NANDHA ENGINEERING COLLEGE (AUTONOMOUS)

Department of Chemical Engineering

Synch

----making things work together----

Volume-1 ✶ Issue-1 ✶ July to September (2024)

Officially in Association with Indian Institute of Chemical Engineers (IIChE) -
NEC Student Chapter, Erode.

PRINCIPAL'S MESSAGE

"Quality is never an accident; it is the result of hard work, determination, and perseverance."

It is with immense pride and satisfaction that Nandha Engineering College presents the latest edition of the magazine 'SYNCH,' brought out by the Department of Chemical Engineering. This magazine not only highlights the various academic and extracurricular activities of the department but also serves as a platform for showcasing the creative talents and intellectual contributions of both students and faculty. I am confident that this issue will resonate positively with our staff, students, and all those with an interest in technical education and technology-based initiatives.

In today's rapidly evolving world, the education system is constantly undergoing transformation. It is crucial for us to pause, reflect, and adapt to these changes, ensuring that we equip our students with the knowledge and skills required to succeed. 'SYNCH' reflects the vibrant energy of our department and its commitment to fostering an environment of innovation and excellence.

I would like to extend my heartfelt appreciation to all the contributors for their thought-provoking articles and varied perspectives. Special appreciation is due to the Editorial Board for their hard work and meticulous planning in producing this magazine. Your collective efforts are truly commendable.

Best wishes for the continued success of the Department and the magazine, and may it continue to inspire and motivate all involved.

HOD MESSAGE

Dear Readers,

As we step into another enriching year, I am pleased to present this edition of Synch Magazine, a platform that brings together the voices, creativity, and innovations of our students and faculty alike. This magazine is not just a collection of articles; it's a reflection of the vibrant academic and professional environment that we continue to nurture within our department.

I extend my heartfelt congratulations to everyone involved in bringing this edition to life. Your hard work, creativity, and passion are truly inspiring. I encourage all readers to engage with the content, participate in the discussions, and continue to push the boundaries of what is possible.

Thank you for your ongoing support, and I look forward to the exciting initiatives and milestones we will continue to reach together.

Warm regards,
Dr. P. Shanmugam
Head & Professor
Department of Chemical Engineering
Nandha Engineering College, Erode-52

In This Issue !

"Strive not to be a success,
but rather to be of value."...

AQUA-SOLAR-HARVEST – A POTENTIAL RESOURCE FOR PURE WATER

This article focuses on harnessing solar energy to produce fresh water from atmospheric air, specifically using the absorption-regeneration method. Materials that absorb moisture from the air at night such as calcium chloride are used in this process [1]. The absorbed water is released when the desiccant is renewed during the day using solar energy. The method provides an affordable substitute for desalination or water transportation and works particularly well in isolated locations with few freshwater resources.

Two main methods are emphasized. The absorption-regeneration method, which uses desiccants and the dew point method which cools air to condense moisture [2]. Because liquid desiccants can absorb more moisture and regenerate at lower temperatures, these process are recommended. According to several tests depending on the desiccant material, system design and local environment. These systems can generate one to two liters of water per square meter each day [2].

Highlight of the article

Solar-powered desiccant systems absorb moisture at night and release water during the day, offering a sustainable solution for water scarcity.

In order to understand and optimize these systems for broader implementation, an innovative and sustainable way to deal with water scarcity is to use solar energy to produce water from air, especially in isolated or dry areas where traditional water sources are not available. The two main strategies used in this approach are desiccant-based systems and dew point cooling. Dew point cooling is a complicated and energy-intensive process that condenses water by chilling humid air below its dew point. For small scale solar powered applications, desiccant-based systems is suitable which employ materials to absorb moisture from the air at night, the collected water is released during the day.

when the desiccant is renewed by solar energy, they can absorb more moisture and require lower regeneration temperatures (usually between 40 and 70°C), liquid desiccants like calcium chloride solutions are particularly effective and ideal for solar integration [3].

