Maharashtra Board Class 10 Science and Technology Part I
Solved Previous Year Question Paper -2022

SECTION A

Best Approach to Attempt a Test

- Go through all the questions, quickly.
- Mark the easy questions you are sure of solving and attempt them first.
- Pay attention to keywords.
- Solve questions, part by part.

Q1. A.

1. Gold plated ornaments is the example of_____.

A. electroplating **B.** alloying
C. anodising **D.** galvanising

Ans: electroplating

2. 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: Newton's third law of motion

3. _____is one of the combustible components of L.P.G.

A. Ethane **B.** Propane
C. Methane **D.** Ethene

Ans. Propane

4. The power of a convex lens of the focal length 25 cm is_____.

A. 4.0 D **B.** 0.25 D
C. -4.0 D **D.** -0.4 D

Ans: 4.0 D

Power = 1/f ; where f is in meters.
= 1/0.25
= 4.0 D

5. _____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: Red

Q1. **B Answer the following:**

1. Find the odd one out:

A. INSAT B. GSAT
C. IRS D. PSLV

Ans: PSLV

2. Complete the correlation:
Group 1 : Alkali metals : :_____: Halogens

Ans: Group 17

3.

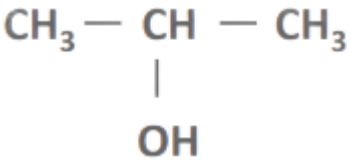
Column 'A'	Column 'B'
Refractive index of water	Refractive index of water a) 1.31 b) 1.36 c) 1.33

Ans: c) 1.33

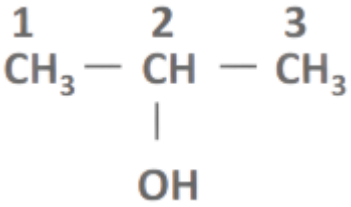
4. **State True or False:**
An electric motor converts mechanical energy into electrical energy.

Ans: False

5. Write the IUPAC name of the following structural formula :



Solution:



Nomenclature:

Prefix + Word root + Primary suffix + Secondary suffix

Prop ane 2-ol

-IUPAC name: propan-2-ol

Q2. A. Give scientific reasons:

i) Atomic radius goes on increasing down the group.

Solution:

As we move down a group, the atomic number increases causing the number of electrons and shells to increase. This results in an increase in atomic radius down the group.

ii) Simple microscope is used for watch repairs.

Solution:

-A simple microscope has a convex lens that has the ability to produce enlarged as well as erect images of an object.

-Simple microscopes are used by watchmakers to see the small parts and screws of the watch while repairing it.

iii) It is recommended to use airtight container for strong oil for a long time.

Solution:

-Oil, when kept aside for a long time, undergoes oxidation. This causes the oil to develop an unpleasant smell and taste.

-Hence, it is recommended to store oil in air-tight containers to slow down the oxidation reaction.

Q2. B. Answer the following:

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?

Ans:

Given:

t = 5 s

s = 5 m

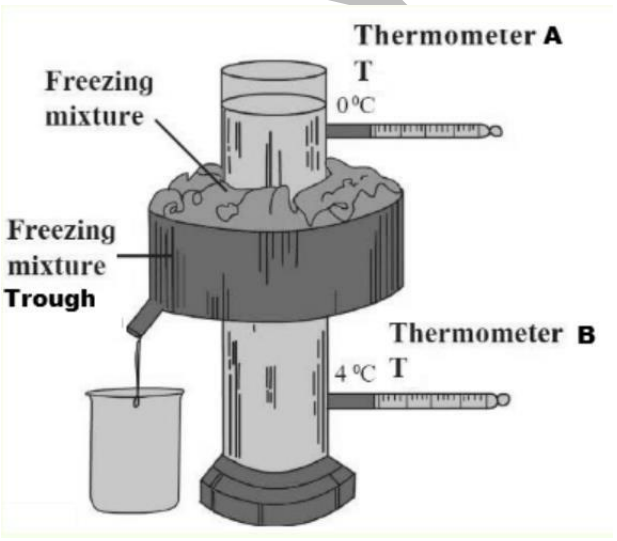
u = 0 m/s

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

$5 = 0 + \frac{1}{2} g 5^2$

Solving $g = 0.4\ m/s^2$

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



iii) State the laws of refraction

Ans:

a) The incident ray, normal and refracted ray all lie in the same plane at the point of incidence.

b) The ratio of sine of angle of incidence to sine of angle of refraction is constant, for the light of a given colour and for the given pair of media.

iv) a) Name the main ore of aluminium.

