ST. ALOYSIUS COLLEGE (AUTONOMOUS) JABALPUR
DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY
2016-17 | VOLUME 13

किरण

INSIDE THIS ISSUE

IN THE WORDS OF THE VICE—PRINCIPAL
FR. J. BEN ANTON ROSE

"The meeting of two personalities is like the contact of two chemical substances: if there is any reaction, both are transformed."

— C.G. Jung

Everything is made of chemicals. Many of the changes we observe in the world around, we see are caused by chemical reactions. Chemistry is very important because it helps us to know the composition, structure and changes of matter. In our every day life, various chemical are being used in various forms - some as food, others as clanging, etc. We are living in an age of synthetic products. The increased demand for various natural products and the fact that they may not be easily available everywhere has led to a new development in the world of chemistry. Today natural products are often created artificially by chemical processes. For example, natural indigo has been completely superseded by equivalent synthetic dyes; likewise we see in the nylon as well as in the rubber industries. The marvels of chemistry are endless. The chemist is the magician who can turn waste products into things both beautiful and useful. I would like to appreciate the efforts taken by the department of Chemistry and Biochemistry in imparting to the students the culture of using chemistry for good things. Thus I would like to tell all our students, use your knowledge and expertise for contributing something beautiful and useful to the world. May God bless all your efforts and endeavors!

GREEN CHEMISTRY

Green chemistry, also called sustainable chemistry, is an area of chemistry and chemical engineering focused on the designing of products and processes that minimize the use and generation of hazardous substances. Green chemistry overlaps with all sub-disciplines of chemistry but with a particular focus on chemical synthesis, process chemistry, and chemical engineering, in industrial applications. Attempts are being made not only to quantify the *greenness* of a chemical process but also to factor in other variables such as chemical yield, the price of reaction components, etc.

NOBEL FOR CHEMISTRY 2016:
MOLECULAR MACHINES

A molecular machine refers to a number of molecular components that produce mechanical movements in response to specific stimuli. A wide variety of rather simple molecular machines have been synthesized by chemists.

- **Molecular motors are molecules that are capable of unidirectional rotation motion powered by external energy input.**
- **A molecular switch is a molecule that can be reversibly shifted between two or more stable states. The molecules may be shifted between the states in response to changes in e.g. pH, light, temperature, an electric current, microenvironment, or the presence of a ligand.**
- **A molecular sensor is a molecule that interacts with an analyte to produce a detectable change. Molecular sensors combine molecular recognition with some form of reporter, so the presence of the item can be observed.**

FUTURE EVENTS

NATIONAL WORKSHOP ON

THINK GREEN AND SUSTAINABLE

SCIENTISTS TURN CARBON DIOXIDE INTO ALCOHOL

Scientists have found a way to take everyone's least favorite greenhouse gas, carbon dioxide, and mix it with water to create alcohol. A research team at Oak Ridge National Laboratory developed a way to convert carbon dioxide into ethanol—and they did it by accident. The material is a small chip—about a square centimeter in size—covered in spikes, each just a few atoms across. Each spike is constructed out of nitrogen with a carbon sheath and a small sphere of copper embedded in each tip. The chip is dipped into water and carbon dioxide is bubbled in. The copper acts as a small lightning rod, attracting electricity and driving the first steps of the conversion of the carbon dioxide and water into ethanol, before the molecules move to the carbon sheath to finish the process. it's like pushing combustion backwards--normally ethanol can burn with oxygen to produce carbon dioxide and water, as well as energy. But they've managed to reverse the process, supplying carbon dioxide and water, supplying it with electricity, and ending up with ethanol.

- PRAKHAR PANDEY
BSc V SEM

THE FOURTH STATE OF MAT-

There's a fourth state of matter, known as plasma. When a gas is heated or subjected to a strong electromagnetic field, applied with a laser or microwave generator, the number of electrons either increases or decreases in it, forming ions. There is a dissociation of molecular bonds. This is plasma.

In simpler words, Plasma is a cloud of protons, neutrons and electrons where all the electrons have come loose from their respective molecules and atoms, giving the plasma the ability to act as a whole rather than as a bunch of atoms. Plasma is more like a gas than any of the other states of matter because the atoms are not in constant contact with each other, but it behaves differently from a gas. It has what scientists call collective behavior. This means that the plasma can flow like a liquid or it can contain areas that are like clumps of atoms sticking together.

