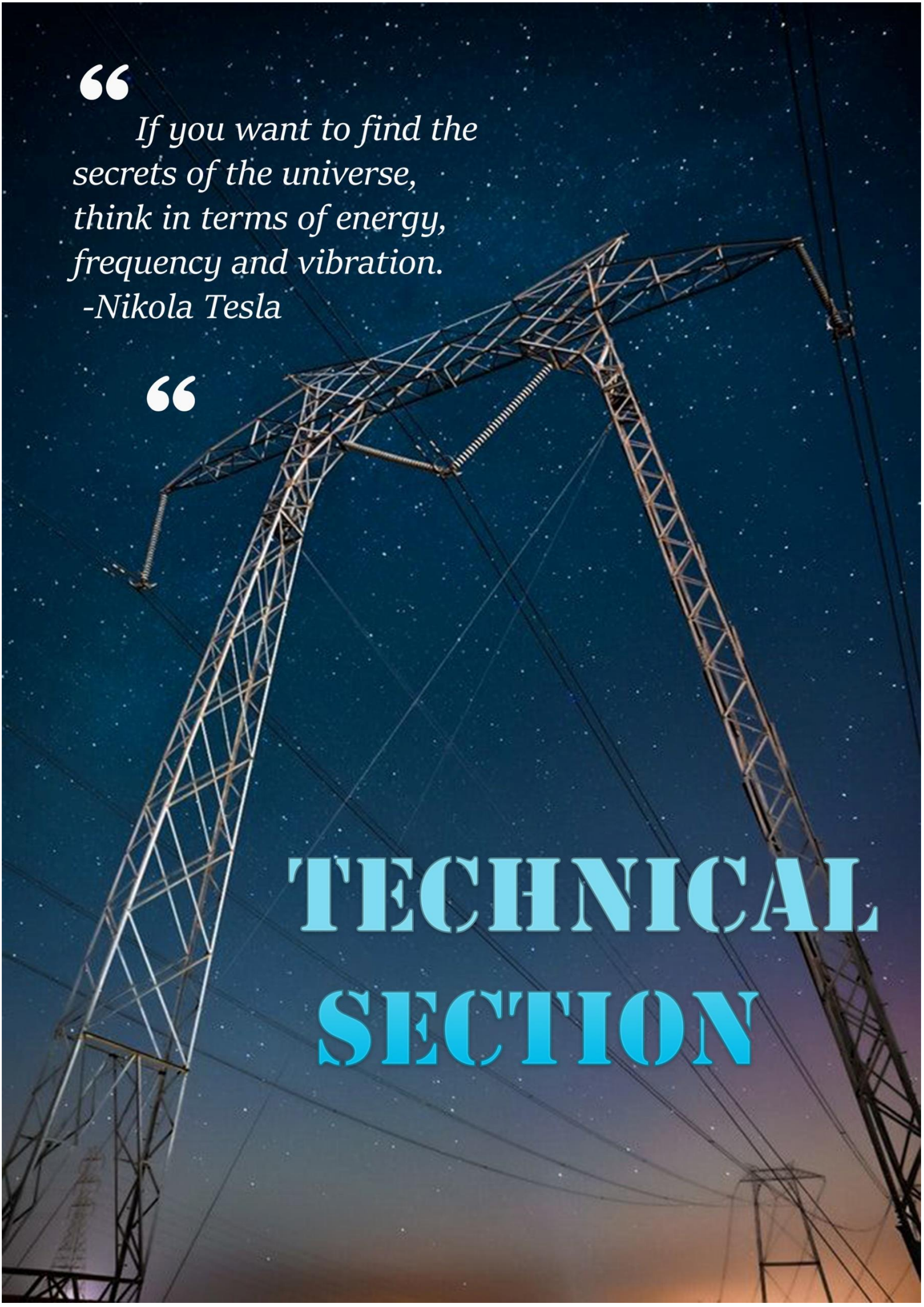
“

*If you want to find the secrets of the universe, think in terms of energy, frequency and vibration.*

*-Nikola Tesla*

“

# TECHNICAL SECTION



# SOLAR POWER GENERATION AND TRANSMISSION OF COMMUNICATION SIGNAL THROUGH E-HIGHWAY

Ranit Sengupta

## **Abstract**

In order to reduce the environmental hazards and deficiency of non-renewable resources, development of Electric Vehicle is a remarkable step. As India going to replace the power sector from conventional non-renewable energy resources to renewable energy resources like solar, wind energy. E-highway will play a significant role on it. Through E-highway solar power can be generated and communication signal is also transmitted from which Internet is provided to the rural areas situated besides the E-highway.

