



Ozone

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**AN OPEN HEART
WITH OUR ALUMNI**

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ISRO'S MILESTONE

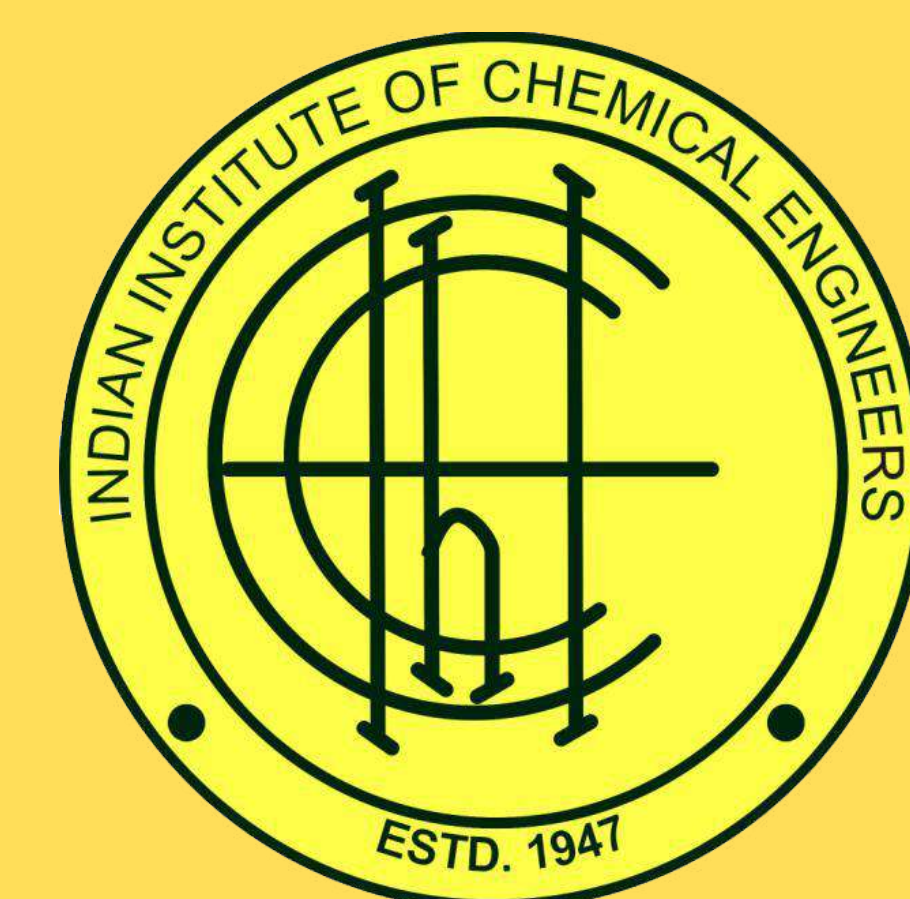
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**IMPROVEMENT OF
SOFT SKILLS**

