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NMCC ChemLetter

Department of Chemistry & Research, Nesamony Memorial Christian College, Marthandam
Kanniyakumari District, Tamilnadu, India

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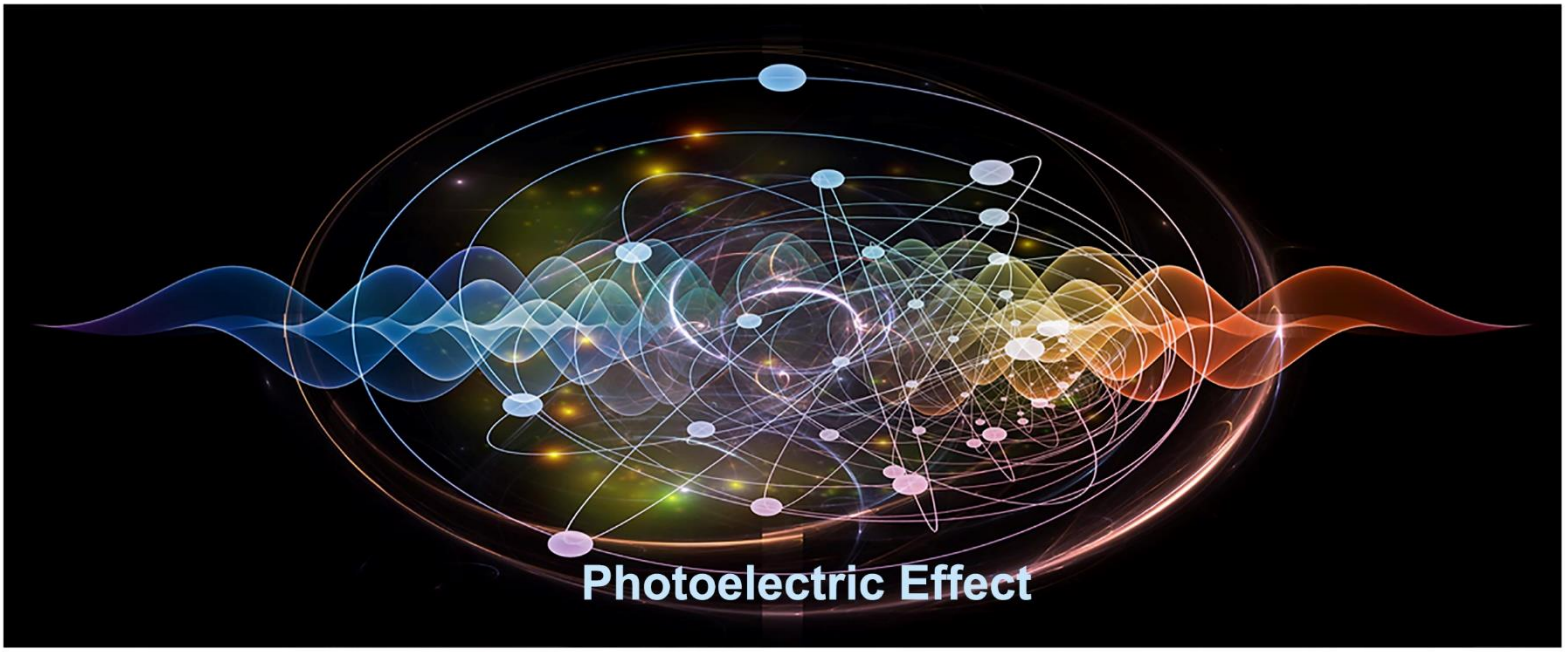

Inside This Issue

Preface from Head of the Dep't

Dear Readers,

I thank the God Almighty, blessed with the inaugural volume of the NMCC ChemLetter.

I have been fascinated to the release of NMCC ChemLetter, a glimpse of facts and fallacies about the development of Chemical sciences in the current era. As a teacher what I feel is the students memorise the science subjects without knowing the basics and applications. The best possible way to make them understanding is to provide reliable source of materials as nutshells which replaces the bulky chapters. This Chem Letter is uniquely designed to meet the basic concepts and applications and to initiate the learning process of students.

I hope this ChemLetter will create interest and develop the skills of the students to face the challenges in studying chemical sciences.