## **Implementation**

The concept of E-highway is not new, with a number of other countries already testing this idea. In august 2017, the German state of Hesse awarded a contract to siemens to build an overhead contact line for electrified freight transport on a 10km stretch of motorway. As part of strategy to boost electric mobility in the country, India is also planning to launch E-highway. Initially, a 10km pilot e-highway will be built with overhead electric lines to power the engines of trucks and buses. Mainly engines are replaced with motors. As we know through E-Highway, two overhead wires are connected to supply power to the Electric Vehicle and those wire suspended from supporting steel pole. Each pole is having 1 or 2 solar panel of 250 watt, from which 250 to 500-watt power can be generated in a bright sunny day. As considering the length of 10 km long E-highway, supporting poles are placed 100m apart from each other and total number of poles will be 100. As a result, 25kw to 30kw power can be generated from the 10km long E-highway and this power is fed back to the grid. This power can be utilized for rural area electrification situated besides the E-highway. As we know India is going to get 5G

internet service, so it can be transmitted through the wire of E-highway. It can distribute connections to its terminal point or use to serve internet connection in nearby rural villages across the highway where internet is still a dream till today. That MHz range signal can be collected from power line by a device name “wave trapper” which is use in High Voltage Power substations to communicate through Transmission line to another substation. In 2018 in Netherlands, during an attempt to test 5G connectivity nearly 300 birds lost live. Wire transmission of 5G is the best option for that. This implementation will lead the country forward with green and eco-friendly technology.

---

**STORAGE SYSTEMS FOR H<sub>2</sub> FUEL**



# H<sub>2</sub> CALLS FOR A CARBON FREE FUTURE

Madhumita Pal

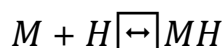
MTech 3<sup>rd</sup>Sem, Integrated Energy systems

## 1. BRIEF INTRODUCTION

The global warming today knocks for a new fuel instead of Co<sub>2</sub>. H<sub>2</sub> provides a promising hand in replacement of the fossil fuel. Germany is leading in implementing in H<sub>2</sub> fuel via automobile sector, power sector. But what is keeping this new fuel so challenging in India and other developing countries? The answer lies in the storage technology which is in its germinating stage. Compressed gaseous hydrogen storage is one of the best and reliable ways of storing H<sub>2</sub> which is seen in the industries, factories. But with emerging technology solid- state H<sub>2</sub> has turned up to be advantageous for its high-density volume storage capacity in a small area.

## 2. METAL HYDRIDE

The reversible reaction of absorption and de-absorption makes MH a viable, efficient option for storing H<sub>2</sub>. Its uses can be seen in integration with Fuel cell for better energy-heat management.



Examples of such material Ti-Cr-V, MgH<sub>2</sub>, AB<sub>2</sub> type alloys.

2.1. There is an optimum refilling rate of MH in any cylindrical tank as per its dimensions, such that the heat generated during the process doesn't burn the H<sub>2</sub> within the tank. This can be analyzed using the graphs

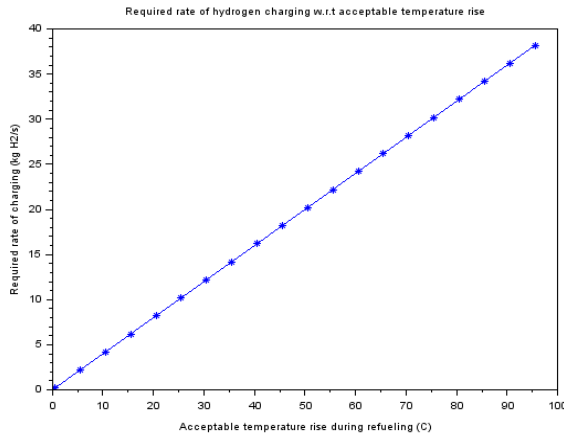


Fig 1 A

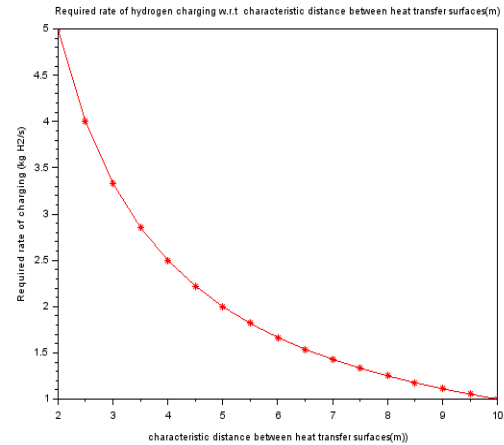


Fig 1 B

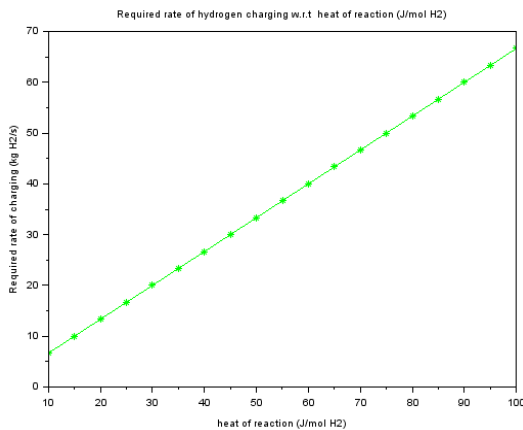


Fig 1 C

Fig 1: Required rate of charging a tank with H<sub>2</sub> is dependent on

Fig1A: Accepted rise in Temperature (°C)