- VEDANTA TIWARI
BSc V SEM

THE NOBEL FOR CHEMISTRY

- **Fraser Stoddart**
- **Jean-Pierre Sauvage**
- **Ben Feringa**

INTERVIEW

HOD CHEMISTRY AND BIOCHEMISTRY

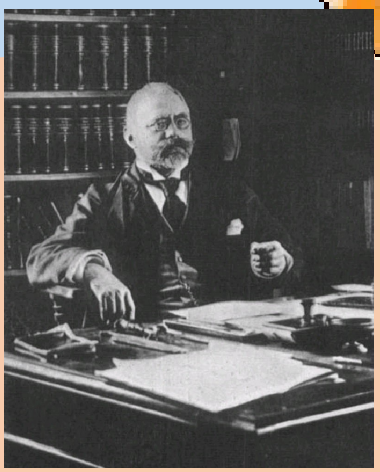
DR. MRS. ANJALI DSOUZA

Question 1: How was your recent Hong Kong trip?
Answer: My recent Hong Kong trip was exceptional. I have travelled in the country but never gone out. It was a learning experience. Secondly, it was a great experience meeting people of 8 different nations. We were talking about women empowerment. The types of stereotypes that are associated with gender are typically the same everywhere. When talking strictly in respect to higher education, comparing India to a country like the Philippines, I was surprised to know that all the key positions are held only by women. So, it was very nice to know that women are forging ahead to key positions in higher education. Hong Kong was a very small part of China – now, it is not with China. The type of infrastructure – we have a long way to go.
Question 2: What is the first step that we need to take to reach that level?
Answer: There is the cleanliness, the roads – every citizen over is patriotic, loyal to their country – that no one ever throws a piece of garbage on the road. There is no monitoring body, yet the system goes. We need to instill that kind of patriotism in our children. Only when this is instilled can we reach that level.
How is your trip going to benefit our students?
Answer: Many institutions there have a 'Women Study Cell'. I was of the opinion that the change in situation of women will only occur, when we start from the grass-root level. So, if being an autonomous institution, we introduce units associated with gender issues in our syllabi and this becomes compulsory, both theoretical and practical because people learn more from practice than from theory. This should be done in such a way that the child is asked to do something to make posters or something to do to make people aware.
Question 4: Tell us something about the scope of research in chemistry in these times.
Answer: The focus is more on the interdisciplinary subjects than on the core subject itself. I think when I am going to get my own candidates, I would like them to do research which is socially beneficial. I find that any research which is beneficial is not related only to chemistry – it is correlated especially to the biological sciences. So, chemistry has to be combined with the living, and only then can we have relevance.

PLASTIC: THE ACCIDENTAL INVENTION

Chemistry is full of experiments, innovations, and inventions. Many invention done in the past have changed our life like penicillin. Did you know that the discovery of a way to make ammonia was the single most important reason for the world's population explosion from 1.6 billion in 1900 to 7 billion today? Or that polythene, the world's most common plastic, was accidentally invented twice?

The first occurred in 1898 when German chemist Hans von Pechmann, while investigating something quite different, noticed a waxy substance at the bottom of his tubes. Along with his colleagues he investigated and discovered that it was made up of very long molecular chains which they termed polymethylene. His method was orthodox and went unnoticed for a long time. Then in 1933 an entirely different method for making the plastic was discovered by chemists at a chemical company, ICI. They were working on high-pressure reactions and noticed the same waxy substance as von Pechmann. Two years later ICI had turned this serendipitous discovery into a practical method for producing the common plastic that's almost certainly within easy reach of you now.



- RASHMI TIWARI
MSc CHEMISTRY

Mosquitoes like the scent of estrogen, that's why women get bitten more often than men do.

Hydrofluoric acid is so corrosive that it will dissolve glass. Still, it is considered a weak acid.

The sound you hear when you crack your knuckles is the sound of nitrogen bubbles bursting between your joints.

DNA is flame resistant. The DNA will survive in traces even if the entire body is burnt.

World's most expensive matter is known to be anti-matter. It costs $25 billion per kg.