Solution :

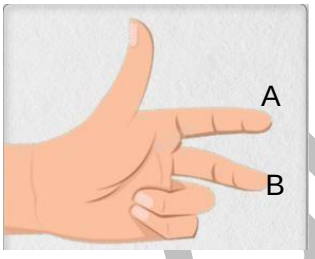
The main ore of aluminium is bauxite ($Al_2O_3.H_2O$).

b) What impurities are present in aluminium ore?

Solution:

The ore contains titanium oxide, iron oxide and silicon dioxide as impurities.

v) Observe the given figure of Fleming's Left Hand Rule and write the labels of



'A' and 'B':

Ans: A: Magnetic Field
B: Current

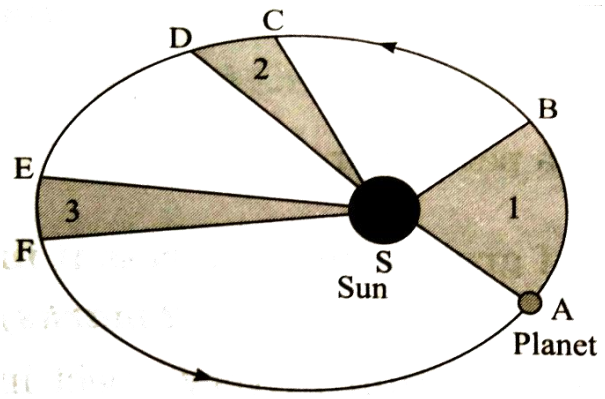
Q3. Answer the following:

A) Write the demerits of Mendeleev's periodic table.

Solution:

1) The position of hydrogen in the periodic table was uncertain.
2) In certain pair of elements, the increasing order of atomic mass is not obeyed.
3) The periodic table could not explain the position of isotopes.

B) State the laws related to the given diagram :



Ans:

Kepler's three laws of planetary motion can be described as follows:

1. The Law of Ellipses: The path of the planets about the sun is elliptical in shape, with the center of the sun being located at one focus.
2. The Law of Equal Areas: An imaginary line drawn from the center of the sun to the center of the planet will sweep out equal areas in equal intervals of time.
3. The ratio of the squares of the periods of any two planets is equal to the ratio of the cubes of their average distances from the sun.

C) Identify the type of chemical reaction given below:

i) $\boldsymbol{CuSO_4 + Fe \rightarrow FeSO_4 + Cu}$

ii) $\boldsymbol{2Mg + O_2 \rightarrow 2MgO}$

iii) $\boldsymbol{2KClO_3 \rightarrow 2KCl + 3O_2}$ t

Solution:

a) $CuSO_4 + Fe \rightarrow FeSO_4 + Cu$: Displacement reaction

b) $2Mg + O_2 \rightarrow 2MgO$: Combination reaction

c) $2KClO_3 \rightarrow 2KCl + 3O_2$ t : Decomposition reaction

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

Ans:

Refractive index = $\frac{\text{Speed of light in vacuum}}{\text{Speed of light in medium}}$

= 2

E) Read the following paragraph and answer the question based on it:

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

The change in temperature continues till the temperature of both objects attains the same value. In this process, the cold object gains heat energy and the hot object loses heat energy. If the system of both objects is isolated from the environment by keeping it inside a heat resistant box, then no energy can flow 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?
b) Which principle do we learn about from this process?
c) How will you state the principle briefly?

Ans:

a) Which principle do we learn about from this process?
Solution: Heat is transferred from a body at a higher temperature to a lower temperature.

c) Which principle do we learn about from this process?
Solution: We learn the principle of Heat Transfer.

d) How will you state the principle briefly?
Solution: Heat is a form of energy. Heat always flows from a hot body to a cold body.

F) Complete the following table for convex lens :

S No.	Position of the object	Position of the image	Nature of the image
1	Beyond $2F_1$		

2	At infinity	
3		Real, inverted & enlarged.

Ans:

S No.	Position of the object	Position of the image	Nature of the image
1	Beyond $2F_1$	Between F_2 & $2F_2$	Real, inverted & diminished.
2	At F_1	At infinity	Real, inverted & highly enlarged.
3	Between F_2 & $2F_2$	Beyond $2F_1$	Real, inverted & enlarged.

G) Explain the following terms:

i) Metallurgy

Solution: The different processes involved in the extraction of metals from their ores and refining are known as metallurgy.