Fig1B: characteristic distance between heat transfer surfaces (m)

Fig 1C: Heat of reaction (J/mol H<sub>2</sub>)

### 3.GAS- SOLID HYBRID STORAGE SYSTEM

Various alloys are used to store H<sub>2</sub> in the storage tank such that total internal volume of the tank is

$$V_{\text{total}} = V_{\text{alloy}} + V_{\text{gas}} + V_o ; \quad V_o = 0.2(V_{\text{alloy}} + V_{\text{gas}});$$

$V_{\text{gas}}$  = internal cylinder volume that contains only gaseous hydrogen.

$V_{\text{alloy}}$  = internal cylinder volume that is filled with alloy

$V_o$  = dead volume of the tank including valves, gas tubes, cylinder body, thermal conductor, etc.

The volumetric hydrogen storage density of the tank (kg m<sup>-3</sup>) is

$$\rho v = \frac{m_{solid} + m_{gas}}{V_{total}};$$

$m_{solid}$  = weight of the solid-state hydrogen stored;  $m_{gas}$  = weight of the gaseous hydrogen stored;

$\rho v$  Varies according to ideal gas equation and is analyzed according to following graphs.

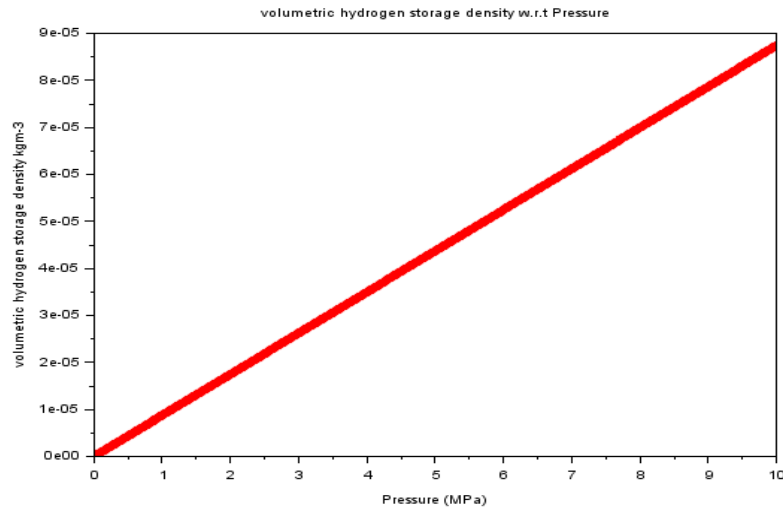


Fig.2.therelationship between volumetric hydrogen storage density and hydrogen pressure (MPa). (At T=300k)

#### 4. STORAGE ON NANOPOROUS SOLID MATERIALS

Solid nano porous materials, such as nano porous carbons, porous polymers and Metal Organic Frameworks (MOFs) are the surfaces to store H<sub>2</sub> on board. The internal high storage capacities are the advantages of these materials at nano scale (10<sup>-9</sup> m).

The volumetric capacity in kg/L is calculated as-

$$v = \frac{a}{vmol} * \frac{v_{adsorbed}}{vpore};$$

$a$  = conversion factor, to convert from moles to kg of hydrogen;

$$vmol = \frac{v_{adsorbed}}{\text{moles of H adsorbed}};$$

$v_{adsorbed}$  = volumes of the adsorbed hydrogen phase;  $vpore$  = volumes of the pore.