According to experimental findings depending on the local environment and system design, these systems can generate one to three liters of water per square meter every day [4]. This approach lessens dependency on fossil fuels and conventional infrastructure by offering a decentralized and sustainable water production alternative. To maximize system efficiency more research is required and investigate novel materials to improve water yield in a range of environmental circumstances.

By
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VOYAGE OF THE STARS

About 10% of the apparent mass of a galaxy is covered by interstellar space, such as the Milky Way. Stars are made up of the stuff that exists in interstellar space (A.K.A) Interstellar medium. It is mostly composed of gas with trace amounts of dust, electromagnetic radiation, cosmic rays. [1]

The Interstellar medium consists of several phases classified by temperature and density, including the hot ionized medium, H_2 regions (photo-ionized hydrogen), the warm, cool and neutral medium and the dense molecular gas medium where star formation occurs. Within massive molecular clouds, high-density cores collapse under gravity to form stars, making the dense molecular gas the primary site for star formation.[1]

Highlight of the article

Stars form from dense molecular gas in the interstellar medium, evolving through fusion. They end their lives in supernovae, enriching space with elements and energy.

Star formation occurs through feedback processes like winds which have the ability to ionize and blow away surrounding gas, stars also interact with the Interstellar medium. These processes impact future star formation by changing the surrounding environment. As can be observed in areas such as the Orion Nebula, young stars release stellar winds and ultraviolet light that create holes. [2]

As these strong gravity gives birth to a young star it'll emit enormous energy like light, heat, and many more by nuclear fission reaction of H_2 to He, until all hydrogen converts into helium. As everything has an end, the star ends its life by supernova

SUPERNOVA

The demise of a large star or runaway fusion in a white dwarf is signaled by a supernova, which is a violent explosion. Either the progenitor star is killed, leaving behind a nebula or it collapses into a black hole or neutron star. Whole galaxies may be momentarily eclipsed by supernovae, with peak luminosity declining over weeks or months. Kepler's supernova in 1604 was the last one seen in the Milky Way and other ones happen around every hundred years. Two processes can cause supernova the collapse of a big star's core or the reignition of fusion in a white dwarf as a result of accretion or merging. High-speed material expuls from these explosions produces shock waves that enrich the interstellar medium create remnants and produce cosmic rays which may cause gravitational waves.[3]

