Answers – Activity Sheet – March 2022

Q.1. (A) Choose the *correct* option. **[5]**

i. Gold plated ornaments are example of _____ .

a. electroplating b. alloying

c. anodizing d. galvanizing

Ans. a

ii. The functioning of the satellite launch vehicle is based on _____ .

a. Newton's first law of motion

b. Newton's second law of motion

c. Newton's third law of motion

d. Newton's universal law of gravitation

Ans. c

iii. _____ is one of the combustible components of L.P.G.

a. Ethane b. Propane c. Methane d. Ethene

Ans. b

iv. The power of a convex lens of focal length 25 cm is _____.

a. 4.0 D b. 0.25 D c. – 4.0 D d. – 0.4 D

Ans. a

v. _____ colour is deviated the least in the spectrum of white light obtained with a glass prism.

a. Red b. Yellow c. Violet d. Blue

Ans. a.

(B) Solve the following subquestions. **[5]**

i. **Find the odd one out.**

INSAT, GSAT, IRS, PSLV

Ans. PSLV. PSLV is a satellite launch vehicle. All the rest are satellites.

ii. **Complete the correlation**

Group 1 : Alkali metals : : _____ : Halogens

Ans. Group 17. Group 1 comprises alkali metals and group 17 comprises halogens.

iii. **Match the correct pair.**

Column A	Column B
Refractive index of water	(a) 1.31
	(b) 1.36
	(c) 1.33

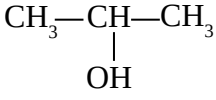
Ans. 1. – c

iv. State whether the following statement is True or False.

An electric motor converts mechanical energy into electrical energy.

Ans. False. An electric motor converts electrical energy into mechanical energy.

v. Write the IUPAC name for the following structural formula.



Ans. Propan–2–ol

Q.2. (A) Give scientific reasons. (Any two) [4]

i. Atomic radius goes on increasing down a group.

Ans.

(a) Atomic radius is the distance between the nucleus and the outermost shell.

(b) While going down a group, a new shell is added in each atom.

(c) Therefore, the distance between the outermost electron and the nucleus goes on increasing.

(d) Hence, the atomic radius goes on increasing while going down a group.

ii. A simple microscope is used for watch repairs.

Ans.

(a) A simple microscope is made of a convex lens with a small focal length.

(b) It produces a virtual, erect, and bigger image of an object.

(c) Thus, it enables small parts of a watch to be magnified and seen clearly.

(d) Therefore, watch repairers use simple microscope for watch repairs.

iii. It is recommended to use an airtight container for storing oil for a long time.

Ans.

(a) When oil is left aside for a long time, it is found to have a foul odour.

(b) This is called rancidity.

(c) This happens because of oxidation of the oil.

(d) The process of oxidation can be slowed down or prevented by storing the oil in an airtight container.

(e) Hence, it is recommended to use an airtight container for storing oil for a long time.

(B) Answer the following questions. (Any three) [6]

i. An object takes 5 s to reach the ground from a height of 5 m on a planet. What is the value of 'g' on the planet?

Solution:

Given: Distance travelled by the object (s) = 5 m

Time taken (t) = 5 s

Initial velocity of the object (u) = 0

Acceleration (a) = g

To find: g = ?

Working: According to Newton's second law of motion,

$$s = ut + \frac{1}{2} at^2$$

$$s = 0 + \frac{1}{2} gt^2$$

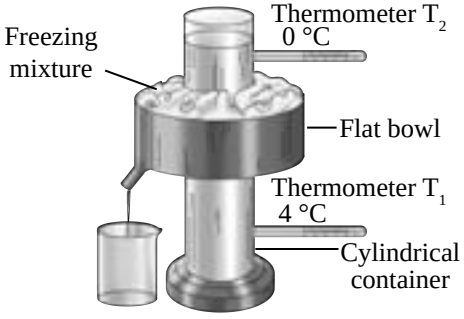
$$g = \frac{2s}{t^2}$$

$$\therefore \quad g = \frac{2 \times 5}{5^2} = \frac{10}{25} = 0.4 \text{ m/s}^2$$

Ans. The value of 'g' on the planet = 0.4 m/s^2.

ii. Draw a neat labelled diagram of Hope's Apparatus.