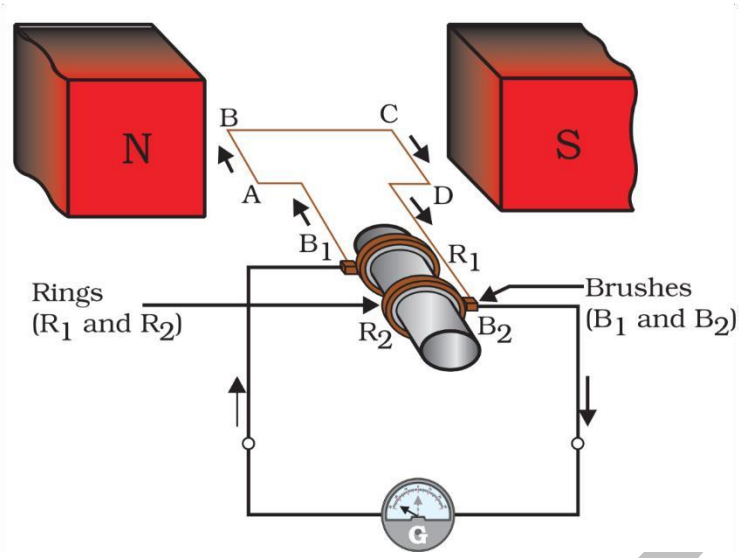
ii) Ores

Solution: The minerals from which the metals can be extracted conveniently and profitably are known as ores.

iii) Gangue

Solution: The unwanted impurities like soil, sand, earthy particles, limestone, rocky material, mica, etc., present in an ore are known as gangue.

Q4. A. Observe the following diagram and answer the questions given below:



a) Identify the above diagram:

Solution: AC Generator

b) State the principle of an electric generator?

Solution: Based on the phenomenon of electromagnetic induction, electric generators are prepared. In an electric generator, mechanical energy is used to rotate a conductor in a magnetic field to produce electricity. This is the principle of an electric generator.

c) Write the working of the above apparatus?

Solution:

i) A rectangular coil that is forced to spin in a uniform magnetic field

The coil is connected to a centre-reading meter by metal brushes that press on two metal slip rings (or commutator rings)

ii) The slip rings and brushes provide a continuous connection between the coil and the meter.

iii) When the coil turns in one direction:

- The pointer defects first one way, then the opposite way, and then bac again
- This is because the coil cuts through the magnetic field lines and an EMF, and therefore current, is induced in the coil.

iv) The pointer deflects in both directions because the current in the circuit repeatedly changes direction as the coil spins

- This is because the induced EMF in the coil repeatedly changes its direction
- This continues on as long as the coil keeps turning in the same direction

v) The induced EMF and the current alternate because they repeatedly change direction.

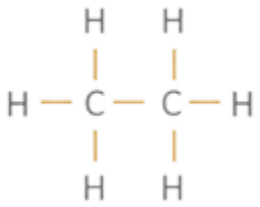
d) Write the use of the above appliance.

Ans: 1. Hydroelectric Power Plant

2. Wind Turbines

Q4. B. Identify the saturated and unsaturated hydrocarbon from the given structural formula:

(1)



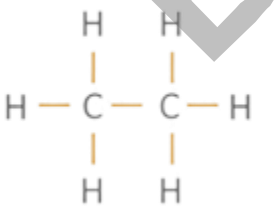
(2)

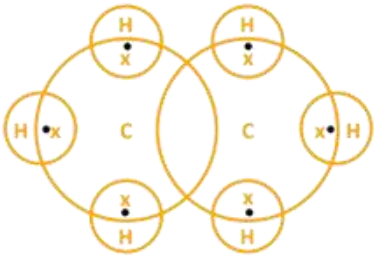
Solution: Here, the hydrocarbons represented in (1) and (2) are ethane and ethene respectively.

B. Draw electron dot structure for (1) and (2).

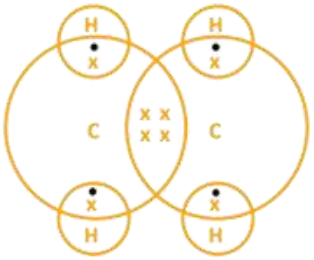
Solution :

(1)





(2)



C. Define homologous series.

Solution :

- A group of organic compounds with similar structures and chemical properties in which the successive compounds differ by $-CH_2$ group is known as the homologous series.
- For example, methane (CH_4) and ethane (C_2H_6) belong to the same homologous series.