By
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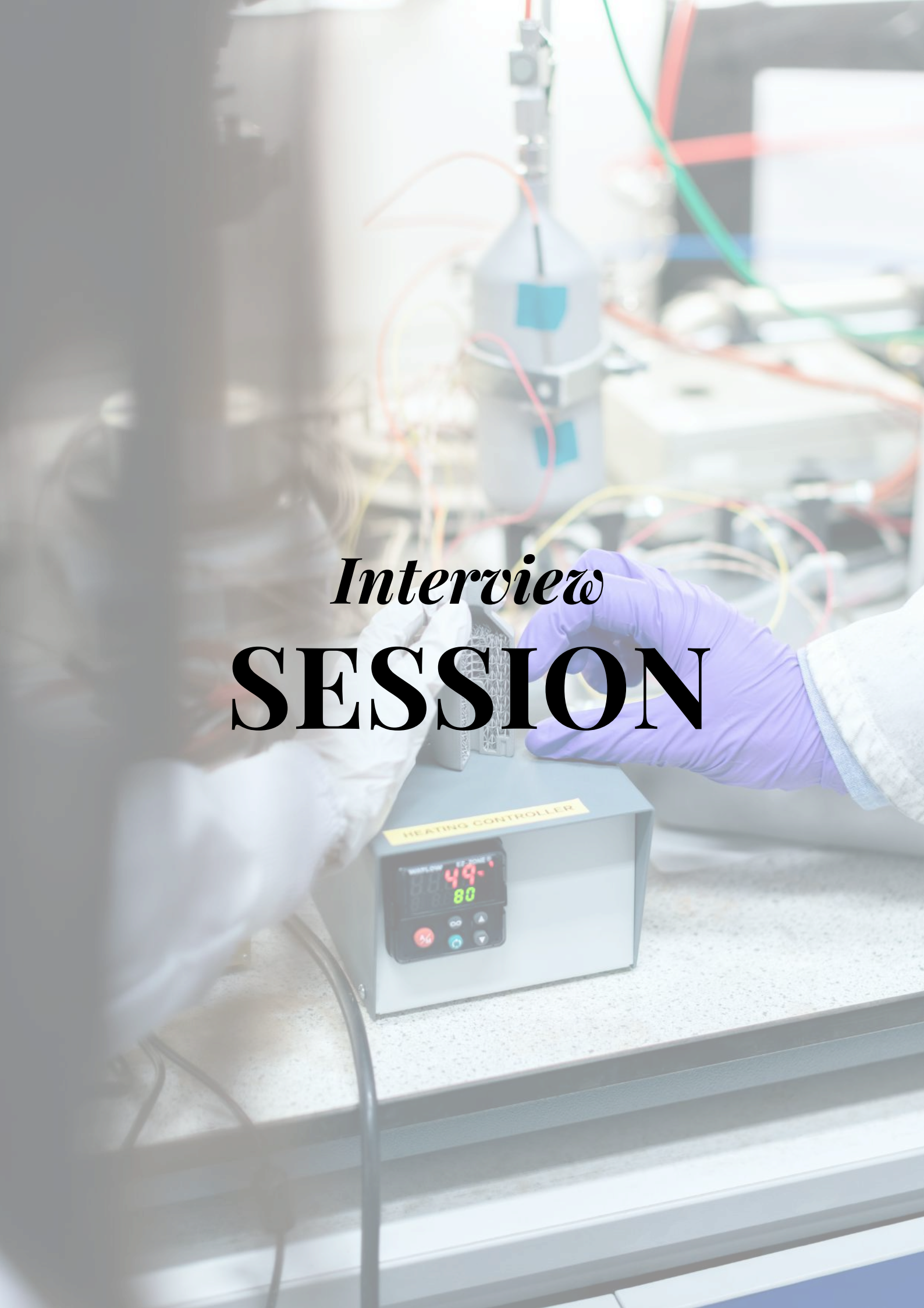


Interview

SESSION

Academic Journey and Career Reminescence

Interview with Dr. D. Revathi, Associate Professor/Chemical Nandha Engineering College, Erode.

Interviewer: Dr. Revathi mam, could you share some details about your educational journey and early career?

Dr. D. Revathi: I began my primary education at Kongu Vellalar Matriculation Higher Secondary School and did Secondary education at A.E.T. Matriculation Higher Secondary School. I completed my undergraduate degree in Chemical Engineering at Kongu Engineering College, Erode in 2000 and my M.Tech., in Chemical Engineering at Coimbatore Institute of Technology, Coimbatore in 2002, and Ph.D. in Chemical Engineering at Anna University, Chennai in 2020.

Interviewer: You've had a diverse career. Can you tell us more?

Dr. Revathi: I started my career as a lecturer at Nandha Polytechnic College and then moved to Kongu Polytechnic College. After working in the industry at Sathiyam Computers and IBilt Technology, I returned to academia in 2010. I served as Assistant Professor Sr. Grade at Kongu Engineering College. Held various positions throughout my tenure namely Department Placement Coordinator (10 years), Student Counselor (10 years), Lab-Incharge, Alumni Coordinator, Project Coordinator, NAAC and NBA Criterion Incharge, etc., in teaching profession and as Test Engineer and Test Lead in Software industry. Currently, I am pursuing my career as Associate Professor at Erode Nandha Engineering College.

Interviewer: What are your main research areas?