Ans.



iii. State the Laws of Refraction.

Ans.

(a) First law of refraction

The incident ray and the refracted ray at the point of incidence are on the opposite sides of the normal to the interface of the two media, and the incident ray, the refracted ray, and the normal all lie in the same plane.

(b) Second law of refraction (Snell's law)

For a given pair of media, the ratio of sin i to sin r is a constant. This constant is called the refractive index of the second medium with respect to the first medium. This law is also called Snell's law.

iv. Answer the following.

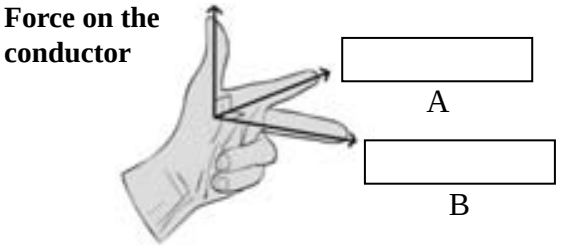
(a) Name the main ore of aluminium.

Ans. Bauxite is the main ore of aluminium.

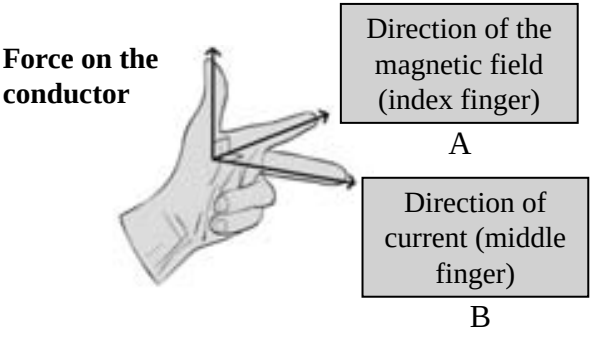
(b) What impurities are present in aluminium ore?

Ans. Silica (SiO_2), ferric oxide (Fe_2O_3) and titanium oxide (TiO_2) are the impurities present in bauxite.

v. Observe the given figure of Fleming's Left Hand Rule and write the labels of 'A' and 'B':



Ans.



Q.3. Answer the following. (Any five) **[15]**

i. Write the demerits of Mendeleev's periodic table.

Ans. The demerits of Mendeleev's periodic table are:

(a) The whole number atomic mass of the elements cobalt (Co) and nickel (Ni) is the same. Therefore, there was an ambiguity regarding their sequence in Mendeleev's periodic table.

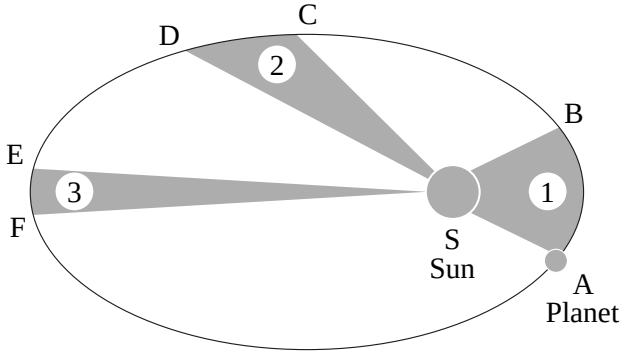
(b) Isotopes were discovered long after Mendeleev put forth the periodic table. As isotopes have the same chemical properties but different atomic masses, a challenge was posed in placing them in Mendeleev's periodic table.

(c) When elements are arranged in an increasing order of atomic masses, the rise in atomic mass does not appear to be uniform. It was not possible, therefore, to predict how many elements could be discovered between two heavy elements.