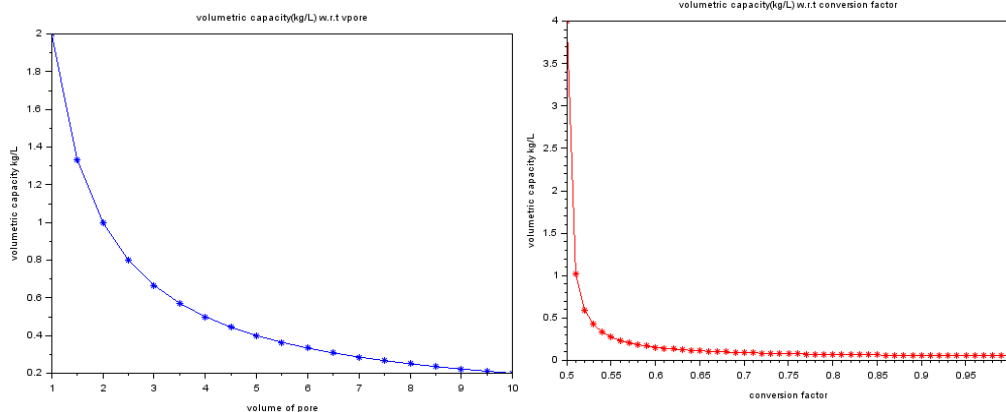


Fig 3 A

Fig 3 B

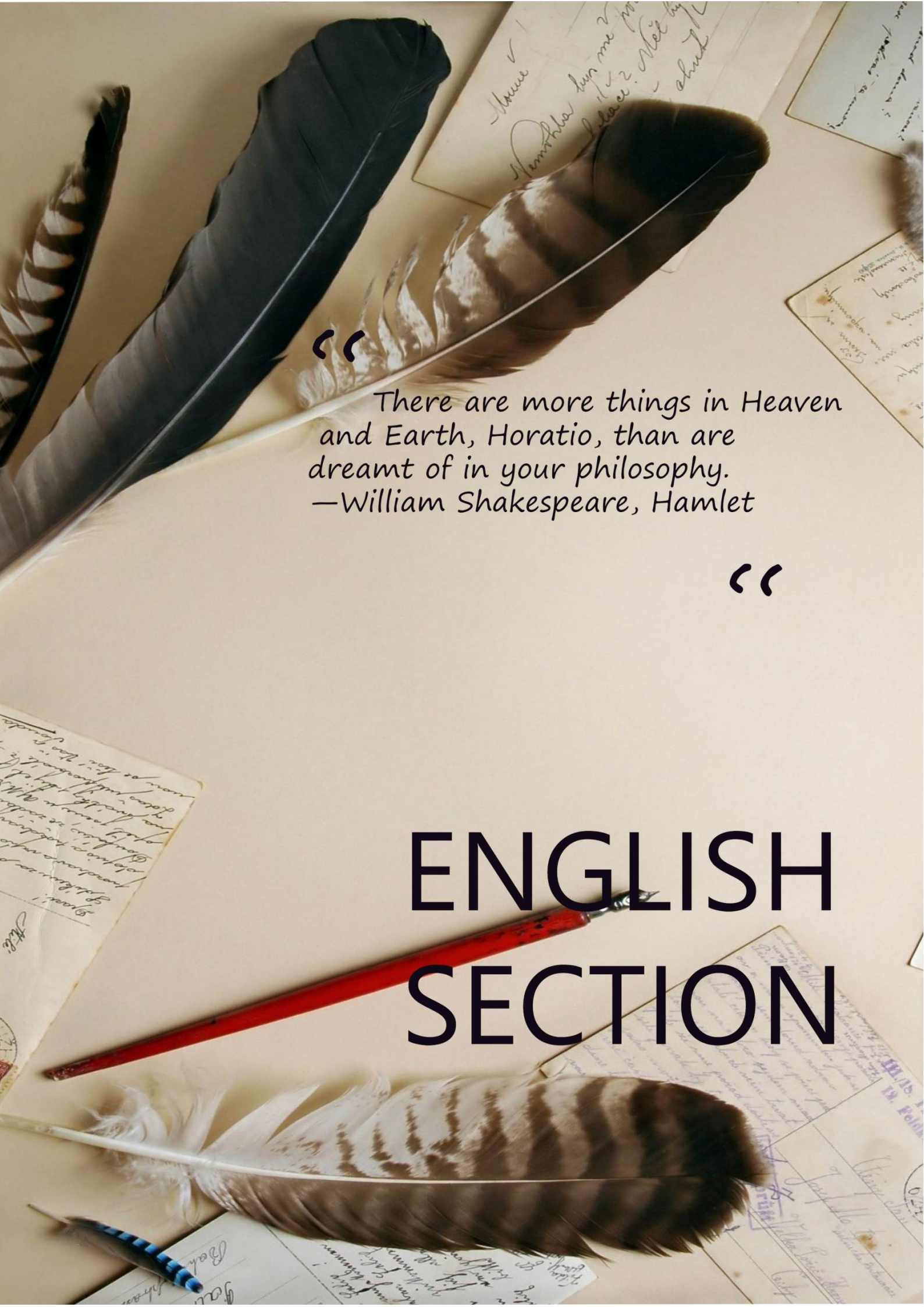
Fig 3 the relation between volumetric capacity in nanomaterial graphene with volume of pore (fig 3A) and with conversion factor (fig 3 B)

## 5. CONCLUSION

Various factors such as temperature, pressure etc. determine the suitable storage systems for H<sub>2</sub>. The nanoparticles and hybrid gas-solid storage systems are two ongoing research areas for storing this clean fuel. The need of the hour is a vibrant approach to harness cheap technology reliant to strategic utilization of it for generating energy as per requirement and demands.

## 6. REFERENCES FOR THIS ARTICLE

1. Development of a gaseous and solid-state hybrid system for stationary hydrogen energy storage.
2. Comparison of theoretical methods of the hydrogen storage capacities of nano porous carbons.
3. Design tool for estimating metal hydride storage system characteristics for light-duty hydrogen fuel cell vehicles.