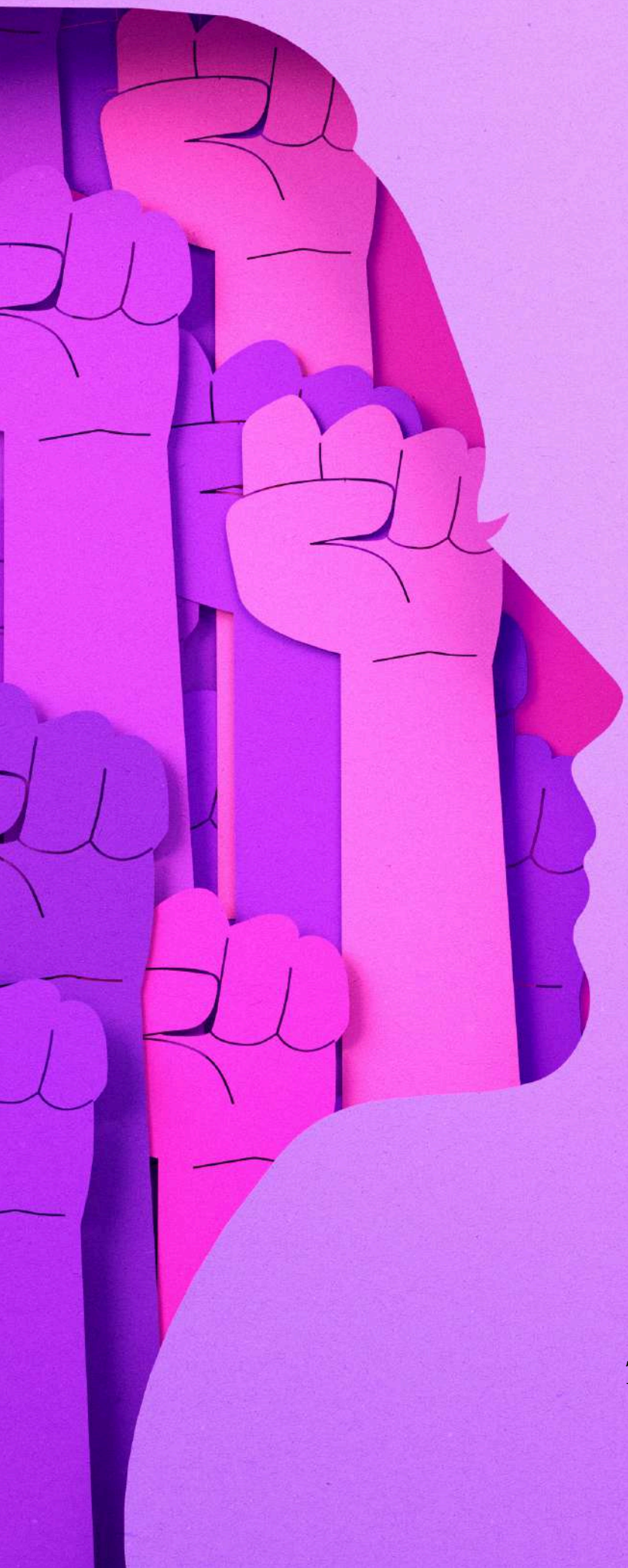
Dr. Revathi: My passion for applications of chemical engineering concepts with technological advancements drives me towards enhancing my technical skill in Computational Fluid Dynamics.

Interviewer: Any advice for students aspiring to pursue Chemical Engineering?

Dr. Revathi: Be curious, focus on building a solid foundation, embrace technology, and never stop learning. Passion and perseverance are key to success .

Quote:

"The greatest pleasure in life is doing things that people say you cannot do."



VOICE OF WOMEN

Empowerment WOMEN

The empowerment of women is the key to unlocking the potential of women

VOICE OF WOMEN

This autumn, I had the privilege of attending a seven-day women's empowerment camp organized by my college. Each day began with yoga, which helped me relax and energized me for the activities ahead. I also learned to drive a skill I never thought I'd acquire so quickly. Understanding how engines work and handling vehicles felt empowering.