I am grateful to Dr. S. Ginil Mon and his team, whose efforts have carefully edited the ChemLetter, to acquaint the students with matters of relevance in everyday life, ranging from the progress and demands in the field of chemical sciences.

Dr. N. T. Nevaditha

From the Correspondent

I am so glad to hear the launch of NMCC ChemLetter by the Chemistry Department of our College. I am proud to have this history maker in my tenure. I really appreciate the efforts made by the department and the editor. "Successful people are always looking for opportunities to help others" – Brian Tracy. I wish this NMCC ChemLetter will go all the way, fulfilling the vision of our prestigious institution.

Adv. L. Rajathurai

Principal's Message

My dear NMCC'ians, Greetings!

I appreciate Department of Chemistry, for this creative initiative of bringing out NMCC ChemLetter. It is a new milestone in the Department of Chemistry during this extraordinary situation of Covid-19. It focuses on academic and other activities of the department and facilitates dissemination of information. It will also include sharing of the alumni of Chemistry. Therefore, I am sure this newsletter will be a platform for all the present students, staff and alumni to have virtual intellectual interaction. According to Aristotle, "We are what we repeatedly do. Excellence, then, is not an act but a habit." I wish that all the staff and students take active part in this creative venture and make it a regular habit of the department. May the Lord bless all your efforts!

Dr. K. Paul Raj

Preface

It is much delighting to learn that a Monthly News Letter 'NMCC ChemLetter' is being released on behalf of Chemistry Department, Nesamony Memorial Christian College, Marthandam. Incorporation of a Quiz session therein, will certainly imbibe a sense of curiosity and infuse alacrity within the academic nerves of the readers.

Small stretches of current developments in the field of research, will be an added attraction for learners. Such painstaking efforts could prove to be sources of innovative thoughts and effective dissemination of scientific knowledge. It is such small buds that blossom into beauty. I do sincerely hope that the Editor Dr. S. Ginil Mon will prove to be a boon to all those who cherish academic research and in pursuit of knowledge. I wish and pray for the success of the Programme!

Dr. D. Vetha Roy
Former Controller of Examinations and Vice-Principal, Head and Professor of Chemistry
Scott Christian College (Autonomous), Nagercoil

Staff Corner

The Lake of the mountain spirits.

In Russia there was a lake known as lake of evil spirits. Any body who visits the lake during sunny weather used to die. People of that area believed this was due to evil spirit.

Geologists and scientists reached place and found that the lake contained not only water but also native mercury. The evil spirits were nothing but mercury vapour. In hot whether the mercury vapours rose up the surface of the lake and people died by inhaling the vapour. This information clearly shows us that science has contributed a lot to redeem the people from superstitions.

Dr. C. Isac Sobana Raj
Associate Professor of Chemistry

Scientist & Discovery

Vladimir Vasilyevich Markovnikov (1837-1904), Russian chemist.

Markovnikov was born at Nizhny Novgorod and studied at Kazan. Initially an economist, he changed to chemistry and after graduating worked under Butlerov at Kazan and Saint Petersburg. After travelling to Germany, he returned to professorships at Kazan and Odessa before settling at Moscow. He is best known for 'Markovnikov's Rule'. This states that if substituting a molecule of the form H-X into an alkene, the -X adds to the carbon with the fewest hydrogen atoms, while the hydrogen H adds to the carbon with the most other hydrogens already attached. He also contributed to organic chemistry by finding compounds containing carbon rings with four and seven carbon atoms.

MCQs

1. Which of the following is homogenous mixture?
   a) Dust b) Bronze c) Pencil led d) Antena rod

2. Calculate the molarity of 10 mL sample of human urine having 5 mg of urea on analysis [Molar mass of urea = 60]
   a) 0.008 M b) 0.005 M c) 0.003 M d) 0.08 M

3. Electric discharge through the gasses in a cathode ray tube is obtained only at
   a) Very low pressure and very low voltage
   b) Very high pressure and very high voltage
   c) Very high pressure and very low voltage
   d) Very low pressure and very high voltage

4. Which of the following shows an increasing value of e/m ?
   a) n < α < p < e b) n < p < α < e
   c) n < p < e < α d) p < n < a < e

5. The energy of the electron in a hydrogen atom has a negative sign for H- atom because
   a) The energy of the electron in the atom is lower than the energy of the free electron at rest
   b) A free electron at rest is electron that is infinitely far away from the nucleus
   c) The energy values assigned to free electron at rest is zero
   d) All of the above