A top-down view of a desk with several quills and a red pencil. The quills are of various colors, including dark grey, brown, and white with brown stripes. The red pencil is positioned horizontally across the middle. The background is filled with several pieces of aged, yellowed paper with handwritten text in cursive. The lighting is soft and even.

“  
There are more things in Heaven  
and Earth, Horatio, than are  
dreamt of in your philosophy.  
—William Shakespeare, Hamlet

“

# ENGLISH SECTION

# Ethics of Life

**MAHESWAR PATRA  
M.TECH (3<sup>RD</sup> SEMESTER)  
POWER SYSTEM ENGINEERING**

*World is full of worries & trouble  
Happiness is just like a soap bubble  
Visible until you don't touch  
When in contact lasts not much  
A little comfort & a little pain  
Both is needed like sun & rain  
Best is peace & never violence  
Sometimes noise & sometimes silence  
Always thinking of loss & gain!?  
Helping the indigent never goes in vain  
What's required is a little solidarity  
That's what we call a life of quality  
Life is a crop that you cultivate  
Live your own, please don't imitate  
As long you live, live with dignity  
Nothing will last for all eternity*

# CHAOS – An invisible push

**MADHUMITA PAL  
M.TECH (3<sup>RD</sup> SEMESTER)  
INTEGRATED ENERGY SYSTEMS**

## to change

*Some people have lived a chaos*

*Some have ignored it*

*Some have even craved it*

*While some have excused it*

*In common everyone have survived it*

*Either it turns your best*

*Or it crawls your worst*

*Either it heals you up*

*Or it slays you back down*

*In common your own chaos has changed your soul...*

# Live the breath

*MADHUMITA PAL  
M.TECH (3<sup>RD</sup> SEMESTER)  
INTEGRATED ENERGY SYSTEMS*

# quieter



*Fall deeper  
Wake up stronger  
Think calmer  
Work bolder*



*Love the heart*

*And forgive*

*When time*

*Hold the*

**MADHUMITA PAL  
M.TECH (3<sup>RD</sup> SEMESTER)  
INTEGRATED ENERGY SYSTEMS**

*the hurt*

*flows opposite*

*strong pillar*

*stronger*

# Uncertainty

*A second is uncertain to create you*

*A second is uncertain to destroy you*

*A second is uncertain to break you*

*&*

*A second is uncertain to repair you*

*Live that each moment*

*Pay that each moment*

*Smile those each second*

*Cry for those each second*

*Success and failures are just parts,*

*But to live and to let humanity live are the full stories of it.*



MAHESWAR PATRA  
M.TECH (3<sup>RD</sup> SEMESTER)  
POWER SYSTEM ENGINEERING

# #BLACK LIVES MATTER

*Caste, creed & colour separation*  
*A big mockery to Almighty's creation*  
*Discriminating people saying white & black*  
*Shows nothing but your mental drawback*  
*Okay, okay let me get this straight*  
*Don't be in illusion that you will write our fate*  
*Nothing will change though much is said*  
*Until you realize what message you want to spread*  
*Doesn't affect them how loud we scream*  
*No racism is still a dream*  
*Hate, slap, punch, kick is what they give*  
*Living in 2020, do we really need to speak!!?*  
*To humanity it's just like a speck*  
*But their knees will be on our neck*  
*No matter what we still be a target*  
*Colour of our skin continue to be a threat*



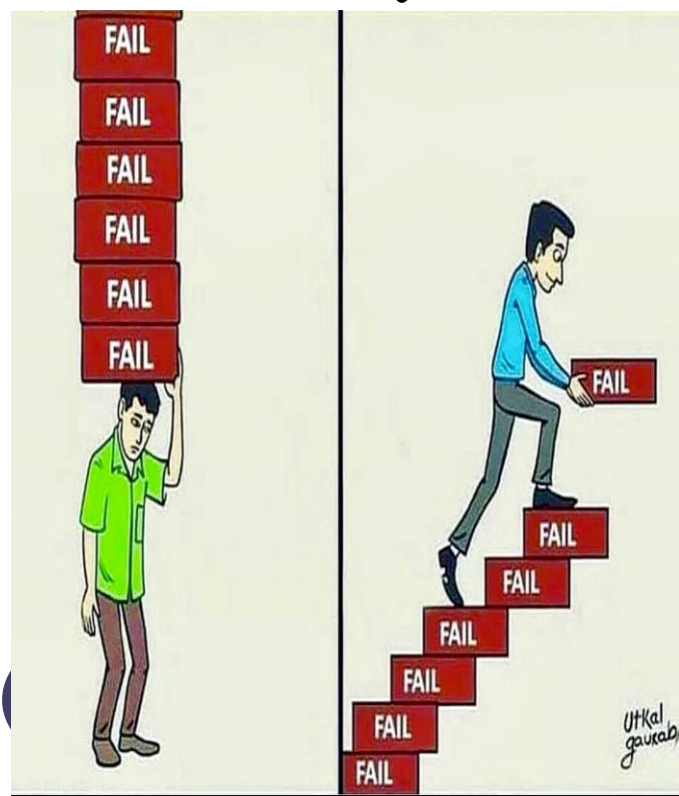
*Support to end this utter nonsense*  
*We can't bear more barbaric violence*  
*Oh stop! Please, we can't breathe*  
*We beg of you!! Just go & leave*

# Failure is the ~~key~~ to

**MOUMITA SAHA**  
**PHD SCHOLAR**  
**ELECTRICAL ENGINEERING**

## ~~Success~~ ingredient for *Creativity*

“Change is the only constant”  
and we need to modify our



conventional proverbs with time.