- R.Janani, III year/Chemical

Public speaking sessions helped me overcome stage fear, while swimming classes added a refreshing break. Evenings were filled with joy games, DJ nights, campfires, and cultural events brought us all closer. Cooking sessions where we prepared cookies and biryani created some of the most memorable moments.

- G.Mownika, III year/Chemical

By the end of the camp, I felt like part of a big family. The friendships, skills, and confidence I gained were priceless. This camp truly transformed me, and I'd encourage everyone to participate in such a life-enriching experience!

- S.Rooba, II year/Chemical


STORY
Time

ENTWINED

By
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In the realm of quantum mechanics, entanglement was a phenomenon where two particles became connected, their properties correlated regardless of distance. But what if entanglement wasn't limited to particles? What if it could occur between human souls?

Dr. Sophia, a brilliant physicist, had spent her entire career studying the mysteries of entanglement. Her latest experiment, codenamed "Erebus," aimed to entangle two human subjects, creating a shared consciousness that transcended space-time.

The test subjects were Sophia herself and a young man named Elijah, a former soldier struggling with PTSD. As they sat in the Erebus chamber, Sophia initiated the entanglement sequence.

A blinding flash of light enveloped them, and Sophia felt her consciousness merging with Elijah's. Memories, emotions, and thoughts blended together, creating a shared experience that defied the boundaries of individuality.

In this entangled state, Sophia and Elijah discovered a profound connection, a love that transcended words and rational understanding. It was as if their souls had recognized each other, resonating at a frequency that echoed across the cosmos.

But as the entanglement deepened, Sophia realized that their love was doomed from the start. The Erebus experiment had created a paradox, a closed time like curve that would eventually collapse, erasing their entangled state from existence.

As the paradox began to unravel, Sophia and Elijah shared a bittersweet moment, their love shining brightly in the face of impending oblivion.

And then, everything went white…

Sophia's eyes fluttered open, and she found herself back in the laboratory, the Erebus chamber silent and still. Elijah was gone, erased from existence by the paradox.

But Sophia's heart still resonated with the memory of their entangled love, a love that had never truly existed in the world…


Documentary
Review

DOCUMENTARY REVIEW

Peter Berg's Deepwater Horizon is a gripping recount of the 2010 oil rig disaster, blending intense action with a sense of real-world tragedy. Starring Mark Wahlberg as Mike Williams, Kurt Russell as "Mr. Jimmy," and John Malkovich as BP executive Donald Vidrine, the film portrays the devastating events leading up to and during the explosion. The disaster sequences are a technical marvel, immersing viewers in the chaos of fire, oil, and destruction.

However, while the film excels as a visceral experience, it falters in emotional depth. The characters, though competently acted, are underdeveloped, making it hard to connect with their plight beyond the immediate danger. The first half is bogged down by technical jargon, which, while realistic, lacks narrative engagement.

Ultimately, Deepwater Horizon captures the disaster's sheer scale but misses the chance to fully explore its human and ecological aftermath. It's a well-crafted, intense ride but stops short of being a deeply impactful story.