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A Technical Magazine by
IICHE-GVPCE(A) Student Chapter
DEPARTMENT OF CHEMICAL ENGINEERING
GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING
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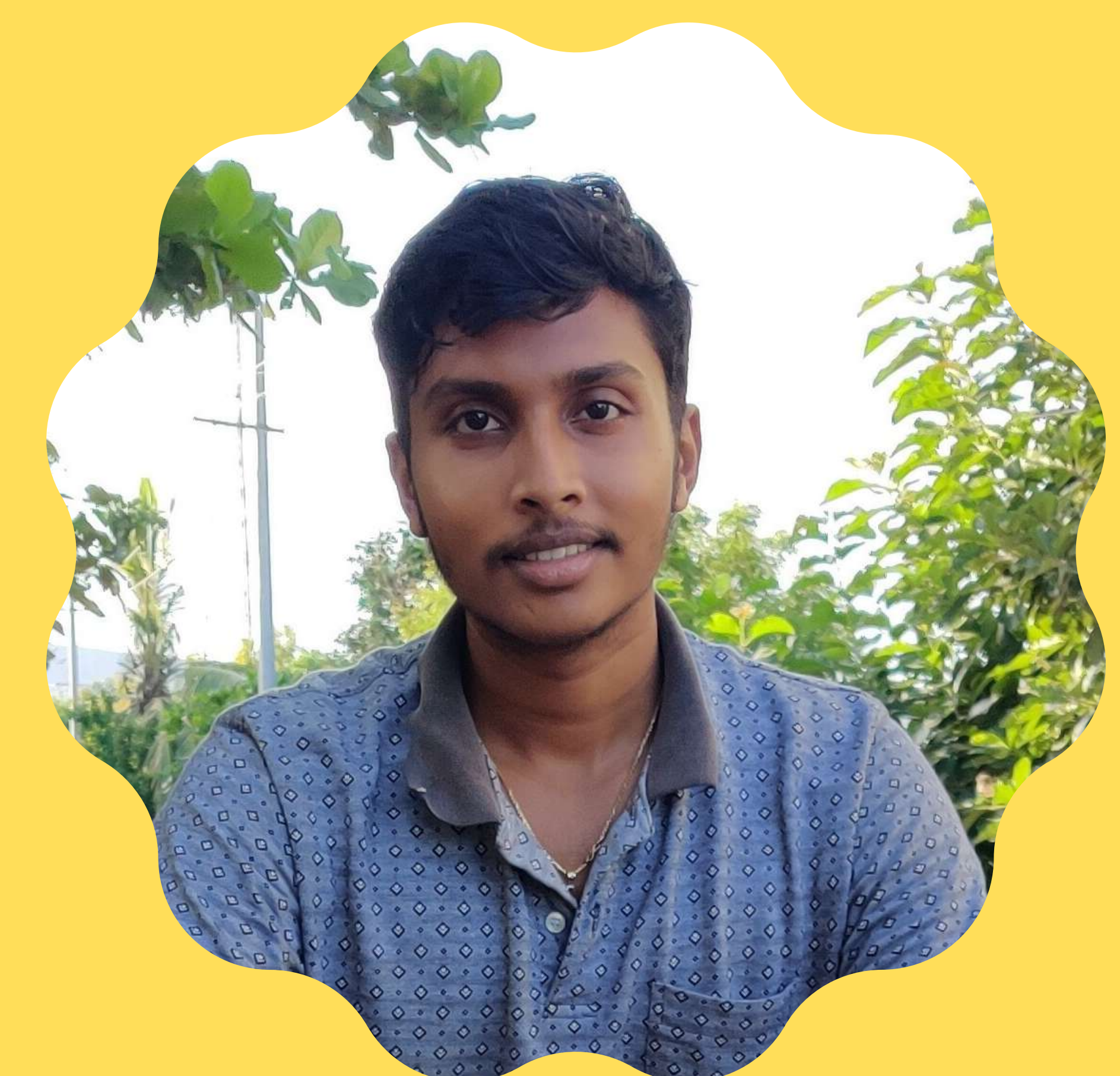
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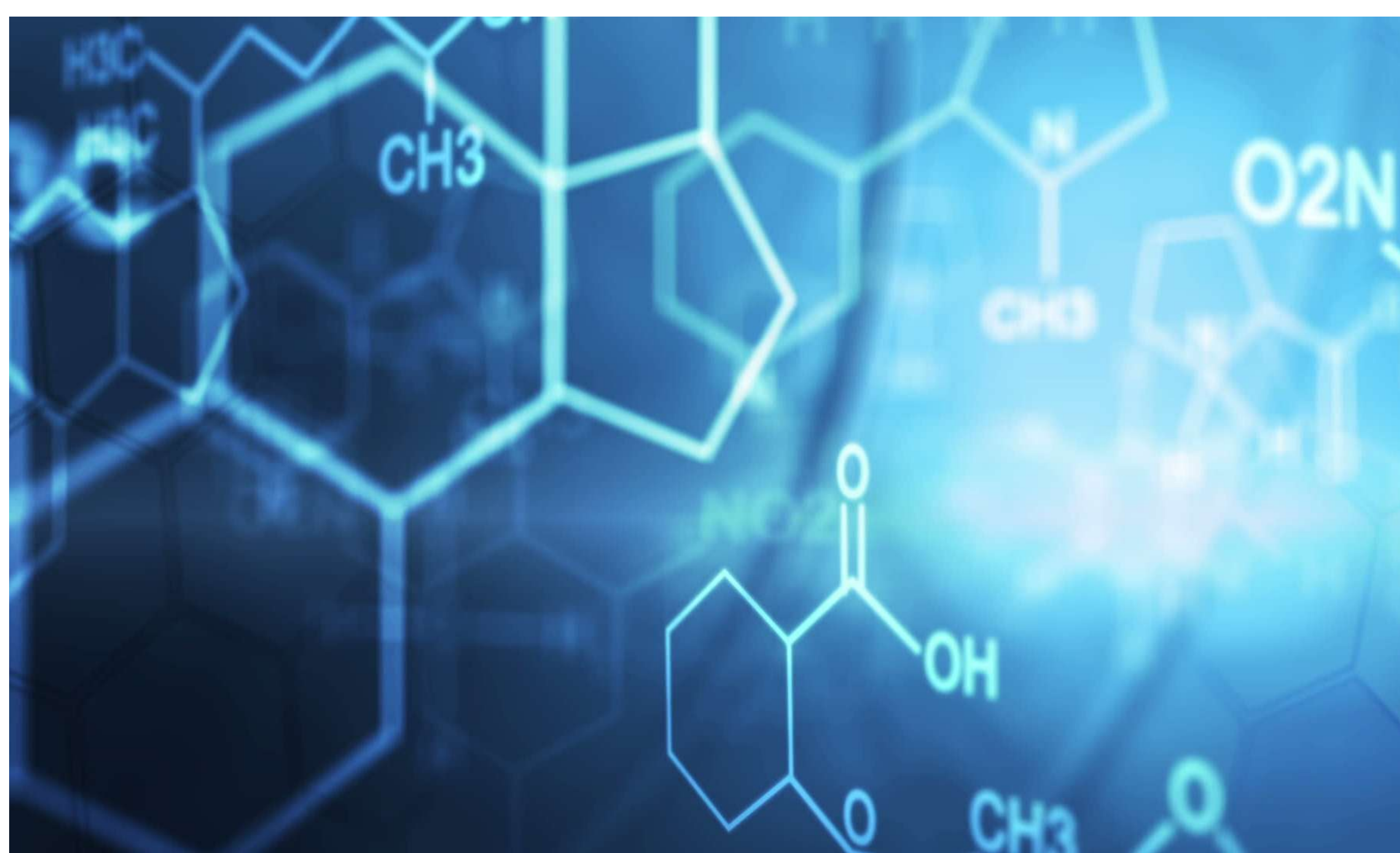
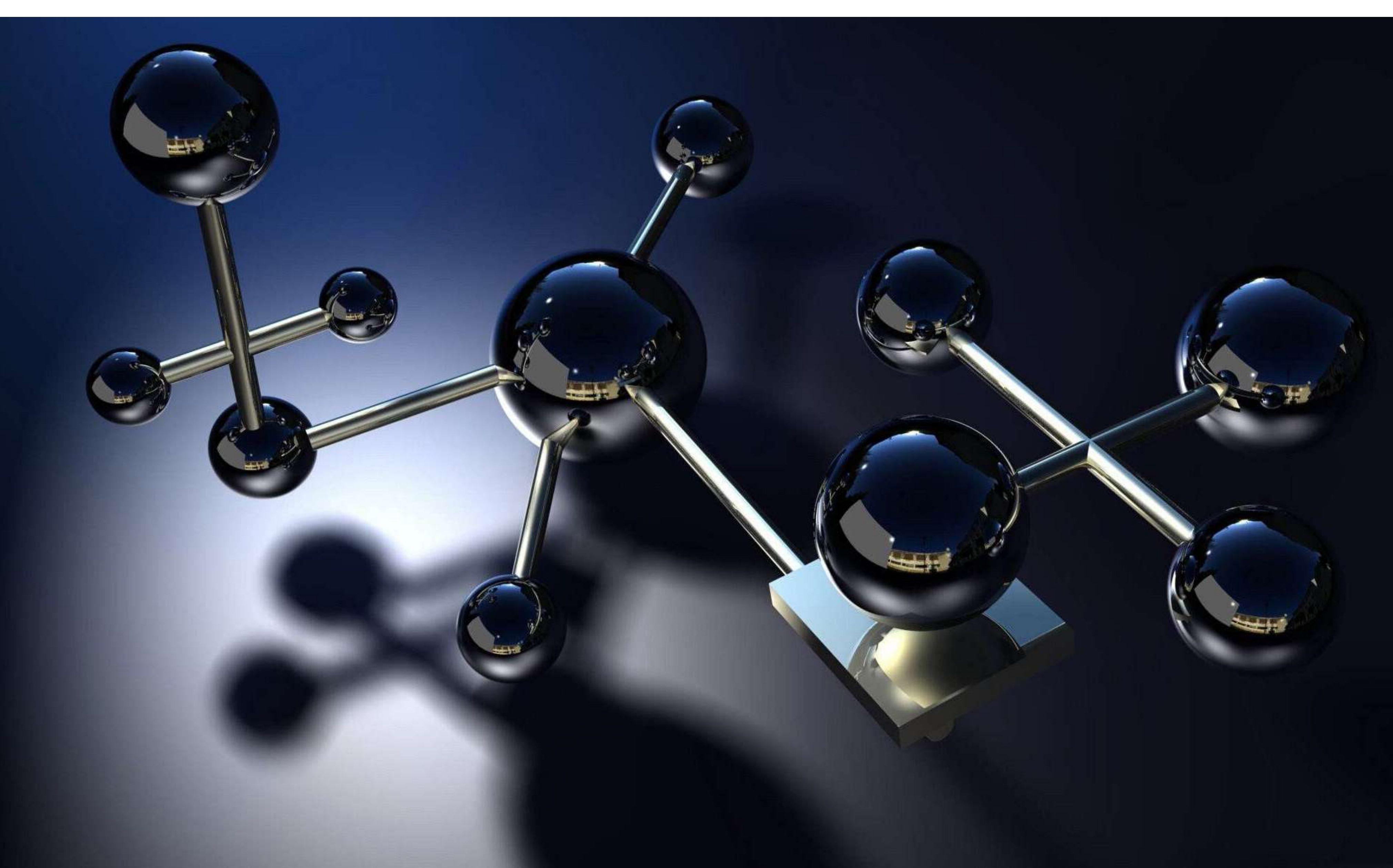
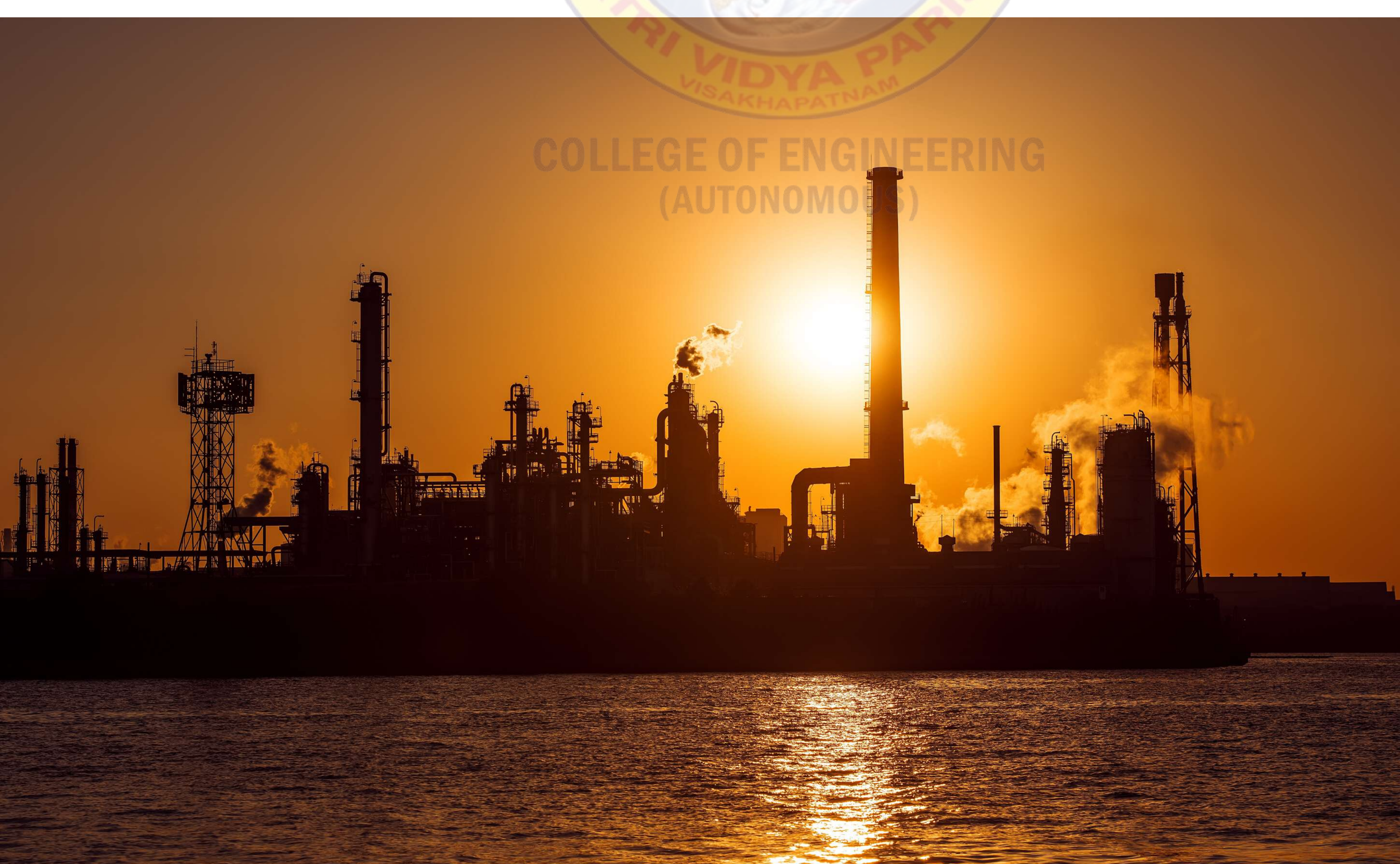
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BIOGRAPHY

