Subject: Science & Technology (Part I)	**Marks: 40**
Date: 21/10/2024	**Time: 8.00 am-10.00 am**

Note:
1) All questions are compulsory
2) Draw scientifically, technically correct labelled diagram wherever necessary.
3) Start writing each main question on new page.
4) Figures to the right indicate full marks.
5) For each MCQ (i.e., Q.no. 1- (A)) evaluation would be done for the first attempt only.
6) For each MCQ correct answer must be written as shown in the Eg. (i) A, (ii) C etc.

Q.1-A) Choose the correct alternative. (5)

1) The gravitational potential energy of a body at a height 'h' from the earth's surface is _____.

A) $-\dfrac{GMm}{R+h}$ B) $-\dfrac{GMm}{(R+h)^2}$ C) $\dfrac{GMm}{R+h}$ D) $\dfrac{GMm}{(R+h)^2}$

2) The first artificial satellite _____ was sent to space by Soviet Union in 1957.
A) Swayam   B) Sputnik   C) Aryabhata   D) Bhaskara –I

3) Eka-boron was subsequently named as _____.
A) Scandium   B) Germanium   C) Molybdenum   D) Gallium

4) If a ray of light passes from a denser medium to a rarer medium in a straight line, the angle of incidence must be _____.
A) 30º   B) 60º   C) 90º   D) 0º

5) A students adds aqueous solution of NaOH to aqueous solution of copper sulphate. A pale blue precipitate of copper hydroxide is formed along with sodium sulphate. The type of chemical reaction is _____.
A) decomposition   B) displacement   C) double displacement
D) Combustion

Q.1-B) Answer the following questions. (5)

1) Find odd one out –
   Voltmeter, Ammeter, Thermometer, Galvanometer

2) Complete the co-relation
   Group 1 **:** Alkali metals **: :** _____ **:** Halogens

3) State whether the following statement are true or false.
   The velocity of light is different in different media.

4) State "Newton's law of gravitation".

5) Define : Combination reaction

Q.2-A) Give scientific reasons (Any 2) (4)

1) It is recommended to use air tight container for storing oil for long time.

2) Tungsten metal is used to make a solenoid type coil in an electric bulb.

3) Metallic character goes on decreasing while going from left to right in a period.

Q.2-B) Answer the following questions (Any 3) (6)

1) Distinguish between mass and weight by giving any two points of distinction.

2) Refractive index of water with respect to air is $\dfrac{4}{3}$ and speed of light in air is 3×10^8 m/s. Find the speed of light in water.

3) 'A' and 'B' are atoms of two elements belonging to period 2. 'A' belongs to group 14 and 'B' belongs to group 17.

   (a) Identify elements 'A' and 'B'.
   (b) Which element is more electro negative among 'A' and 'B'.

4) If a current of 0.6 ampere is passed through a wire having resistance 15 Ω for 2 minute. Calculate the heat generated in the wire in Joules.

5) When hydrogen gas is passed over black copperoxide, a reddish coloured layer of copper is formed. Observe the chemical reaction given below and answer the following questions.
   $CuO + H_2 \longrightarrow Cu + H_2O$

   (a) Write the reductant in the above chemical reaction.
   (b) Name the reactant which has undergone reduction.

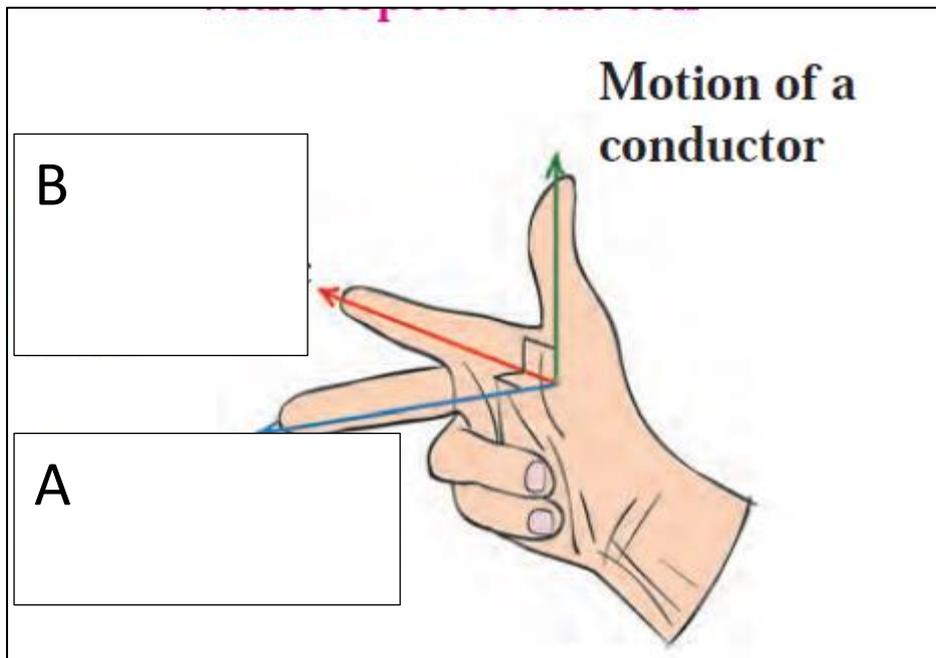**Q.3 Answer the following questions (Any 5)**   **(15)**