6. The stability of an electron in multi-electron atom is because
   a) Total attractive interactions > total repulsive interaction
   b) Total attractive interaction = total repulsive interactions
   c) Total attractive interaction < total repulsive interactions
   d) It is independent of interactions amongst electrons

7. Which of the following statements is true regarding absorption and emission spectra?
   a) Emission spectrum is observed when white light is passed through the substance and the transmitted radiations are analysed by the spectroscope
   b) Absorption spectra is always discontinuous whereas emission spectra may be continuous or may be discontinuous
   c) Absorption spectrum gives bright lines (coloured) on dark background whereas emission spectrum gives dark lines on bright background
   d) Radiations from emitting sources are analysed by the spectroscope in absorption spectrum

8. When ammonia donate the lone pair to boron trifluoride, an adduct is formed. The geometry of the adduct will be
   a) square planar b) tetrahedral
   c) trigonal bipyramidal d) octahedral

9. Na^+ and F^- are isolectronic, yet there ionic radii are different. The reason is
   a) Sodium is a metal and fluorine is a non-metal
   b) Na^+ is more reactive than F^-
   c) Sodium is electronegative and fluorine is electropositive
   d) Effective nuclear charge for the 2p electrons in F^- is much smaller than it is in Na^+

10. Zn converts from its melted state to its solid state, it has hcp structure, then what would be the number of nearest neighbouring atoms?
    a) 6 b) 8 c) 12 d) 4

11. The VSEPR model is based on the
    a) Number of bonded pairs of electrons around the central atom
    b) Number of bonded and lone pair of electrons around the central atom
    c) Number of lone pair of electrons around the central atom
    d) Number of protons around the central atom

12. Select the pair of compounds in which both have different hybridisation but have same molecular geometry
    a) BCl_3 , PCl_3 b) PCl_3 , NCl_3 c) BF_3 , BrF_3 d) ICl_2^- , $BeCl_2$

13. The common features among the species CN^- , CO and NO^+ are
    a) Isoelectronic and weak field ligands
    b) Bond order three and isoelectronic
    c) Bond order three and weak field ligand
    d) Bond order two and π-acceptors

14. The cyanide ion, CN^- and N_2 are isoelectronic, but in contrast to CN^- , N_2 is chemically inert, because of
    a) Low bond energy
    b) Absence of bond polarity
    c) Unsymmetric electronic distribution
    d) Presence of more electrons in bonding orbitals

15. NO_2 gas is paramagnetic at room temperature. On cooling below 0°C, it becomes diamagnetic. The reason behind the change of property is
    a) NO_2 becomes amorphous
    b) NO_2 becomes liquid
    c) NO_2 becomes N_2O_4
    d) NO_2 becomes solid

16. The vapour pressure of water at 100°C is 760 mm. The latent heat of vaporization of water in this range is 41.27 kJ/mol. What will be the vapour pressure at 96°C?
    a) 658 b) 758 c) 858 d) 958

17. What will be formed, when the reduction of glucosone takes place by Zn and CH_3COOH?
    a) glucose b) fructose c) glucosazone d) arabinose

18. The most effective pair of reagents for the preparation of tert-butyl ether is
    a) Tert-butyl alcohol and ethyl bromide
    b) Sodium ethoxide and tert-butyl bromide
    c) Potassium tert-butoxide and ethanol
    d) Potassium tert-butoxide and ethyl bromide

19. The cleavage of an aryl-alkyl ether with hydrogen halide will give
    a) A molecule each of phenol and an alkyl halide
    b) A molecule each of an alkyl halide, aryl halide and water
    c) A molecule each of an aryl halide and water
    d) A molecule each of an alkyl halide and water

20. Which of the following statement is not true about the hexagonal closed packing?
    a) The coordination number is 12
    b) It has 74% packing efficiency
    c) Tetrahedral voids of the second layer are covered by the spheres of the third layer
    d) In this arrangement spheres of the fourth layer are exactly aligned with those of the first layer

Student's Corner

Chemistry is a big part of our every day life. We start the day with chemistry. We can find chemistry in the foods we eat,the air we breath, cleaning chemicals, our emotions and literally every objects we can see or touch... Love ,jealousy, envy all share basis in chemistry.