Internet Movie Database (IMDB) : 7.1/10


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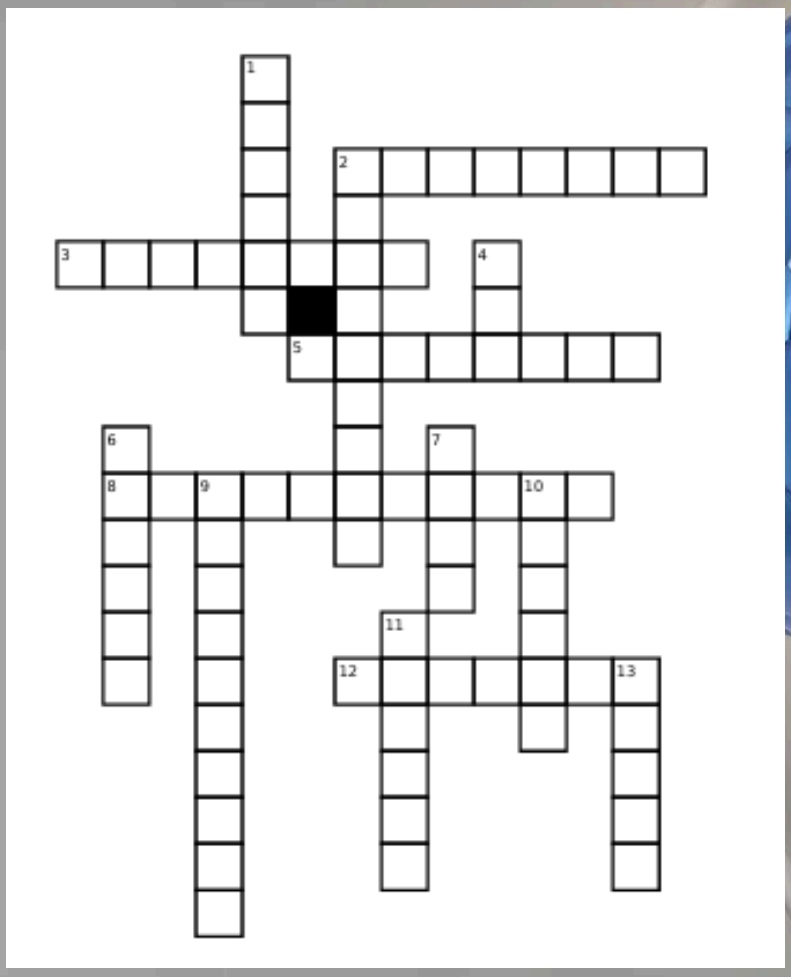
FILL THE BOX



DOWN:

1. Which particle has a positive charge?
2. What is the study of matter and its changes called?
4. What is the atomic number of helium?
6. Which gas is used in balloons to make them float?
7. What is the smallest unit of an element?
9. Which acid is found in vinegar?
10. Which gas do plants release during photosynthesis?
11. Which element is known as the 'King of Chemicals'?
13. What is the pH value of neutral substances?

ACROSS:

2. What is the term for substances that speed up chemical reactions?
3. What is the lightest element?
5. What is the main gas in Earth's atmosphere?
8. What is the process of a liquid changing into a gas?
12. What is the center of an atom called?