9	74	6
F	W	C
Fun	With	Chemistry

1. Two chemists walk into a restaurant.
The first one says, "I think I'll have H2O."
The second one says, "I will have H2O too."
The second one dies.

2. **Question:** What will you do with a sick chemist?
Answer: If you can't helium or curium, then you might as well barium.

3. Did you know that you can cool yourself to -273°C and still be OK.

4. The optimist sees the glass half full.
The pessimist sees the glass half empty.
The chemist sees the glass completely full: half in the liquid state and half in the vapor state.

5. **Question:** What do you call a tooth in a glass of water?
Answer: One molar solution.

- UNNATI KATARHA
BSc I SEM

A POEM ON HYDROGEN

A hydrogen atom was a happy place,
With an electron at a happy pace
Going around a loving neutron,
Celebrating their happy dawn!

Let me but tell you now
Of what happened and how
This electron played that Juliet
And the neutron her bloody idiot.
A sad and greedy fellow
An atom of a gas light yellow

Came the element number seventeen
With its horrific gleam serpentine!

It was but a game of affinity
And electro-negativity,
The electron thought for not a while,
And left for chlorine with a smile.

And hydrogen acquired a charge positive
Heartbroken, swore to be the most reductive.
Till this day, a thousand atoms you may surround,
But none is at rest when H+ is around!

-PRAKHAR PANDEY
BSc V SEM

ANSWERS TO CROSSWORD ON PAGE 6
ACROSS: 1. PROTEINS 2. CHEMISTRY 3. SCHRODINGER 4. TITRATION
DOWN: 1. ELECTRONS 2. BLOODRED 3. RUTHERFORD 4. AVOGADRO 5. HYDROGEN 5. GALILEO 6. MATTER

ENTRIES FROM the imagery writing COMPETITION

A HAPPY CHANGE

Almost three months had passed away, and still there was no improvement in John's health. He would hardly go out to play and rarely talk. His mother, Clara, could not understand what was bothering her son. Among all the high-tech video games, modern amenities at home, the lush green lawn, and the servants, there was nothing that could not please her son, lest worry him!

Darcy, the servant' son had come from the village just a week ago and had given John a good company. There was a little improvement in John's health, but as Darcy went back, promising to come back next year, John went back to his gloomy self.

Clara was really worried about her son's deteriorating health, and decided to take a break from her work and spend time with John. One day, she asked John, 'Do you remember your good friend, Darcy?'

John nodded.

'Would you like to pay him a visit?' asked Clara.

John gave a slight nod again.

So, the very next day, they packed their bags and hit the road. As the skyscrapers and the busy roads of the city were fading in the background, and the big green trees and the dirt free pathways of the village came into sight, Clara could see the warm smile on John's face that reached his eyes.

On their arrival, Clara and John were warmly greeted by Darcy. Bruno, Darcy's pet dog came running, wagging its tail, going round and round the just arrived guests. It was pleased by their arrival. John and Bruno instantly became friends. Bruno would never leave John's side. In their stay at the Alms village, John was regaining his health. He had got a new companion.

Darcy would insist Clara and John to join him for a walk around the village every morning. Bruno would accompany them. The early morning breeze passing through the green trees, the birds singing, the beautiful flowers and the dew on the ground were the things that were never experienced in the city. John was rejoicing. Every morning, John would have fresh milk and bread for breakfast. He was seriously regaining his health. He was really enjoying the simple and peaceful life at the village.

On their last day in the village, Clara and John went for a walk along with Bruno. They tried to fill their senses with the beauty of nature, before going back to the busy life of the city. As they were leaving, John got sad upon the idea of leaving Bruno behind, as he had found a loving companion in him. Even Bruno was not leaving his side. He kept wagging his tail. On seeing this, Darcy himself insisted John and Clara to take Bruno along. John was very happy. On returning to the city, John was now in an improved health. Clara was happy as well.