J.B.Joshi

AN OUTSTANDING
HARDWORKER



Born on May 28, 1949, Prof. J.B. Joshi has done an outstanding work in the area of multiphase reactor design. He has succeeded admirably in developing design procedures for multiphase sparged and mechanically agitated reactors. His success arose out of a conceptual breakthrough and has brought about fresh thinking in this difficult area in which several renowned scientists all over the world are actively involved. A unique blend of theory, modelling, experiments and intuition has resulted in a rational basis for the design, scale-up and implementation of a large number of commercial size reactors in India and throughout the World.

Padma Bhushan laureate Jyeshtharaj Bhalchandra Joshi is an Indian chemical engineer, nuclear scientist, consultant and teacher, widely known for his innovations in nuclear reactor designs and generally regarded as a respected teacher. He is the DAE-Homi Bhabha Chair Professor, Homi Bhabha National Institute, Mumbai, he is the recipient of Shantiswarup Bhatnagar Prize for Engineering Sciences and many other awards & recognitions.

His progress as an independent researcher has been phenomenal in all respects: teacher, scholarly writer and also as the most wanted consultant in the Chemical Industry in India and abroad.

His major contributions include:

- He has developed in-house codes for computational fluid dynamics (CFD) for multiphase dispersions and complex geometries.
- Development of an algorithm for the prediction of fractional gas hold-up and bubble size distribution.
- Professor Joshi has analysed probably the most complex case of multiphase reactions, namely the absorption of nitrogen oxides (NO_x) in water, alkaline and acidic solutions.
- Development of new designs for household cooker and stoves with thermal efficiencies of 50 to 60%, an improvement on the conventional cookers which have a thermal efficiency of 12 to 20%. He has released these technologies on a commercial basis.
- Development of a relationship between the mean and turbulent flow patterns and the design parameters such as axial mixing, mixing time, heat and mass transfer coefficients.

AN OPEN HEART WITH OUR ALUMNI

Bora Meenakshi Scientist /Engineer SC, Liquid Propulsion Systems Centre, ISRO



Interviewer : You could be an amazing source of inspiration to the chemical engineering aspirants in GVPCOE. The way to ISRO wouldn't definitely be a flower path. Who was your prime support?

B Meenakshi : The way to junior scientist in ISRO wasn't a piece of cake. I had to jump over multiple jobs to get to this destination. My parents supported me with everything they could.

Interviewer: During this voyage it's easy for one to get demotivated and to give up What made you not to do so?

B Meenakshi: I sincerely believe that " Today's struggle is tomorrow's relief". I definitely wasn't the type who cries over spilt milk, in fact that could never change anything.

Interviewer: Describe your journey to ISRO?

B Meenakshi: As I told earlier it wasn't a piece of cake to me, especially if you're a normal girl with no influence..

I first worked at Chegg India, it was more like a robotic life without my heart in it. I was in search of myself and felt that I missed it , so I resigned there. I attempted an exam for Junior Research Fellowship-UGC and did my best. I then attempted an interview in Advanced Research Centre for Powder Metallurgy gave my best to succeed there but lost with a one mark difference seasoned with politics. I did not take the incident to my heart and I was stubborn enough not to give up. I took a break from everything and prepared like hell for competitive exams.

I terminated my struggle with an interview in ISRO, shot my answers crisp - in a nutshell and the interviewers were dazzled by my execution. There you go, I got into ISRO and there's nothing that could explain how I felt on the day when I've known that I got selected for the should be taken responsibility.

Interviewer: What advice would you like to give to the present generation of chemical engineering students?

B Meenakshi: Textbooks aren't the only source of information. Internet can prove to be very constructive for students. Spending ambient time on each topic is an enormous exercise to sharpen their skill in a topic.

I would like to suggest students to spend at least 2 hours time on each topic. Attend conferences, workshops, study research papers and lectures. In interviews the panel expects condensed and precise answers. Working on the basics can only do the work. One more tip is not to neglect sports and physical health.

Interviewer: What suggestion would you give to your younger self if you could?

B Meenakshi: Not learning simulation and computing software was one of my biggest regret. I never paid enough importance to score marks. I would love to ask my younger self to pay more attention to read and to improve knowledge.

Interviewer: What were the hardest decisions you had to take in your life?

