

## KIRAN TUTORIALS

Seat No.

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Std 10 (English)

Science And Technology - I

Date 09-10-20

## HTT 5

Time 1HRS

Chapter 6.00,9.00

Marks 20

## Q.1 Multiple Choice Questions

3

- 1 Which type of carbon-carbon bonds are present in Vanaspati ghee?  
a. Single      b. double      c. triple      d. single-double

Ans Option a.

- 2 The refractive index of water is .....  
a. 1.33      b. 1.36      c. 1.31      d. 1

Ans Option a.

- 3 If the angle of incidence  $\angle i = 0^\circ$  then angle of reflection  $\angle r = \dots\dots\dots$   
a.  $0^\circ$       b.  $90^\circ$       c.  $45^\circ$       d.  $180^\circ$

Ans Option a.

## Q.2 Find the odd one out

2

- 1 Cyclohexane, Cyclopentane, Isobutane, Cyclopropane

Ans Isobutane - It is open chain compound while others form a closed ring structure

- 2 LPG, CNG, Ethanol, Methanol

Ans Methanol - It is a poisonous molecule while others are used as fuel

## Q.3 Match the pair

1

Column "A"	Column "B"
i. $C_2H_6$	a. Triple bond
ii. $C_3H_2$	b. Molecular formula of alcohol
	c. Saturated hydrocarbon

i. $C_2H_6$	Saturated hydrocarbon
ii. $C_3H_2$	Triple bond

## Q.4 State True or False(Any One)

1

- 1 Substances that can give oxygen to other substances are called oxidants or oxidizing agents.

Ans Substances that can give oxygen to other substances are called oxidants or oxidizing agents - **True.**

- 2 Spectrum of light was first observed by Albert Einstein.

Ans Spectrum of light was first observed by Albert Einstein - **False.**

Spectrum of light was first observed by Sir Issac Newton.

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**Q.5 Give scientific reasons(Any Two)**

1 Rainbow can be seen at fountains in any season.

**Ans** i. Rainbow appears in the sky after a rain shower.

ii. Water droplets act as small prism.

iii. The water droplets refract and disperse the sunlight and then they reflect it internally and finally again refract resulting in a rainbow.

iv. The water droplets of a fountain can do the same thing if sunlight passes through them.

v. Hence it is possible to enjoy a rainbow at fountains in any season.

2 The sky appears dark instead of blue to a person located in space.

**Ans** The blue colour of the sky is due to scattering of light by the atmosphere

i. At higher altitudes there is no atmosphere hence the scattering of light does not take place at all.

ii. Hence in space the sky appears dark instead of Blue.

3 The sun appears reddish early in morning. Explain.

**Ans** i. At the time of sunrise or sunset the sun is very close to the horizon.

ii. Sunlight has to travel a longer path through the atmosphere to reach the observer.

iii. The blue and the violet colours are scattered in a greater amount than the red colour.

iv. The light that reaches the observer is mostly red and yellow.

v. Hence the sun appears reddish early in the morning.

4 Stars twinkle at night.

**Ans** i. Stars are point source of light as they are very far away.

ii. The refractive index of air in the given region in atmosphere goes on changing continuously and randomly.

iii. When the atmosphere refracts **more light** towards us, the star is seen bright.

iv. When the atmosphere refracts **less light** towards us, the star is seen dim.

v. Thus due to the change in refractive index of atmosphere, stars appear twinkling at night.

**Q.6 Solve Numerical problems.(Any One)**

1 The refractive index of glass with respect to air is  ${}_a n_g$  and of a liquid with respect to air is  ${}_a n_l$ . Express the refractive index of glass with respect to liquid.

**Ans**

$${}_a n_g = \frac{n_g}{n_a}$$

$${}_a n_l = \frac{n_l}{n_a}$$

$$\text{dividing both} = \frac{{}_a n_g}{{}_a n_l} = \frac{n_g}{n_l}$$

$$\frac{{}_a n_g}{{}_a n_l} = {}_l n_g$$

$$\therefore \text{Refractive index of glass with respect to liquid} = \frac{{}_a n_g}{{}_a n_l}$$

2

A light ray moves from carbon disulphide ( $n_c = \frac{5}{3}$ ) to glass ( $n_g = \frac{3}{2}$ ) what is the refractive index of glass with respect to carbon disulphide

**Ans Given:** Refractive index of carbon disulphide =  $\frac{5}{3}$

$$\text{Refractive index of glass} = \frac{3}{2}$$

$$\begin{aligned} \text{Refractive index of glass with respect to carbon disulphide} &= \frac{n_g}{n_c} \\ &= \frac{\frac{3}{2}}{\frac{5}{3}} \\ &= \frac{9}{10} \\ &= \mathbf{0.9} \end{aligned}$$

∴ **0.9** is the refractive index of glass with respect to carbon disulphide.