(d) Hydrogen shows similarity with halogens (Group VII). In the same way, there is a similarity in the chemical properties of hydrogen and alkali metals (Group I). There is a similarity in

the molecular formulae of the compounds of hydrogen and alkali metals (Na, K, etc.) formed with chlorine and oxygen. On considering the above properties it cannot be decided whether the correct position of hydrogen is in the group of alkali metals (Group I) or in the group of halogens (Group VII).

ii. State the laws related to the given diagram.



Ans. The laws depicted in the figure are Kepler's laws of planetary motion. The three Kepler's laws of planetary motion are as follows:

(a) Kepler's first law: The orbit of a planet is an ellipse with the Sun at one of the foci.

(b) Kepler's second law: The line joining the planet and the Sun sweeps equal areas in equal intervals of time.

(c) Kepler's third law: The square of period of revolution of a planet around the Sun is directly proportional to the cube of the mean distance of the planet from the Sun.

iii. Identify the type of chemical reactions given below.

a. $CuSO_4 + Fe \rightarrow FeSO_4 + Cu$

b. $2Mg + O_2 \rightarrow 2MgO$

c. $2KClO_3 \rightarrow 2KCl + 3O_2\uparrow$

Ans.

a. Displacement reaction

b. Combination reaction

c. Decomposition reaction

iv. If the speed of light in a medium is 1.5×10^8 m/s, what is the absolute refractive index of the medium?
(Speed of light in vacuum = 3×10^8 m/s).

Solution:

Given: Speed of light in a medium = v = 1.5×10^8 m/s,

Speed of light in vacuum = c= 3×10^8 m/s

To Find: n = ?

Working:

Absolute refractive index, $n = \frac{c}{v}$

$c = 3 \times 10^8$ m/s

$$n = \frac{3 \times 10^8 \text{ m/s}}{1.5 \times 10^8 \text{ m/s}} = 2$$

Ans. The absolute refractive index of the medium is 2.

v. Read the following paragraph and answer the questions based on it.

If heat is exchanged between a hot and cold object, the temperature of the cold object goes on increasing due to gain of energy and the temperature of the hot object goes on decreasing due to loss of energy.

The change in temperature continues till the temperatures of both the objects attain the same value. In this process, the cold object gains heat energy and the hot object loses heat energy. If the system of both the objects is isolated from the environment by keeping it inside a heat resistant box, then no energy can flow from inside the box or come into the box.

(a) Heat is transferred from where to where?

Ans. Heat is transferred from the hot object to the cold object.

(b) Which principle do we learn about from this process?

Ans. From this process, we learn the principle of heat exchange.

(c) How will you state the principle briefly?

Ans. The principle of heat exchange states that heat energy lost by the hot object is equal to the heat energy gained by the cold object.

vi. Complete the following table for convex lens.

Sr. No.	Position of the object	Position of the image	Nature of the image
1.	Beyond $2F_1$	.....	.....
2.	.....	At infinity	.....
3.	.....	.....	Real, inverted and enlarged

Ans.

Sr. No.	Position of the object	Position of the image	Nature of the image
1.	Beyond $2F_1$	Between F_2 and $2F_2$	Real, inverted and smaller
2.	At focus F_1	At infinity	Real, inverted and very large
3.	Between F_1 and $2F_2$	Beyond $2F_2$	Real, inverted and enlarged

vii. Explain the following terms.

a. Metallurgy

Ans.

(a) The science and technology of extracting metals from ores and purifying them is called metallurgy.

(b) Ores of metals are taken out from mines and the gangue is usually separated from them at the site itself by various methods.

(c) Then the ores are carried to the place where metals are produced.

(d) There, the metals are extracted in pure form. Then the metals are further purified by different methods of purification. This entire process is called metallurgy.

b. Ores

Ans.

(a) Most metals, being reactive, do not occur in nature in free state but are found in the combined state.

(b) These compounds of metals along with the impurities are called minerals.