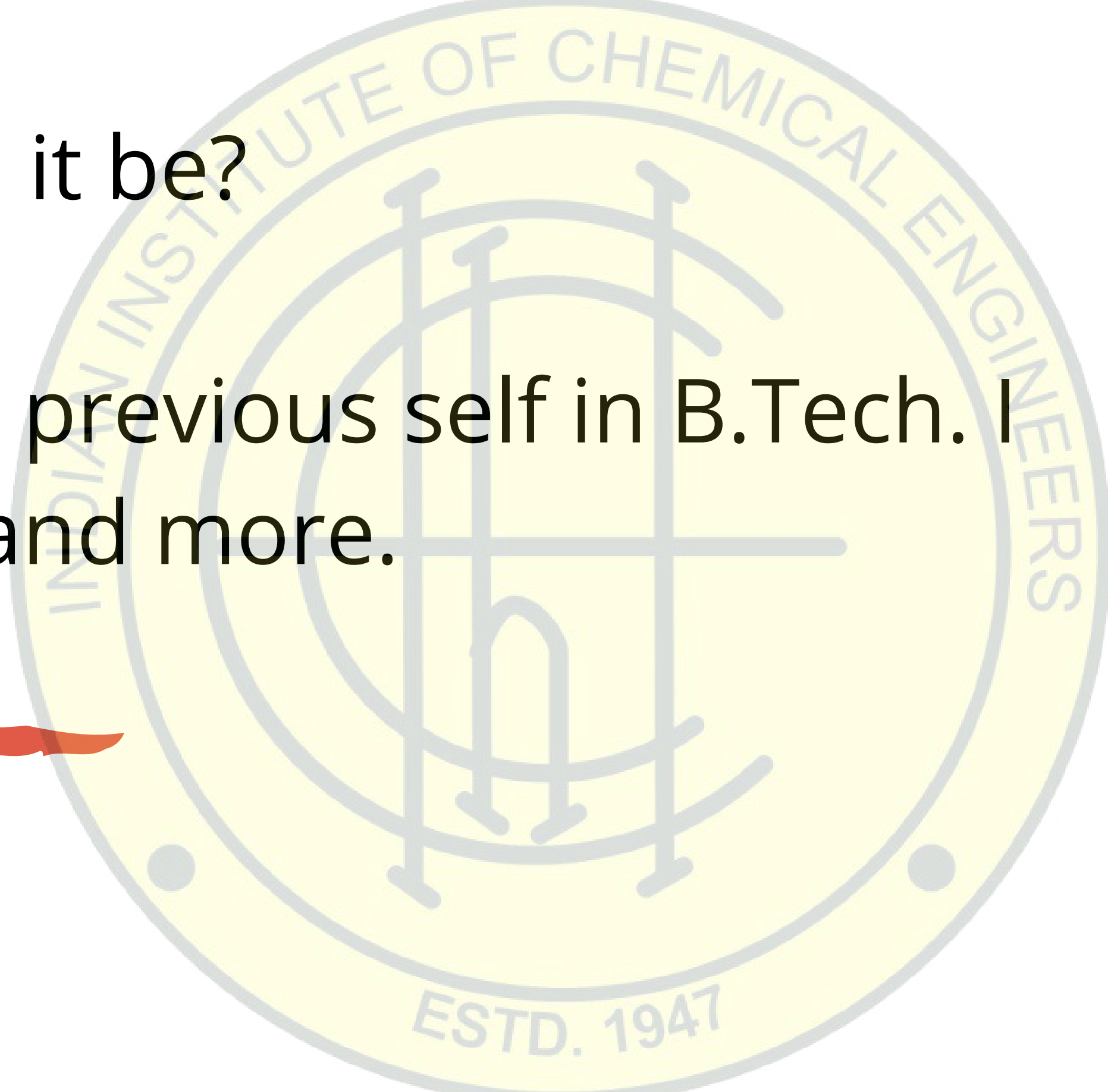
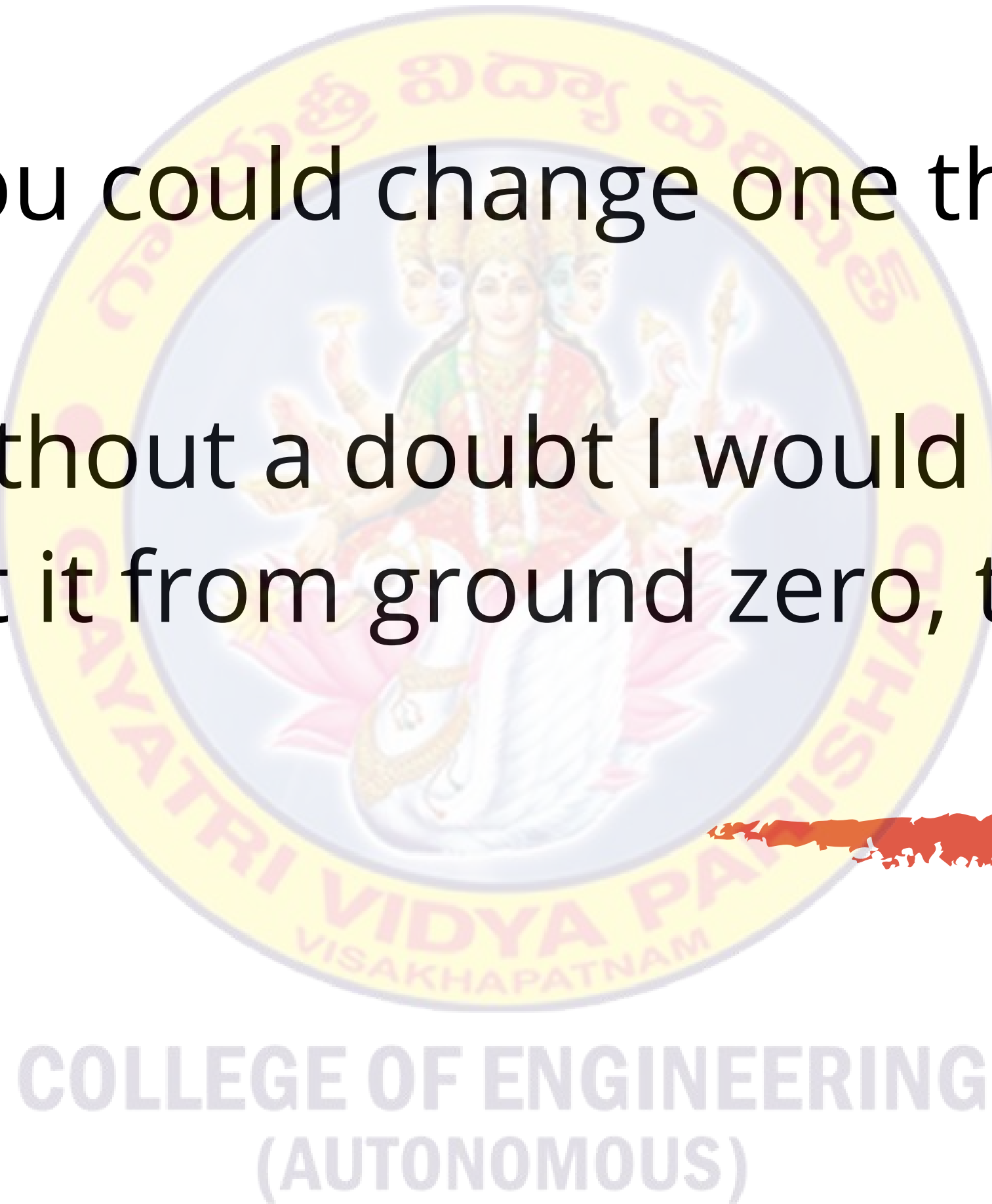
B Meenakshi: Jumping over multiple jobs was never easy. I had to spend two years of my time to get this job and one complete year on job search.

Interviewer: What was the biggest factor that has helped you in your life?

B Meenakshi: My diploma education has made perfect basis for my education. My 6 months internship at Rashtriya Ispat Nigam Ltd (RINL) which is the corporate entity of Visakhapatnam Steel Plant (VSP) as well as at Coromandel International Ltd which is located in the city of destiny itself, helped me gain my practical knowledge.

Interviewer: If you could change one thing in your life, what would it be?

B Meenakshi: Without a doubt I would definitely like to change my previous self in B.Tech. I would like to start it from ground zero, to implement myself more and more.



ISRO's MILESTONE

300 satellites from 33 nations put in space in 20 years

Two months after lunar lander Vikram's failure to softland on Moon, cheer was back at Indian Space Research Organisation (Isro) on Wednesday morning when it successfully launched PSLV-C47 that placed Earth observation satellite Cartosat-3 and 13 US nanosatellites. It marked Isro's milestone of launching more than 300 satellites from 33 countries in two decades. On Wednesday, around 17 minutes after the rocket lifted off from the second launch pad at Satish Dhawan Space Centre, Sriharikota, the launcher injected Cartosat-3 into a 509km polar sun-synchronous orbit. In the next 10 minutes, 13 nanosatellites from the US were placed in their respective orbits.

The 1,625kg Cartosat-3 is the first in the third-generation Earth observation satellite with a high-resolution imaging capability and the ninth in the Cartosat series. Isro chairman K Sivan said, "Cartosat-3 is the most complex and advanced earth observation satellite developed by Isro so far." The camera on board the satellite is expected to capture images with a spatial resolution of less than 30cm (which means from space it can see objects as small as 30cm). Cartosat-1 had 2.5m resolution and the Cartosat-2 series had 1m resolution. Isro said Cartosat-3 would help large-scale urban planning, rural resource management and infrastructure development, besides providing information for coastal land use and land cover.

For Isro, this is the 47th successful PSLV flight since its first success on October 15, 1994, when the vehicle, in its second development flight placed 804kg remote sensing satellite IRS-P2 in orbit. So far, PSLV has placed 48 satellites including Chandrayaan, Mars Orbiter Mission and micro, nano and experimental satellites. It was the fifth launch of the year that comes after GSLV-MkIII successfully launched Chandrayaan-2 in July 22. In September, Vikram lander crashed when it attempted to softland on Moon. Isro has so far placed 310 satellites from 33 countries since May 26, 1999 when PSLV, on its second operational flight, carried three satellites in a single vehicle for the first time which included those from Korea and Germany.