VEDANTA TIWARI
BSc V SEMESTER (CBZ)

FIRST PRIZE

दृढ़ निश्चय की शक्ति

एक समय की बात है सर्दियों का मौसम चल रहा था. आयुष नाम का एक लड़का जो कि पढने में बहुत होशियार रहता है. आयुष रोज़ सुबह-सुबह स्कूल जाकर वहाँ के हॉल में आग जलाया करता था ताकि आग की गर्माहट से हॉल गर्म हो जाये तथा वहाँ आने वाले आयुष के सहपाठी व शिक्षकों को ठण्ड न लगे. आयुष होनहार छात्र होने के साथ-साथ बहुत अच्छा लड़का था. दूसरों की मदद करना उसकी दिनचर्या में शामिल था. एक दिन आयुष सुबह जल्दी उठा और तैयार होकर स्कूल चला गया. उस दिन आयुष की माँ ने उसे स्कूल जाने से रोका क्योंकि उनका मन बहुत घबरा रहा था कि कुछ गलत होने वाला है. आयुष ने माँ को सांत्वना देते हुए पैर स्पर्श किया और स्कूल चला गया. जैसा कि आयुष रोज़ करता है वैसे ही उसने हॉल में आग जलाई तब तक स्कूल में ८-१० बच्चे आ चुके थे. आयुष खड़ा होकर आज कक्षा में होने वाले टेस्ट के बारे में सोच रहा था. तभी वहाँ अचानक से एक बिल्ली आई और पास में रखे मिट्टी तेल के कनस्तर को धक्का मारकर गिरा दिया. कनस्तर में से तेल बह कर आयुष के चारों ओर फ़ैल चुका था. जैसे ही तेल आग तक पहुंचा वैसे ही आयुष के चारों ओर आग फ़ैल चुकी थी और आयुष आग की लपटों में घिर चुका था. वहाँ मौजूद अन्य विद्यार्थियों ने आयुष को बचाने की कोशिश की तथा कुछ छात्र शिक्षकों को बुला लाये. थोड़ी ही देर में आयुष के पैर पूरी तरह से जल चुके थे और वह बेहोश हो गया. जब आयुष की आँखें खुली तब उसने अपने आप को अस्पताल के एक कमरे में पाया जहां आयुष की माँ और डॉक्टर आपस में बात कर रहे थे. डॉक्टर आयुष की माँ से कह रहे थे कि "आपका बेटा अपाहिज हो चुका है और अब वह आजीवन अपने पैरों पर नहीं चल पाएगा." आयुष बिस्तर पर लेटे-लेटे डॉक्टर और माँ की सारी बातें सुन रहा था. आयुष की माँ मन ही मन रो रही थी लेकिन उन्होंने आयुष को हिम्मत दिलाई और यह हौसला दिलाया की वह एक दिन ज़रूर अपने पैरों पर खड़ा ही नहीं बल्कि चल पाएगा और दौड़ेगा भी. कुछ दिनों बाद आयुष को अस्पताल से घर ले आया गया. आयुष की माँ उसे रोज़ तेल की मालिश करने लगी, जिससे उसके पैर कुछ हद तक हिलने लगे. आयुष की माँ उसे रोज़ महापुरुषों की तथा ऐसे व्यक्तियों की कहानियां सुनाती जिससे आयुष को आगे बढ़ने की, अपनी अपाहिजता से लड़ने की प्रेरणा मिले. २ माह बाद आयुष की माँ ने उसे एक व्हील- चेयर लाकर दी तथा रोज़ सुबह-शाम उसे घर के बाहर लगे उद्यान में घुमाने ले जाया करती थी. तथा वहाँ जाकर उसे सहारा देकर चलाने का प्रयास करती थी. कुछ दिनों तक तो आयुष ने कभी माँ का सहारा लेकर तो कभी उद्यान में लगी किनारे की पट्टियों को पकड़कर चलना सीखा. ६ माह बीत चुके थे. आयुष की माँ की मालिश तथा उसके लगातार चलने की कोशिश कामयाब हुई. अब आयुष अपने पैरों पर बिना किसी सहारे के चल पा रहा था. कुछ ही दिनों में उसने स्कूल जाना शुरू कर दिया. अब आयुष बहुत खुश था. तथा फिर से पढ़ाई में मन लगाया. वह अपनी कक्षा में हर बार की तरह प्रथम आया. जब वह बड़ा हुआ तब उसने ओलम्पिक में होने वाली दौड़ में हिस्सा लिया और वह प्रथम आया. इस बात की खबर सुनकर आयुष से ज़्यादा उसकी माँ खुश थी. उनकी आँखों में आज ख़ुशी की चमक झलक रही थी.