(c) The minerals from which the metals can be separated economically are called ores.

(d) Metals can be extracted from their ores by various methods of separation.

c. Gangue

Ans.

(a) Ores contain many types of impurities such as soil, sand, and rocky substances along with metal compounds.

(b) These impurities are called gangue.

viii. **State the importance of Space Missions.**

Ans.

(a) The world has become a global village due to space missions. Today, we can contact a person in any part of the world within a second.

(b) We can gather information about worldwide events sitting at home. Due to the Internet, every information is available at our fingertips.

(c) It has become possible to get advance alerts about natural calamities and take proper precautions.

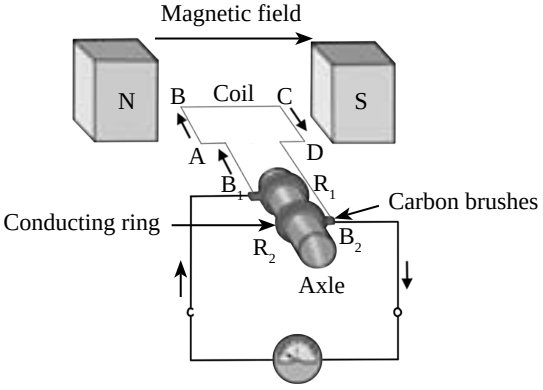
(d) During war, it is possible to get information about the actions of the enemy through aerial surveillance using satellites.

(e) It is also possible to explore the fossil reserves and minerals in the earth.

(f) Thus, due to unlimited applications of space missions, space technology has become an inevitable part for the development of a nation.

Q.4. Answer any one of the following questions. [5]

i. Observe the following diagram and answer the questions given below.



(a) Identify the above diagram.

Ans. The figure shows an AC electric generator.

(b) Write the principle on which the above appliance works.

Ans. It works on the principle of electromagnetic induction.

(c) Write the working of the above appliance.

Ans.

Working:

(i) When the axle rotates, the branch AB goes up and branch CD goes down (i.e. the coil ABCD rotates clockwise).

(ii) According to Fleming's right hand rule, electric current is produced in the branches AB and CD in the direction A → B and C → D. Thus, the current flows in the direction A → B → C → D.

(iii) In the external circuit, the current flows from B2 to B1 through the galvanometer.

(iv) After half a rotation, branch AB takes the position of branch CD and branch CD takes the position of branch AB. Therefore, the induced current goes as D → C → B → A.

(v) The branch BA is always in contact with the brush B_1 and branch DC is in contact with brush B_2.

(vi) Hence, in the external circuit, current flows from B_1 to B_2 i.e. opposite to that during the previous half rotation.

(vii) This repeats after every half rotation and alternating current is produced.

(d) Write the use of the above appliance.

Ans. Some uses of an AC electric generator are:

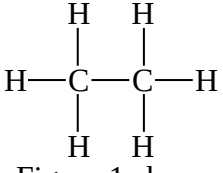
(i) It is used to drive motors.

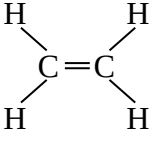
(ii) It provides backup for emergency use in hospitals, offices, etc.

(iii) It is used to supply power for construction sites

ii.

(a) Identify the saturated and unsaturated hydrocarbon from the given structural formulae.

(1) 

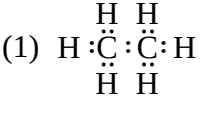
(2) 

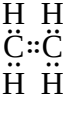
Ans. Figure 1 shows structural formula of Ethane. It is a saturated hydrocarbon.

Figure 2 shows structural formula of Ethene. It is an unsaturated hydrocarbon.

(b) Draw electron-dot structure for (1) and (2).

Ans.

(1) 

(2) 

(c) Define Homologous series.

Ans. Homologous series: A series of compounds formed by joining the same functional group in the place of a particular hydrogen atom on the carbon chains having sequentially increasing length is called a homologous series.