The well-known proverb “Failure is the key to Success” is no more valid for to-days generation. Persistence and certitude are the difference between success and **failure**. So if we want to succeed, we have to learn from our failure and need to modify our streamline in a creative way. Fail often, fail fast and take break to think creative. The more times we fail, the closer we are getting to success because we get more time to think before taking our next step.

Revolution cannot be achieved by hard work but by smart work.

One of the **key** ingredients of **smart work** is **failure**. We all are willing to do breathless job from day to night unless until failure knock the door. In order to be **creative**, we have to be willing to **fail**.

In order to build a culture that's unafraid to **fail**, we have to be willing to trust people to make mistakes and fix them quickly.

Failure and creativity go hand in hand.

## **Walt Disney**

*Mickey Mouse* creator Walt Disney dropped out of school at a young age in a failed attempt at joining the army. One of his earlier ventures, Laugh-o-Gram Studios, went bankrupt due to his lack of ability to run a successful business. He was once fired from a Missouri newspaper for “not being creative enough.” Yet today, the genius behind Disney studios is responsible for generations of childhood memories and dreams. From *Snow White* to *Frozen*, Disney will continue to entertain the world for generations to come.

## **Vincent Van Gogh**

During his lifetime, Vincent Van Gogh suffered mental illness, failed relationships, and committed suicide at the age of 37.

He only ever sold one painting in his life, pinning him a failure as an artist. However that did not put a damper on his enthusiasm and passion for art.

He would never know that years and years after his death he would become known as a key figure in the world of post-impressionism, and ultimately, one of the greatest artist that ever lived. He would never

know that he became a hot topic in art classes and his image was going to be used in TV, books and other forms of popular culture.

## **Oprah Winfrey**

She grew up in extreme poverty and was even fired from her first job at Baltimore's WJZ. She created the highest-ranked talk show in Chicago and secured a career as a successful producer and philanthropist.

**JAYA SAHA**  
**PHD SCHOLAR**  
**ELECTRICAL ENGINEERING**

# **Mysterious Covid-19 Pandemic**

On 31 December 2019, unknown pneumonia cases were reported in people associated with the Huanan Seafood Wholesale Market in Wuhan, Hubei Province, China. On January 7, 2020, the Chinese health authorities confirmed that this case community was associated with a new type of coronavirus.

Later, this clinical picture was named Coronavirus disease 2019



(COVID-19), and its factor was reported as “Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2)”. COVID-19, which has been declared a pandemic with current data, continues to spread by increasing the number of infected cases and mortality day by day. SARS-CoV, an epidemic with viruses from the same family, appeared in 2002-2003, while 8,000 cases and 800 deaths occurred; Middle East Respiratory syndrome (MERS)-CoV appeared in 2012, causing 2,500 cases and 800 deaths.

On March 11, 2020, the World Health Organization (WHO) classified the COVID-19 infection as a pandemic.

More than six months into the pandemic, the coronavirus has infected more than 11 million people worldwide, killing more than 525,000. But despite the increasing toll, scientists still do not have a definitive answer to one of the most fundamental questions about the virus: **How deadly is it?**

A firm estimate could help governments predict how many deaths would ensue if the virus spread out of control. The figure, usually called the infection fatality rate, could tell health officials what to expect as the pandemic spreads to densely populated nations like Brazil, Nigeria and India.

In even poorer countries, where lethal threats like measles and malaria are constant and where hard budget choices are routine, the number could help officials decide whether to spend more on oxygen concentrators or ventilators, or on measles or on measles shots and mosquito-nets.

The question became even more complex, when the Centers for Disease Control and Prevention released data suggesting that for every documented infection in the United States, there were 10 other cases on average that had gone unrecorded, probably because they were very mild or asymptomatic. If there are many more asymptomatic infections than once thought, then the virus may be less deadly than it has appeared. But even that calculation is a difficult one.