SAKSHI SONI
BSc III SEMESTER (CBZ)

SECOND PRIZE

A GAMBLE OF LIFE

To poor Jimmy, this walk was everything. It was the moment that he waited for, the entire day. All through his learnings and yearnings, the things that he craved for the most was the evening walk.
'How was the school, darling?' his mother asked softly, her fingers cuddling with Jimmy's as the two walked through the fields. 'Fine,' Jimmy replied, apparently bored, 'as always.' The winters were quite near. The Sun had rushed behind the hills, leaving behind just the traces of its yellow light that mingled with the specks of fog overlaying the plants.
Behind them, tied in a leash, walked their dog, a young husky – white and black and muscular, but still a kid. 'Come on, dude,' Jimmy tugged onto the leash, then kneeled down in front of the dog and stroked its fur. 'What's the deal with you?' 'I guess, Man's reluctant due to the cold,' his mother said. 'Seeing that he's not quite fond of this, I think, we will need to cut on our walking time.' Jimmy looked up at her, sighed, and nodded. 'Well, anything for him.'

*

Arya plucked the dead flower. The plants had been dying INCREASINGLY. The winter, she guessed. She stroked the leaves of the bush. Yellow. How she hated yellow! Green buds were, however, sprouting below the dying plants. She watered them daily. Hope! Hope was everything.
Winter was here. There had been a snowstorm yesterday. It was, definitely, no good for anyone. But it provided her opportunity. Now, Mr. Jenette would ask her to mow his garden as well. It was the middle of the month and her income from Jenette's gardening had well perished. At home, Jimmy had suspended their walk for Man's sake. He, now, was morose all the time. But any pain for Man was a big deal for him. He had also caught a fever – a mild fever, thankfully. There was no other source of permanent income, and during such hardships, cleaning the garden of snow was a bonus.
'Aye, a dog,' she heard her employer's shouts from within the house. This guy was a loud talker, and well, she used this as an entertainment during the job. 'I remember. Don't say it again!' He was almost banging at some furniture. 'I don't know where to get another husky. That's none of my business.'
Winters meant sledge races. Huskies needed to be trained. She knew it was torturous, the training. She hated the races.

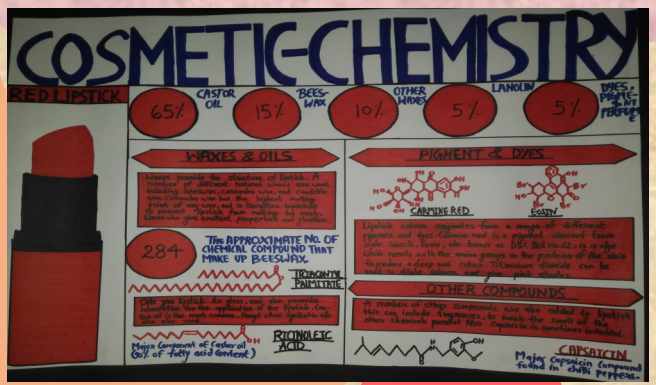
*

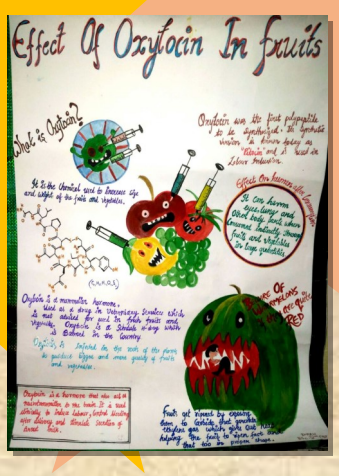
Jimmy held her hand weakly. The fever had gained pitch. She was already under much debt to ask for more. Gardening and lawn-mowing were not enough. She looked around the house. Dark, damp, empty pitchers, naked wires, broken sockets, empty picture frames, and crushed dreams. Abundance! Her child was sighing silently. He was almost unconscious.
Man was curled sitting behind Jimmy, curled into a heap. Occasionally, he would lick Jimmy's face and a smile would scatter on his lips. Suddenly, some voices rang in her mind. '…a dog! I don't know where to get it… A HUSKY?'
She clicked her tongue. Her heart was beating wildly. She jumped off her chair and opened the casement doors. Night was almost off. There was an evidence of rays. No clouds. Surely sunny! But who cared about the weather and the white sky? Mountains sparkled only under clouds. Was it fair to sell beauty for a little comfort? Was it fair to have weight and lose the essence?
It was unanimous. Hope had left her stranded long back. She picked up her phone and dialed a number.
'Hello?' the darn voice reported.
'This is Arya,' she replied, almost stammering. 'I am ready to sell the dog.'
'Oh! At last!' the voice replied back with lust.