### Q.7 Write Short Notes(Any Two)

4

1 Characteristics of carbon.

- Ans**
- Carbon has a unique ability to form strong covalent bonds with other carbon atoms; this results in formation of big molecules. This property of carbon is called catenation power.
  - Two carbon atoms can be bonded together by one, two or three covalent bonds. These are called single bond, double bond, and triple bond respectively.
  - Being tetravalent one carbon atom can form bonds with four other atoms (carbon or any other). This results in formation of many compounds.
  - Carbon has one more characteristics which is responsible for large number of carbon compounds. It is 'isomerism'.

2 Write short note on Structural isomerism.

- Ans**
- The phenomenon in which compounds having different structural formulae have the same molecular formula is called 'structural isomerism'.
  - For example in  $C_4H_{10}$ , there two different structures possible for the same molecular formula.
  - One is straight chain while another which can be formed is branched. As these structural formulae are different they form two different compounds.
  - Also these compounds have different IUPAC names depending on the chain and the parent alkane.
  - The number of carbon compounds increases further due to the isomerism observed in carbon compounds.
  - Isomerism cannot be seen in lower members of alkanes such as Methane, Ethane and Propane where as in alkene, Ethene and alkyne, Ethyne.

3 Write short note on Ethanol.

- Ans**
- At room temperature colourless ethanol is a liquid and its boiling points is  $78^{\circ}C$ .
  - Generally ethanol is called alcohol or spirit. Ethanol is soluble in water in all proportions.
  - When aqueous solution of ethanol is tested with litmus paper it is found to be neutral. Consumption of small quantities of dilute ethanol shows its effect as it harms health in a number of ways.
  - Ethanol being good solvent, it is used in medicines such as tincture iodine (solution of iodine and ethanol), cough mixture and also in many tonics.

4 Write short note on Refractive index

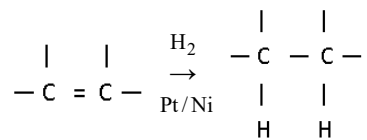
- Ans**
- For a given pair of media, the ratio of the sine of the angle of incidence to the sine of the angle of refractive is constant.
  - $\frac{\sin i}{\sin r} = \text{Constant} = n$
  - This constant is called refractive index.
  - The value of the refractive index is different for different media and also for the light of different colours for the same medium.

### Q.8 Explain with the help of examples(Any One)

3

1 What is a catalyst? Write any one reaction which is brought about by use of catalyst?

- Ans** i. Catalyst is a substance due to presence of which rate of reaction changes without causing any change to it.
- ii. The rate of reaction increases in hydrogenation of vegetable oils. This is addition reaction.
- iii. The catalyst used are platinum or nickel.



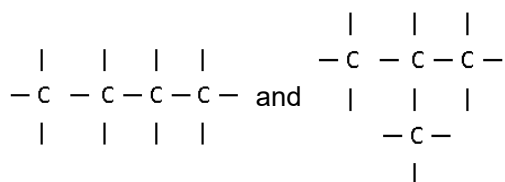
**2** Explain the following terms with example.

- a. Structural isomerism    b. Covalent bond    c. Hetero atom in a carbon compound

**Ans** i. **Structural isomerism.**

The phenomenon in which compounds having different structural formulae and same molecular formula. This is called as structural isomerism.

**For example :** Two structures of  $C_4H_{10}$ :



ii. **Covalent bond.**

The chemical bonds formed by sharing of valence electron between the two atoms is called covalent bond.

It can be shown by electron dot structures.

**Example :-**

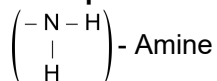
Hydrogen molecule -  $H : H$

Oxygen molecule -  $O : : O$

iii. **Hetero atom in a carbon compound.**

The atom of the element which is substitute for hydrogen in hydrocarbon is referred to as a hetero atom.

**Example :**



-  $COOH$  - Carboxylic acid