### **Differences in Sensitivity of Children and Adults to COVID-19**

There are some studies investigating why the disease is transmitted in children with a milder clinic picture. Due to the immature immune system in children, there are some data supporting the rarely occurrence or slight effect of some infections. For example; It has been shown that

immature mice do not have poliovirus-induced paralysis due to maturational changes of the axonal transport system. Another thesis is that children have a more active natural immune response. Unlike adults, less exposure to air pollution and cigarette smoke, and other factors such as underlying diseases are thought to be the reason for the healthier airways of children. In addition, acute respiratory distress syndrome (ARDS) was associated with a much stronger immune response reaction in adults. One of the most remarkable reasons among these is that the distribution, maturation and functional differences of viral receptors vary depending on age. SARS-CoV, SARS-CoV-2 and human coronavirus NL63 use the SARS-CoV receptor, namely angiotensin converting enzyme-2 (ACE-2) as a cell receptor to enter the host cells in humans. As a result, these and similar effects can be cited as the reason why children are more resistant to COVID-19 infections.

In adults infected with the SARS-CoV-2 virus, there is a markable or progressive decrease in the number of peripheral absolute lymphocytes at an early stage. Both the CD4+ and CD8+ lymphocyte count decrease, and the neutrophil/lymphocyte ratio increases as SARS-CoV-2 consumes lymphocytes as an early and prominent sign. This proves that the virus used lymphocytes to reproduce and spread in the early stages. Adult cases become severe within 7-10 days from the onset of the disease. As a result of rapid virus replication, inflammatory cell infiltration, pro-inflammatory cytokines, and chemokine response increase, transition to ARDS, which is fatal lung injury occurs. The fact that the number of leukocytes and absolute lymphocytes is quite normal and there is no decrease in lymphocytes after the SARS-CoV-2 infection in children suggests that there is fewer immune dysfunction.

On the other hand, mild COVID-19 disease in children may be associated with trained immunity/active immunization. The creation of a trained immune system is a new immune model. Some designated vaccines, such as Bacillus Calmette Guerin (BCG), create immune memory by training natural immunity. Most of the children in China and Asia are regularly vaccinated according to the routine scheme, which also includes BCG. In the light of this information, it should be investigated in more detail in terms of educating the immune system with vaccination, which may be one of the reasons why children have less ARDS than adults.

## **Economic Consequences of the COVID-19 Outbreak**

As the spread of the virus is likely to continue disrupting economic activity and negatively impact manufacturing and service industries, especially in developed countries, we expect that financial markets will continue to be volatile. There is still a question as to whether this unfolding crisis will have a lasting structural impact on the global economy or largely short-term financial and economic consequences. In either case, it is evident that communicable diseases such as COVID-19 have the potential to inflict severe economic and financial costs on regional and global economies. As outbreaks of novel infections are not likely to disappear in the near future, proactive international actions are required not only to save lives but also to protect economic prosperity

*RAJATSUBHRA*

# Sanatan Dharma

## The Origin

With the world fast-pacing into the technological development meridian, many of us from the prevailing the-human-race experience the hunger for external and internal or to be more specific, spiritual growth. Some bourgeoisie who claim themselves to be the more practical and advanced among us multitudes, reject this hunger and the need to satisfy it, as a mere waste of time and energy. But what they do not comprehend is this hunger fuels the creation and the perfect regulation of our time and energy.

Now, one might ask if this spiritual growth is so momentous and essential, how does one achieve it? The answer to that question lies in two words, that although seem limited but are infinite in possibilities and growth. The two words are Sanatana Dharma. What does Sanatana Dharma mean? Wikipedia defines Sanatana Dharma as "Sanātanadharmā (Devanagari; meaning "eternal dharma" or "eternal



order") is another name for Hinduism." Although the literal meaning is correct, Sanatana Dharma is not another name for Hinduism. Sanatana Dharma is not another name of any religion in this world.

Then what is Sanatana Dharma in reality? Sanatana Dharma is the external dharma or duties or laws that govern the existence of all life in this multiverse. According to Vedic Mathematics, the age of Sanatana Dharma is estimated to be 155.52 Trillion Years. Sanatana Dharma is eternal (beyond the time). It is the Universal Truth that sustains the very core of the Universe and its beings. It is defined by the quest for cosmic truth, just as the quest for physical truth defines science. In a broad sense, Sanatana Dharma represents a code of conduct and a value system that has spiritual freedom as its core. If any religion provides such a code of conduct and spiritual awakening, then that religion is Sanatana Dharma. By this syllogism, a Hindu, a Muslim, a Sikh, a Christian, a Buddhist, or be a person who is a devoted follower of any religion, is a practitioner of Sanatana Dharma. Every religion is Sanatana Dharma. One cannot limit it to a particular religion or cult or sect of society. Every religion teaches us the ways and enlightens the path to become more-virtuous varieties of ourselves.

Human nature has always been to become limitless in all aspects of our existence. Infinite knowledge, infinite strength, infinite durability, and so on. We want to become gods. In the Bible, it is written, God created us in his image. i.e. we are the sublets of God and it is our destiny to become Him.

But there are no such methods devised by the modern and advancing world to become limitless. As a gift to us, to help us reach the eternal and ultimate state of presence, to guide us on the path of becoming the Supreme Personality of Godhead, our forefathers left us with the knowledge of Sanatana Dharma.

Sanatana Dharma is...