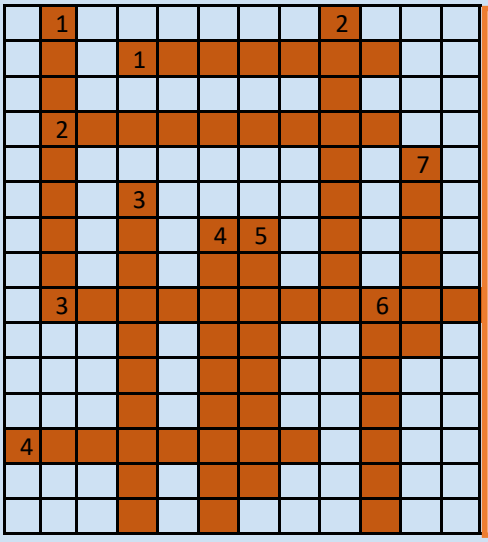
PRAKHAR PANDEY
BSc V SEMESTER (BTZ)

THIRD PRIZE

SELECTS FROM THE
POSTER MAKING COMPETITION







CHEMISTRY CROSSWORD

-PRAKHAR PANDEY
BSc V SEM

ACROSS:

1. If there's something which actually makes you, you – it's this.
2. A dance of electrons.
3. A scientist popularly known as a cat person.
4. The most important color for you, scientifically.

DOWN:

1. If Chemistry is a kingdom, these cause the wars.
2. Not the journey, only the end point matters.
3. The first person to make some good use of gold.
4. Every science student knows his number.
5. It is behind the lightness of balloons and the fury of stars.
6. He made an astronomer's equivalent of the microscope.
7. Is weighty and demands space, but is still classy.

ANSWERS ON PAGE 3

Bee stings are acidic while the wasp stings are alkaline.

Titin is the longest protein with the formula $C_{169723}H_{270464}N_{45688}O_{52243}S_{912}$.

The color blue has a calming effect. It causes brain to release calming hormones. This is why most social networking websites such as Twitter, Skype, etc. have chosen a blue theme. In contrast, the color red has an appetizing effect, that's why it is used as the theme color for various food-

A pHOEM

For coffee, it's 5, for tomatoes, it's 4,
While household ammonia's 11 or more.
It's 7 for water if in a pure state
But rainwater's 6 and seatwater's 8.
It's basic at 10, quite acidic at 2,
And well above 7 when litmus turns blue.
Some find it a puzzle – doubtless their fog
Has something to do with a negative log!

- UNNATI KATARHA
BSc I SEM

CHEMISTRY OF BOOKWORMS

Scientists discovered a new species of worms called bookworms. They occur in true state in schools and colleges.

Preparation: They are prepared by reacting student units with books under high pressure of teachers and parents. At times, the reaction is spontaneous at room NTP.

Physical properties:

- **They are good conductors of notes.**
- **They are generally attracted to libraries.**
- **They are bad conductors of fashion.**
- **They are repelled by cinema houses.**

Chemical Properties: They are generally present as noble gases, but may be reactive under some conditions.

- **Bookworms + night lamps = good marks.**
- **Bookworms + entertainment = no reaction**
- **Bookworms + company = getting bored**

Bookworms + curious question = tension to the teacher

- KOMAL
BSc I SEM

STARS OF THE DEPARTMENT

Simran Sarowa
BSc 2nd Year Topper
(Biochemistry)

Gurpreet Kaur Bansal
BSc 3rd Year Topper

Neha Maravi
MSc 1st Year Topper

Tripti Moses
National Third Rank
(Western Solo Singing)