Sivan said the agency has planned 13 missions in the next four months which includes six launch vehicle missions and seven satellite missions. "Our hands are full. Team Isro will rise to the occasion and meet every demand," he said.



COURSES FOR CHEMICAL ENGINEERS

Chemical Engineering continues to be a field with the most versatility and there are numerous options that can be pursued each with its own characteristics, the three main verticals for a chemical engineer would be :

- Design
- Production
- Quality

The most demanding of all would be courses of biochemical engineering, safety engineering, environmental engineering, process instrumentation, petrol refinery engineering, high polymer engineering and fluid mechanics. Most graduates can opt for jobs without pursuing for higher education however experience is what makes an engineer grow. Licensure for chemical engineers is not as common as it is for other engineering occupations, nor is it required for entry-level positions. A Professional Engineering (PE) license, which allows for higher levels of leadership and independence, can be acquired later in one's career. Other courses which are in demand are :

- 1)Architectural and Engineering Manager
- 2)Biomedical Engineering
- 3)Chemical Technician
- 4)Chemist and Materials Scientist
- 5)Nuclear Engineering
- 6)Occupational Health and Safety Specialist and Technician

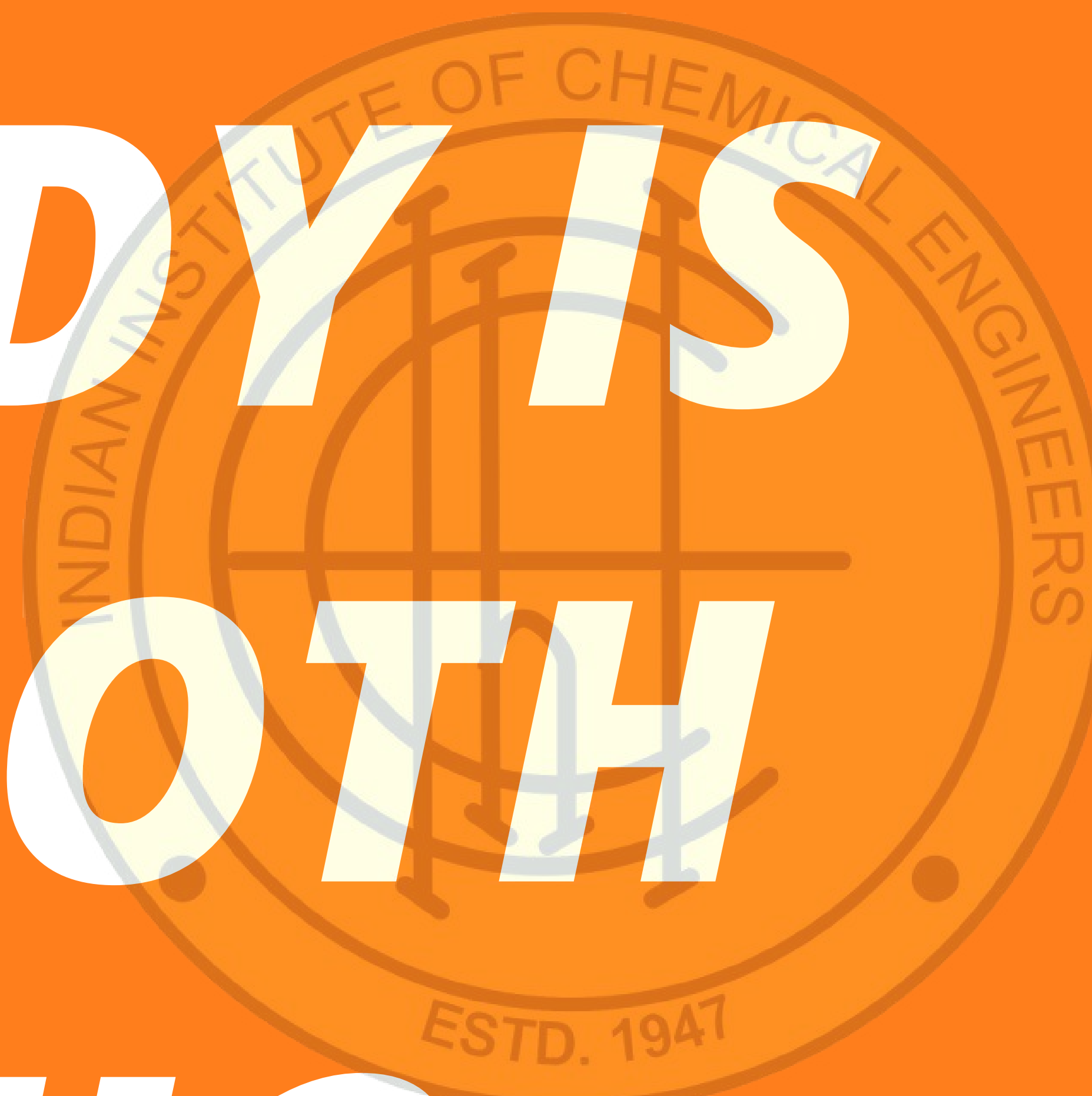
In addition, chemical engineering will continue to migrate into dynamic fields, such as nanotechnology, alternative energies, and biotechnology, and thereby help to sustain demand for engineering services in many manufacturing industries. Approaching online websites which offer a plethora of these courses is another alternative , some of which include COURSERA, EdX etc. Software skills also are an important part of a chemical engineer's core some of which are :

- MATLAB
- COMSOL
- ASPEN
- ANSYS
- Microsoft Office

.....

DID YOU KNOW...

***THE HARDEST
CHEMICAL IN
YOUR BODY IS
YOUR TOOTH
ENAMEL?***



Software for Chemical Engineers

MULTIPLE OPTIONS FOR SOFTWARE SKILL DEVELOPMENT

The field of chemical engineering is never constant, it changes time to time. We have to upgrade ourselves to maintain our knowledge not only in the core but also in the software.

Ultimately, we should be able to be in a position to run both the fields and achieve a secure job. Hence, learning something new could place us in a highlighted position but it does not degrade our wisdom. Here are a few softwares which are easy to tackle and they contribute a major part in the variable field.

MS Excel



Everyone is aware that Microsoft office excel contains graphing tools, tables and a macro programming language - visual basic. It's main advantage is that is available very easily and it is used in our academics which gives us a slight knowledge in it.

- It has built in formulas which makes our work easy and comfy.
- Since everything is designed in rows and columns we can sort out for the required data.
- Plotting graphs could be more easily done with this.
- Excel acts as a great solver which is an add-in functionality of this software that optimizes our problems.