1. God-centered rather than prophet-centered.
2. Experience-based rather than belief based.
3. Beyond any historical date of founding.

4. The process of growth, which comes from the seed.
5. Inherent in, and inclusive of all.
6. In the world, while above the world.
7. Both immanent and transcendent.
8. The whole and the parts.
9. Loving of all and excluding of none.

*RAJATSUBHRA*

Sanatana Dharma is Anadi (without beginning) and also a-paurusheya (without a human founder). Sanatana Dharma represents much more than just a religion. It provides its followers with an entire worldview, way of life, and with a coherent and rational view of the cosmic reality.

# Sanatan Dharma

## The Principles

In our previous article, we began our study or discussion on Sanatana Dharma and its origins. We got to know that Sanatana Dharma, just as its name suggests is eternal and was, is, and always will remain and be preserved even when nothing existed, exists, or will exist. We discovered that Sanatana Dharma enlightens the path for creatures born in this universe, created in God's image to be godlike, to be gods themselves. Sanatana Dharma teaches us humility and responsibility whilst making us masters of great powers, powers gained through enlightenment and liberation from this cycle of life and death. Sanatana Dharma teaches us to live in Death, Death which is ever constant and ever fair and unbiased.

Sanatana Dharma is delimited by the desideratum for cosmic veridicality, just as the desideratum for physical truth defines scientific discipline. Its earliest record is the Rigveda, which is the record of ancient sages who by whatever means tried to learn the truth about the universe concerning Man's place in the cosmos. They saw nature — including all living and non-living things — as part of the same cosmic equation, and as pervaded by a higher consciousness or Paramatman.

In this article, let us delve deeper into Sanatana Dharma by canvassing the principles it upholds.

1. Sanatana Dharma recognizes that the greater portion of human religious aspiration has always been unknown, undefined, and outside of any institutionalized belief.
2. The river of Dharma, regardless of what name you call it, whether Dharma or some other name is ever-flowing and has eternally existed. It has been before any of the great and ancient teachers were born. It is not better than, or alternative to, but is inclusive of all. Dharma is that out of which our earth and humanity itself emerged. Dharma not only is, but always was, and always will be. To live in alignment with, and to understand, the true nature of that Sanatana Dharma is one among the ways of describing the upper goal of life.
3. Sanatana Dharma gives reverence to individual spiritual experience over any formal religious doctrine. Wherever the Universal Truth is manifest, there's Sanatana Dharma — whether it's during a field of faith, art or science, or within the lifetime of an individual or community. Wherever the Universal Truth isn't recognized or is scaled-down and limited to a specific group, book, or person, albeit done so within the name of God, there Sanatana Dharma ceases to function, whatever we call the activity.
4. Sanatana Dharma comprises spiritual laws that govern human existence. Sanatana Dharma is to human life what natural laws are to the physical phenomena. Just as the phenomena of gravitation existed before they discovered it, the spiritual laws of life are eternal laws that existed before the ancient rishis (sages discovered them) for the present age during the Vedic period. Sanatana Dharma declares that something

cannot come out of nothingness and, therefore, the universe itself is the manifestation of the Divine Being.

5. Since Sanatana Dharma corresponds to those ways of being are in concert and complete harmony and are synchronous with the Brahman and are aphoristic laws, this term refers not to something open to alteration or mutation. Just as the laws of gravity, mathematics or logic are not flexible with prejudiced criticism or relativistic opinions (gravity, for example, is an inherent law of nature whether or not one believes in the law of gravity), similarly the subtle laws of God transcend all irrespective of their beliefs and nature

6. The universe is designed up of three depositions, reflexes, characteristics or tendencies called Gunas: Tamasic, Rajasic, and Sattvic. Tamasic tendencies are those that are inert, lazy, dull, and dark and procrastinating. Rajasic tendencies are people who are active, moving, indecisive, and forceful. Sattvic tendencies are those that are pure, clean, good, wholesome, calming, and peaceful. If it were not for these three tendencies, we would not exist. Everything in this universe a mixture of them. Even a saint who is primarily sattvic, no matter however small, has some level of rajas and tamas in him/her.

7. Sanatan Dharma utilizes Yoga as the means to realize Moksha or God-realization. A very bland and rough translation of Yoga means "union". It means "union", but that is a poor definition because it encompasses so much more. Yoga is the union with Brahman (Absolute God). Therefore, the word yoga is not merely a statement of a union, but it encompasses the experience of liberation. In simpler words, Yoga is Enlightenment or Moksha.

Just as a visible iceberg is only 10% of the actual size and mass of the complete iceberg, what we discuss in these articles is only skimming off the top of a magnificent and enormous iceberg that is ever-expanding. The more we know about it, the more we dive deeper into it, the more we get lost in its beauty and the more we come closer to the Paramatman.

**NATIONAL INSTITUTE OF TECHNOLOGY  
AGARTALA**



Semester Magazine of Department of Electrical Engineering  
NIT Agartala