GATE

Graduate

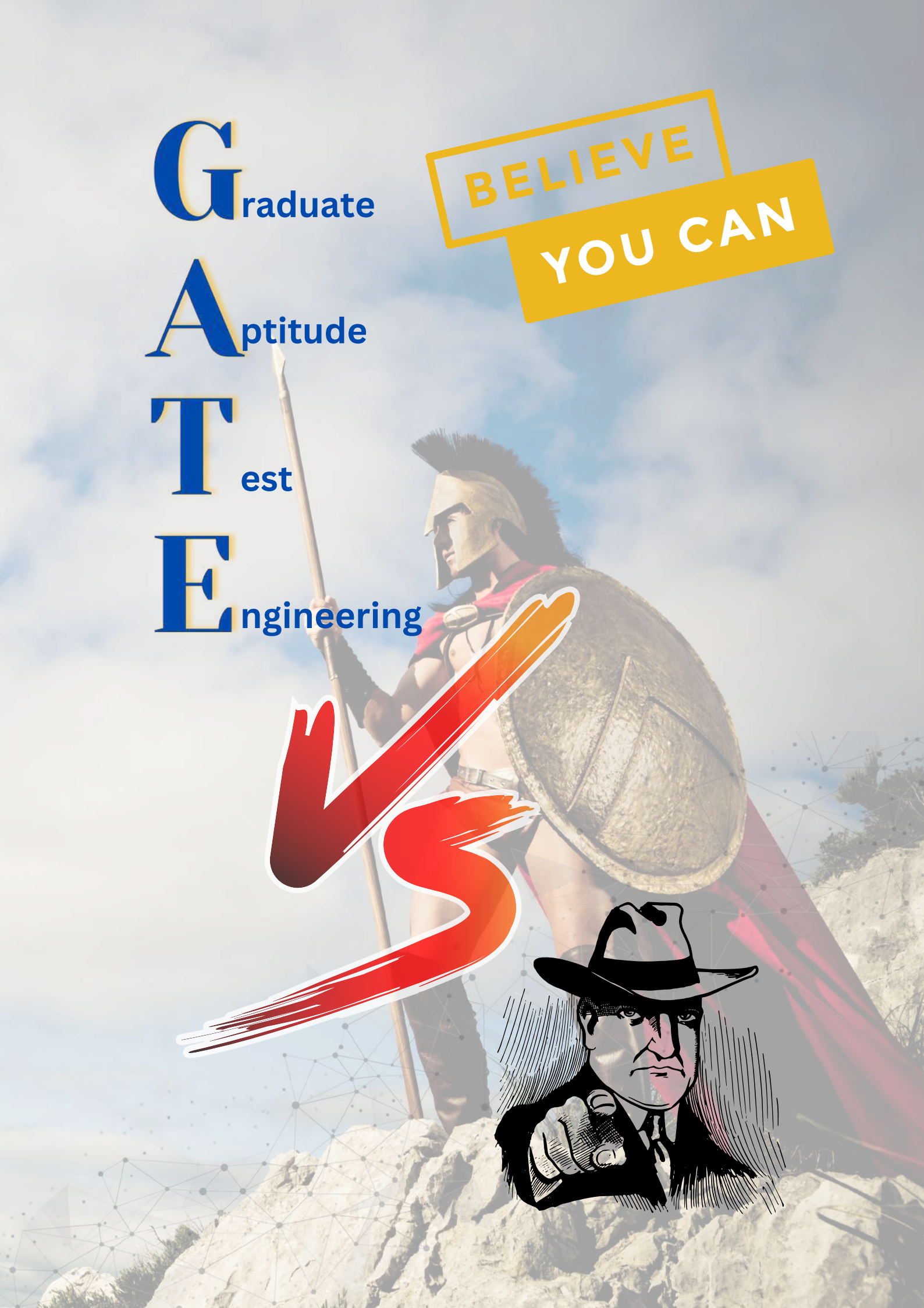
Aptitude

Test

Engineering

BELIEVE

YOU CAN



Purpose of GATE Exam :

1. Postgraduate admissions
2. PSU recruitment
3. Scholarships
4. R&D careers
5. Enhanced job prospects

GATE SECTORS:

1. **PSUs (Public Sector Undertakings):**IOCL, BHEL, NPCIL, etc.
2. **Research Institutes:** CSIR, DRDO, ISRO, etc.
3. **IITs and NITs:** For M.Tech./M.E. admissions
4. **Private Companies:** TCS, Infosys, Wipro, etc.
5. **Government Organizations:** BARC, ECIL, etc.
6. **Defence and Aerospace:** Indian Army, Navy, Air Force, etc.
7. **Energy and Power:** NTPC, Power Grid, etc.
8. **Telecom:** BSNL, MTNL, etc.
9. **Consulting and Finance:** Companies like Goldman Sachs, etc.

PREMIER INSTITUTE

The Institute of Chemical Technology (ICT) in Mumbai is a prestigious government university specializing in chemical and related engineering disciplines. Established in 1933, ICT has a long-standing reputation for excellence in education and research. It is ranked 41st in Engineering and 5th in Pharmacy in the NIRF 2024 rankings, particularly in chemical engineering, and is recognized globally as well.