C- community H- health E-environment
M- medicine I- industry S- sciences
T- teaching R- research Y- you

Some examples of chemistry in our daily life are:-

* SKY IS BLUE: The blue colour of the sky can be explained by "Rayleigh scattering" that consists of the scattering of light by particles much smaller than its wavelength.

* ICE FLOAT ON WATER: Ice is less dense than liquid water . the heavier water displays the lighter ice, so ice floats on water.

* HOW SUNSCREEN WORKS ?: Sunscreen combines organic and inorganic chemicals to filter the light from the sun. The reflective particles in sunscreen usually consists of " Zinc oxide or Titanium dioxide ".

* VEGETABLE IS COLOURED : Many vegetables and fruits are strongly coloured because they contain a special kind of chemical compounds named " Carotinoids " . These compounds have an area called "Chromophore". This is where the importance of chemistry can revealed.

* COFFEE MAKES US AWAKE: Coffee keeps us awake because of the presence of chemical called " Adensine" in our brain. It binds to certain receptors and slows the nerve cell activity when sleep is signaled.

* WE CRY WHILE CUTTING ONIONS: Onions make you cry due to the presence of sulphur in the cells which break after the onions are cut . This sulphur gets mixed with moisture and thus irritates your eyes.

Christin Jemisha C
416, II B.Sc. Chemistry

Campus News

Two-week MOOC Workshop for College Teachers on Management of Environment and its Resources - Batch-I 28/04/2020, Batch-II 19/05/2020 - 2000 participants

National Level Webinar on "Research Methodology and Catalysis in Chemical Sciences - 16/06/2020 - 731 participants

National Level Chemistry Quiz for College Students - 19/06/2020 - 715 participants

Alumni's Space

Road from NMCC to CSIR-NIIST

I humbly thank all the teachers and mentors who had inspired and motivated me during my studies starting from the school days, then in college and doctoral research. I learnt from my experience that, everyone must have a great dream about the profession of choice, implement the plan to achieve the goal through self-determination, consistent hard work and with a passion and positive attitude. Don't let yourself mentally down during difficult times. The people and environment around us can also greatly influence us. My ambition to become a Scientist came to my mind during my Post graduate project days in Vikram Sarabhai Space Centre, ISRO, Trivandrum and the interaction with many scientists who had motivated me.

Dr. T. P. D. Rajan
Senior Principal Scientist - MSTD
CSIR-NIIST, Thiruvananthapuram

21. The appearance of colour in solid alkali metal halides is generally due to
    a) F- Centres b) Schotky defect
    c) Frenkel defect d) interstitial positions

22. The dissolution of ammonium chloride in water is an endothermic reaction. The solubility of this reaction
    a) Increases in increasing temperature
    b) Decreases on decreasing temperature
    c) Decreases on increasing temperature
    d) Increases on decreasing temperature

23. Aquatic animals are more comfortable in cold water rather than in warm because
    a) Solubility of gases decreases with increase in temperature
    b) Solubility of gases increases with increase in temperature
    c) Solubility of gases decreases with decrease in temperature
    d) Solubility of a gas in liquid is higher

24. CH_2Cl_2 is more volatile than $CHCl_3$. This concluded that the equilibrium vapour pressure will be always rich in the component which is
    a) less volatile b) more volatile
    c) concentrated d) unsaturated

25. Osmotic pressure measurement is useful particularly for biomolecules which are generally unstable
    a) At lower temperature b) at higher temperature
    c) at lower pressure d) at higher pressure

Photoelectric Effect in Automatic Doors

You may have seen many elevators and door systems which open up automatically, when a person comes near them. These systems use a beam of light and a photoelectric device known as photocell. As long as the beam of light strikes the photocell, the photoelectric effect generates enough ejected electrons to produce a detectable electric current. When the light beam is blocked by a person, the electric current is interrupted and the doors are signalled to open.

Dr. S. Ginil Mon

Answers for Previous Issue

To submit this quiz online
Scan the QR Code
Or
Use the Link Below

https://forms.gle/Y7rtshtSCZcs4e999

Instructions

Kindly use the link given to submit this quiz online on or before 30th of September, 2020

Regular partcipants can enter the yearly quiz fest which will have participants from all regions. Winners will move forward to compete for Universal Trophies organized by the MAP International.

The Publisher's decision will be final.

The Editor

The Publishers

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