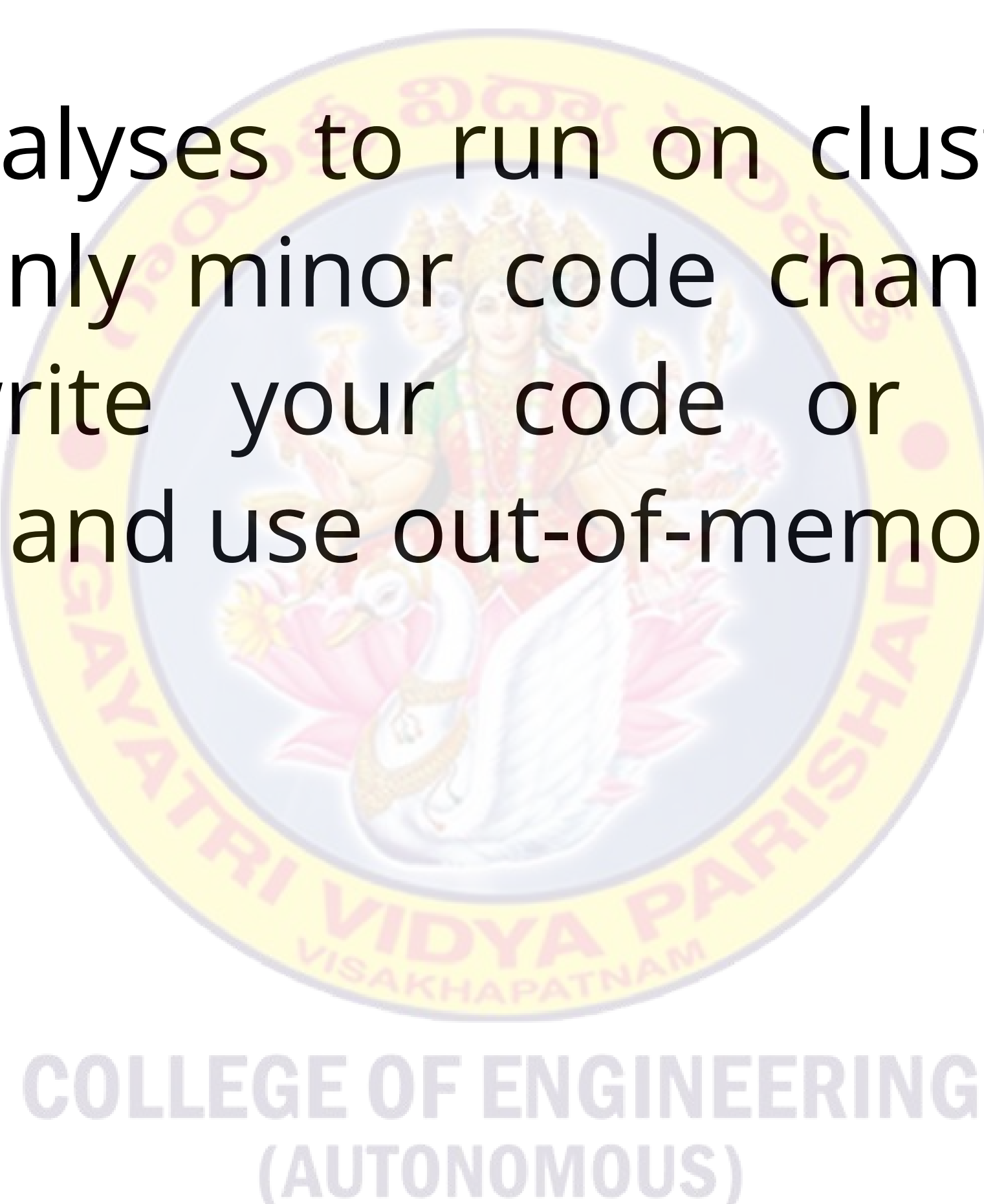
We can link excel with other softwares like MATLAB or CHEMCAD.

MATLAB

MATLAB is a programming language which is classified into scripts and functions that is saved in the form of '.m' files.

It has a number of functions which help us to solve linear and non-linear problems

- Momentum, mass and energy transfer sums can be solved easily with the help of 'pdepe' tool box.
- Distillation and column operation which is also called as McCabe operation is a typical shortcut to solve the operations of binary Distillation columns.
- Modelling equipment with the help of MATLAB like heat exchangers, pumps, valves, evaporators, columns etc can be made.
- Professionally built MATLAB toolboxes are highly developed, rigorously tested, and fully documented.
- MATLAB app lets you see how different algorithms work with your data. It iterates until you've got the result you want, then automatically generates a MATLAB program to reproduce or automate your work.
- Scale your analyses to run on clusters, GPU's and clouds with only minor code changes. There's no need to rewrite your code or learn big data programming and use out-of-memory techniques.



Chemstations CHEMCAD

CHEMCAD is an integrated suite of intuitive chemical process simulation software that fits into the chemical engineering workflow and supercharges an engineer's efficiency. Perhaps most significantly, it continues to evolve to meet the ever-expanding needs of chemical engineers.

- Highly customizable, flexible and affordable.
- All modules work within a single graphical user interface for seamless interaction.
- Adapts to how you approach engineering challenges.
- Appealing graphics and reports are easy to export to third-party software.
- Easily integrates into chemical engineering computing environment.
- Personalized technical support second to none.

CC - steady state

CC - dynamics

CC - THERM

CC - Batch

CC - SAFETY NET

CC - FLASH

TIPS FOR INTERVIEWS

SUGGESTIONS THAT HELP CRACKING AN INTERVIEW

Research the company and the interviewers

- You always have to do a background investigation on the company you are planning to join.
- This improves your knowledge in it and makes your interview go smooth.

Practice your answers to common questions

- Interviewers test our basic knowledge by asking simple questions which we usually skip to think about, concentrating on such common questions would make us look diligent.

Pre- read the job description

- The job description is something which we read for once understanding it's basic but we never look the words at it in particular in which the interviewers catch us.

Use the STAR method

- S- situation T-task A-action R-result
- Place yourself in the situation for the given task and imagine to your result, this would do the work in the right way.

Early bird gets the worm

- An early arrival makes a good impression on you and it shows your punctuality.

Practice your manners and soft skills

- Your body language, your skills play an important role in hiring you as their employee.
- Send a personalized thank you letter after attending your interview.
- Even after disregarding you, they can still consider you as a choice after this letter, as we should show our desperateness to get hired but also maintain our behavior /attitude to impress them.

FOLLOWING THESE SIMPLE TECHNIQUES WOULD DEFINITELY BRING A CHANGE IN OUR ATTITUDE.

SMART CLASS INNOVATION

Collect Dirty Water In A Bottle And Get Pure Water In Return

Engineering students from St. Joseph's college decided to work on the filthy water problem. They developed what is called as Ibo which purifies the dirty water, which is portable.

What makes their silicon bottle different from others is the water filter cartridge. The bottle has an in-built organic filter at the center-bottom, on the base. Its job is the same as the previously built water filter– to remove all impurities. The iBo or 'Intelligent Bottle' has a three-layer filtration system that consists of Nano-fibre membrane, made with the help of nanotechnology. It will help to remove microorganisms such as bacteria and protozoa. Coconut activated carbon will be able to remove odour, chemicals and chlorine contents from the water. The third stage of the filter consists of a mineral add-on feature that will add minerals to the water and make it slightly alkaline, so that it is beneficial for the health of the customer. The alkalinity of the water has the potential to kill viruses. All one has to do is fill the bottle with any kind of water and the purifier will provide safe drinking water within minutes! The bottle is priced at Rs 600.

Make a simple water filter of your own:

Materials:

- Plastic soda or juice bottle
- Vase or tall drinking glass
- Gravel or small stones
- Clean Sand
- Activated Charcoal
- Cotton balls, small cloth or coffee filter
- Gardening dirt
- Water
- Scissors or knife

Instructions:

- Cut off the bottom of an old plastic soda or juice bottle using scissors or a knife.
- Place the bottle upside down into the vase or tall drinking glass.
- Place cotton balls, cloth, or a coffee filter inside the bottle as the first layer. The first layer should be about one to two inches thick.
- Add an inch of activated charcoal as the second layer on top of the cotton layer.
- Over the charcoal, add about two inches of gravel or small stones as the third layer.
- Add about three to four inches of clean sand on top of the gravel.
- Add gravel to the bottle as the final layer. Leave about a half inch of space from the top of the upside down bottle.
- Add dirt to a glass of water to create muddy water. Alternatively, get creative and add other things like glitter, beads, cooking oil or other materials to make dirty water.
- Pour the glass of muddy water on top of the homemade water filter and watch the water drip clean into the glass below.

DID YOU KNOW...

***OUR STUDENT CHAPTER
WEBSITE HAS ITS OWN
STUDENT'S PORTAL TO
ASSIST IN OUR
ACADEMICS??***

IMPROVEMENT OF SOFT SKILLS

MAKE A CHANGE TO YOUR COMMUNICATION SKILLS

Soft skills play a major role on the determination of your ATTITUDE which has been playing a vital part of your life. Here are some key points to maintain your soft skills :

1) AIM TO BE UNDERSTOOD:

You can share your gut feeling if you are writing and sharing it, but when you speak in front of, a bunch of people make sure that you stay on the topic, deviate less and speak specifically.

2) MAKE EYE CONTACT :

Keep your eyes focused on the person whom you are talking to, this can make your conversation more effective, if you are uncomfortable looking into the person's eyes look onto the bridge of his/her nose, being distracted looking somewhere else can make you personify as a rude person.