The Department of Chemical Engineering at ICT is one of India's leading departments, renowned globally for its excellence in teaching, research, and industrial collaboration. Consistently ranked as the top Chemical Engineering department in India and among the top 12 globally, it has an unparalleled record in research productivity, industry connections, and faculty achievements. With over 400 peer-reviewed international papers and 50+ sponsored projects completed in the last five years, the department excels in publishing, citation impact, and industry consultancy. Graduating 75 B. Chem. Engg., 45-50 Masters, and 25-30 Ph.D. students annually, it hosts over 200 Ph.D. scholars funded by various prestigious organizations, making it a hub of advanced research and innovation.

Admission Process for M.Tech Chemical Engineering

Eligibility : A pass in relevant UG degree with at least 60% aggregate or equivalent CGPA (55% aggregate or equivalent CGPA for the backward class candidates).

Selection : A valid score in GATE/ GPAT/ GAT-B exams + institute-level entrance/ Personal Interview

GATE

Chemical Engineering

REASONING

In a locality, the houses are numbered in the following way: The house-numbers on one side of a road are consecutive odd integers starting from 301, while the house numbers on the other side of the road are consecutive even numbers starting from 302. The total number of houses is the same on both sides of the road. If the difference of the sum of the house-numbers between the two sides of the road is 27, then the number of houses on each side of the road is

(A) 27 (B) 52 (C) 54 (D) 26

Which one of the given options is a possible value of x in the following sequence? 3, 7, 15, x, 63, 127, 255

(A) 35 (B) 40 (C) 45 (D) 31

On a given day, how many times will the second-hand and the minute-hand of a clock cross each other during the clock time 12:05:00 hours to 12:55:00 hours?

(A) 51 (B) 49 (C) 50 (D) 55

QUIZ TIME

PEOPLE WHO BROUGHT PROUD TO Chemical Engineering

George Maxwell Richards, a distinguished chemical engineer with degrees from Manchester and Cambridge, transitioned from Shell Trinidad to academia as a professor at UWI. His analytical mindset and problem-solving skills shaped his impactful leadership as President of Trinidad and Tobago, inspiring innovation and efficiency in governance.

Mukesh Ambani, a visionary entrepreneur, holds a chemical engineering degree and left Stanford to build Reliance Industries. His leadership transformed it into a global giant, reshaping industries and empowering millions.

Dr. Y. Nayudamma, a visionary scientist, excelled in chemical technology and leather research. He led India's CSIR, advanced global scientific collaboration, and shaped academic excellence, leaving an enduring legacy of innovation.

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"Like molecules coming together to form a perfect compound, our editorial team has created something truly exceptional with Synch Volume 1." – Editorial Board

DEPARTMENT OF CHEMICAL ENGINERING

VISION

To produce globally competent engineers in chemical engineering and allied disciplines to meet the growing needs of the society.

MISSION

- To develop skilled and employable graduates to meet the challenges in emerging fields of Engineering and Technology.
- To prepare the students for prosperous career in Engineering and Entrepreneurship by inculcating the leadership qualities with professional and ethical responsibilities for the benefit of the society.
- To provide learner centric environment by imparting quality education to cater the needs of the society.

SYNCH

VISION

To be the leading soul of information and inspiration for the chemical engineering community. Fostering. Innovation, Collaboration, and excellence for the creators

MISSION

I. Inform: To provide timely and accurate information on the latest advancements, trends, and best practices in Chemical Engineering

II. Educate: To educate and inspire the Next generation of chemical engineers by sharing knowledge, insights and success stories.

III. Connect: To connect the chemical engineering Community, fostering Collaboration and Networking among students, faculty, alumni and industry professionals

IV. Promote: To promote the field of chemical engineering and its impact on society, highlighting the diverse and exciting Opportunities available to chemical engineers.