3) MONITOR YOUR BODY LANGUAGE:

Maintain your posture by sitting straight and leaning forward to show your interest. Do not tap the bench, move your legs rapidly, this shows that you are impatient. Do not make unnecessary moves that might give a wrong motive.

4) PRACTICE SPEAKING :

Make sure that you learn to talk in both the ways - personal and public. If you are not comfortable speaking formally or making a personal chat try it first with a close friend or your sibling. If you have a problem with public talks try taking a lead in your group of friends, give presentations and small classroom talks. In this way you can practice speaking.

5) DEVELOP WRITING SKILLS :

If you are a good speaker then you can be a good writer too, it's just that you have to practice the vocabulary and imagine the paper as a person. The more you write the easier it becomes. After the completion give a glance and check for grammatical errors.

6) ACTIVE LISTENING SKILLS:

Pay attention to what others are saying, it's a very important thing to do, you always have to listen first react next, ask questions after listening this shows your keen interest, pay respect to the latter whilst speaking and take notes if necessary.

7) PAY ATTENTION TO OTHERS' BODY LANGUAGE :

You have to maintain your body language and observe others'. This helps in understanding the personality of the latter and his behavior, so that you can handle the person in a suitable manner.

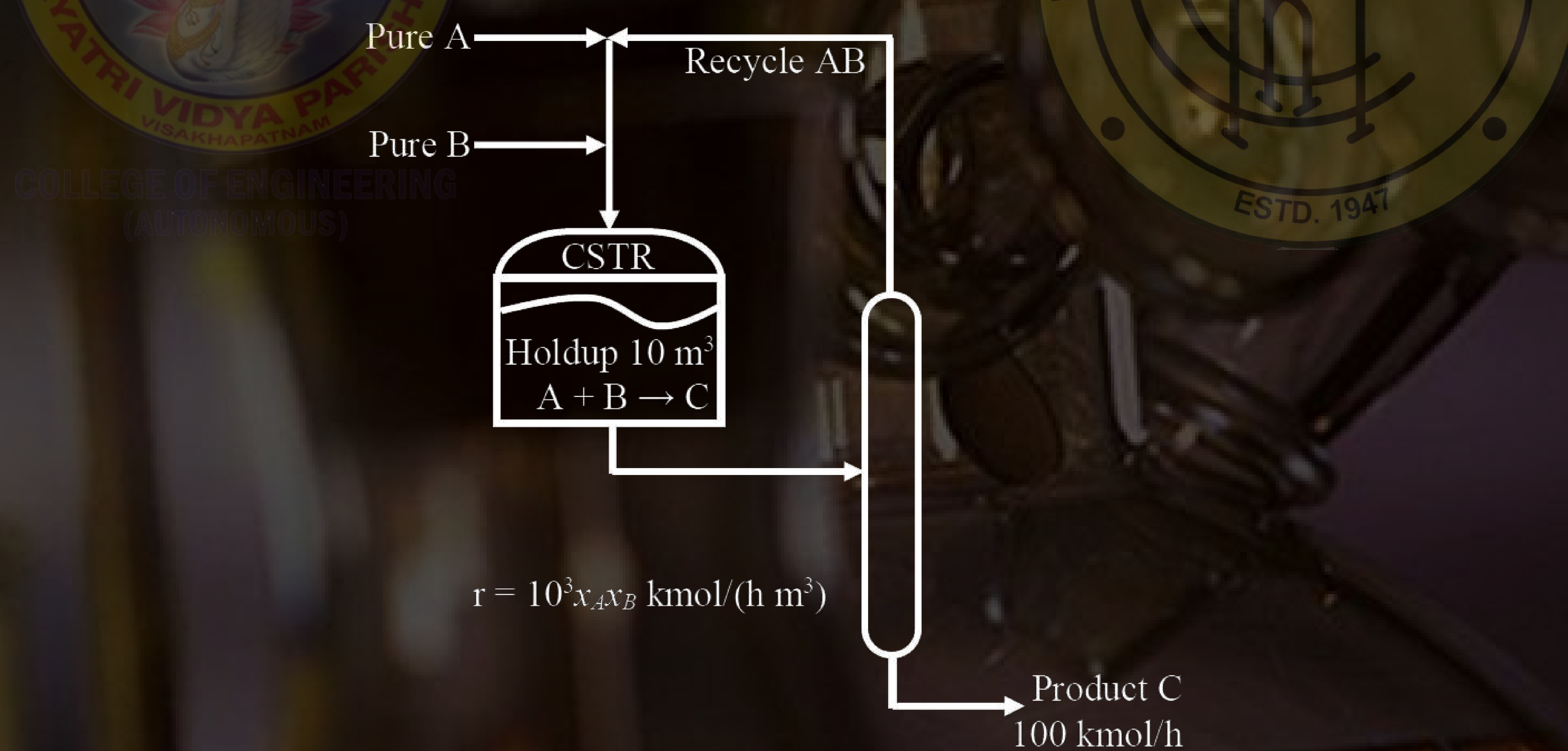
Just by following these small and simple hacks you can develop your soft skills and you can thank yourself for putting an effort by taking this initiative to bring a change within yourself.

BRAIN TEASERS

QUIZ

- Compiled by Dr. B.Sivaramakrishna

1. Consider the reactor separator recycle process operating under steady state conditions as shown in the fig. The reactor is an ideal continuous-stirred tank reactor(CSTR), where the reaction $A+B \longrightarrow C$ occurs. Assume that there is no impurity in the product and in the recycle stream. Other relevant information is provided in the fig. the mole fraction (x_B) in the reactor that minimises the recycle rate is _____ (rounded off to two decimal places).



2. Two spherical camphor particles of radii 20 cm and 5 cm; far away from each other, are undergoing sublimation in a stream of air. The mass transfer coefficient is proportional to $1/\sqrt{r(t)}$, where $r(t)$ is the radius of the sphere at time t . Assume that the partial pressure of camphor far away from the surface of the particle is zero. Also, assume quasi-steady state, identical ambient conditions, and negligible heat effects. If t_1 and t_2 are the times required for complete sublimation of 20 cm and 5 cm camphor particles, respectively, the ratio t_1/t_2 is _____ (round off to 1 decimal)

3. The elementary irreversible gas-phase reaction $A \longrightarrow B+C$ is carried out adiabatically in an ideal CSTR operating at 10atm .Pure A enters the CSTR at a flow rate of 10 mol/s and a temp of 450K .Assume A,B,C to be ideal gases. The sp heat capacity at const pressure (C_{Pi}) and heat of formation (H_i^0) ,of component i (i=A,B,C) ,are:

$$C_{PA} = 30\text{J/mol.k}$$

$$C_{PB} = 10\text{J/mol.k}$$

$$C_{PC} = 20\text{J/mol.k}$$

$$H_A^0 = -90\text{kJ/mol}$$

$$H_B^0 = -54\text{ KJ/mol}$$

$$H_C^0 = -45\text{ KJ/mol}$$

the reaction rate constant $k/s = 0.133 \exp \left\{ \frac{E}{R} \left(\frac{1}{450} - \frac{1}{T} \right) \right\}$, where $E = 31.4\text{KJ/mol}$ and the universal gas constant $R = 0.082\text{ L atm/mol.k}$. the shaft work maybe neglected in the analysis , and the sp heat capacities do not vary with temperature . All heats of formation are referenced to 273K .The reactor volume (in Lit) for 75% conversion is _____ (round off to nearest integer)

4. a 20 cm diameter cylindrical solid pellet of a nuclear fuel with density 6000kg/m^3 and conductivity of 300W/m.k generates heat by nuclear fission at a spatially uniform rate of 10000 W/kg . the heat from the fuel pellet is transferred with surrounding coolant by convection such that the pellet wall temperature remains constant at 300°C . Neglecting the axial and azimuthal dependence , the maximum temperature(in degree c) in the pellet at steady state is _____ (rounded of to nearest integer).

5. Consider a vessel containing steam at 180°C .The initial steam quality is 0.5 and the initial volume of the vessel is 1m^3 . The vessel loses heat at a constant rate q and under isobaric conditions so that the quality of the steam reduces to 0.1 after 10hrs . The thermodynamic properties of water at 180°C (subscript g: vapor phase ; subscript f : liquid phase) :

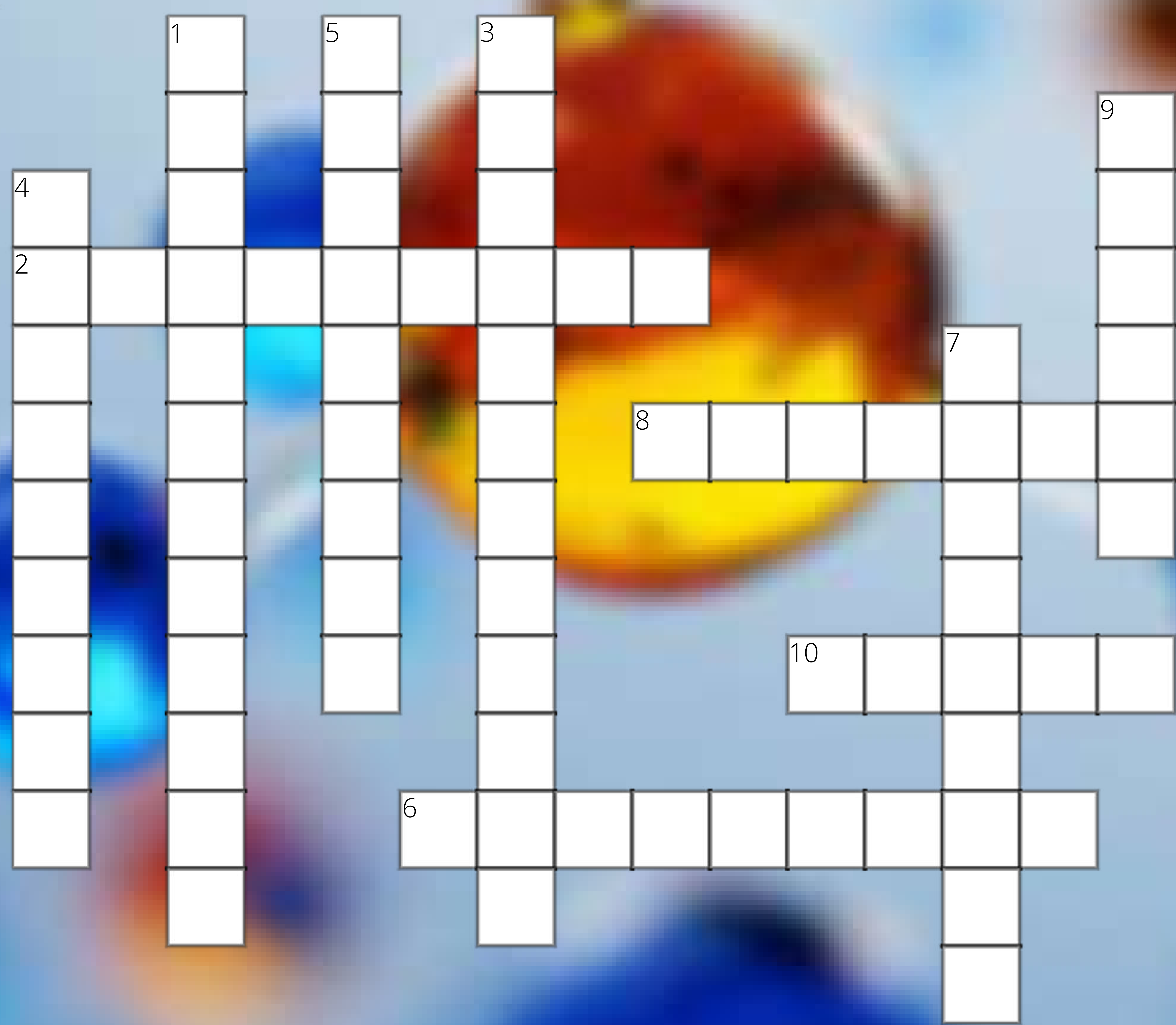
$$\text{sp volume : } v_g = 0.19405\text{ m}^3/\text{kg}, \quad v_f = 0.001127\text{m}^3/\text{kg}$$

$$\text{sp internal energy: } u_g = 2583.7\text{ KJ/kg}, \quad u_f = 762.08\text{KJ/kg};$$

$$\text{sp enthalpy: } h_g = 2778.2\text{KJ/kg}, \quad h_f = 763.21\text{KJ/kg}.$$

the rate of heat loss q (in KJ/hr) is _____ (rounded of to nearest integer).

ChemCross



Across

2. Metal converts to stable oxide naturally

6. Device for measuring volumetric flow rate

8. A German Scientist who devised an important dimensionless number for Heat Transfer

10. It protects the nature, and it's color is pale blue

Down

1. Asset value decreases over time

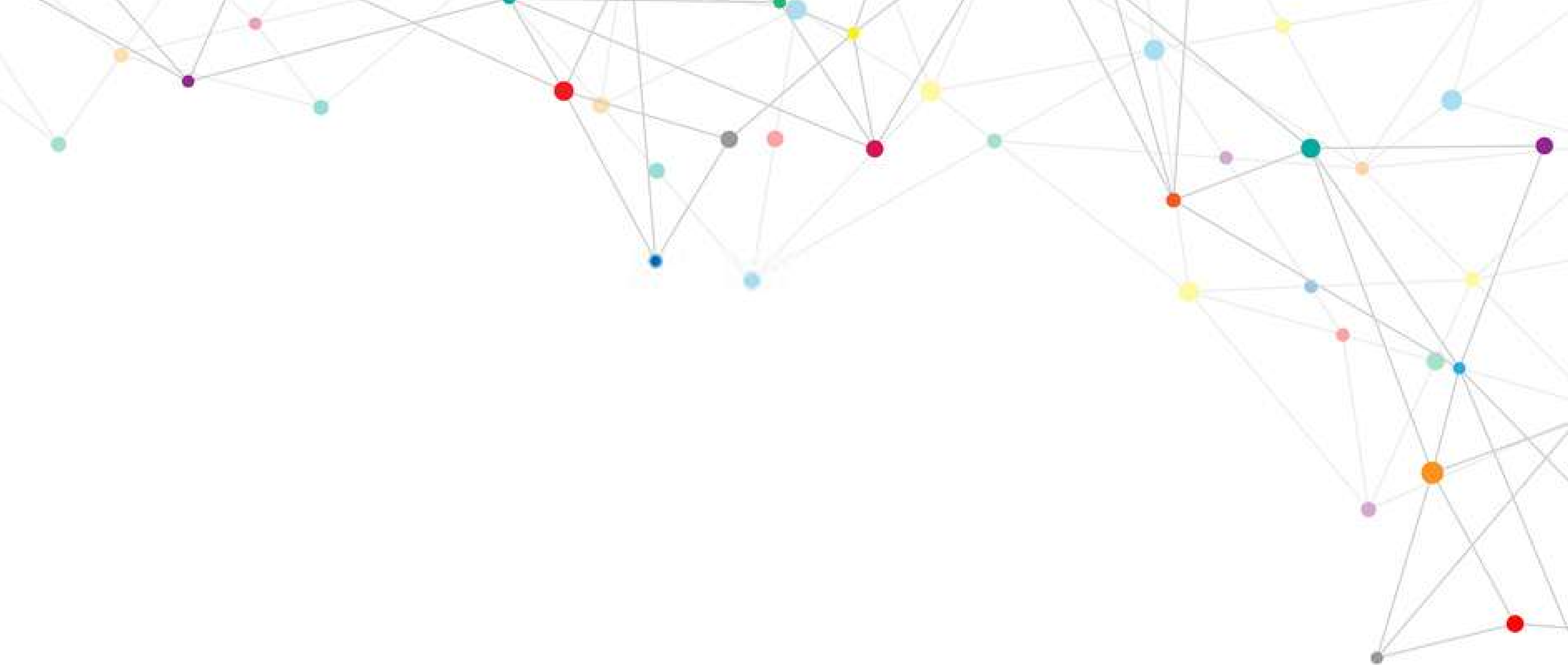
3. Effective use of a situation or resource

4. Separates mixtures into two fractions

5. A type of mixture which can't be separated easily through distillation

7. Naturally occuring source of energy

9. Condition to prevent harm



STAY TUNED TO

Ozone

Vol 2 Coming Soon