1) Identify the following phenomenon shown in the given figure and explain it.
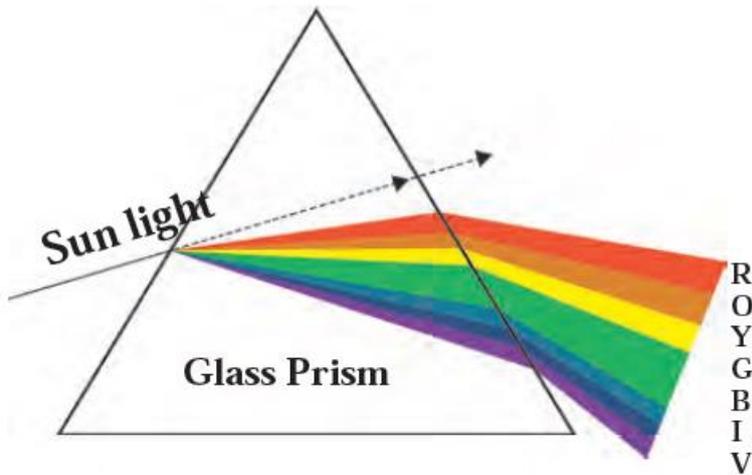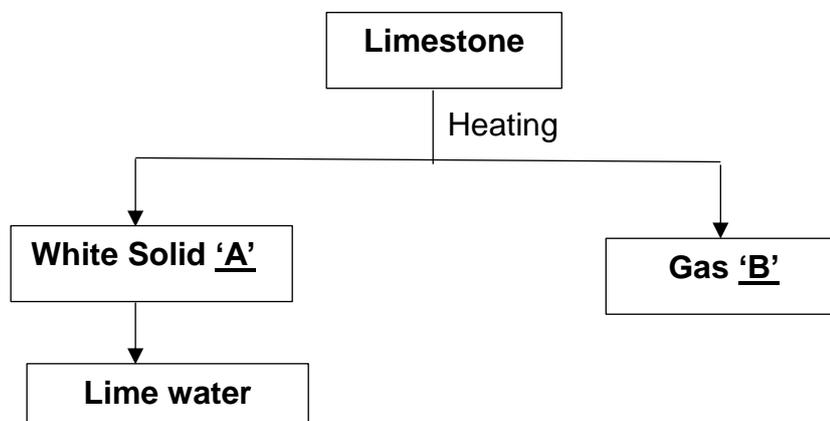

2) An object thrown vertically upward reaches a height of 500m. What was it's initial velocity. How long will the object take to come back to the earth (Assume g = 10m/s^2).

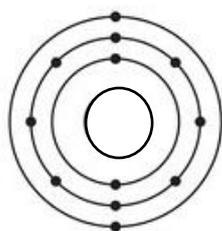3) Observe the diagram given below and answer the questions.

a) Which rule does the above diagram represent.
b) State the rule
c) Label the parts : A and B

4) Distinguish between High Earth orbits and low earth orbits by giving atleast three points of distinction between them.

5) Complete the following chart by identifying the products 'A' and 'B' and also write the balanced chemical equation for the chemical reaction that occurs when limestone is heated.

```
              ┌──────────────┐
              │  Limestone   │
              └──────┬───────┘
                  Heating
          ┌──────────┴──────────────┐
          ▼                         ▼
┌────────────────────┐      ┌──────────────┐
│ White Solid 'A'    │      │  Gas 'B'     │
└─────────┬──────────┘      └──────────────┘
          ▼
┌────────────────────┐
│    Lime water      │
└────────────────────┘
```

6) Write any three demerits of Mendeleev's periodic table.

7) An electric geyser rated 500W is operated for one hour daily. What will be the electrical consumption expenses for that in the month of August, if the cost of unit is Rs.3?

8) Atoms of two different elements are represented in the following diagrams observe it and hence answer the questions given below.
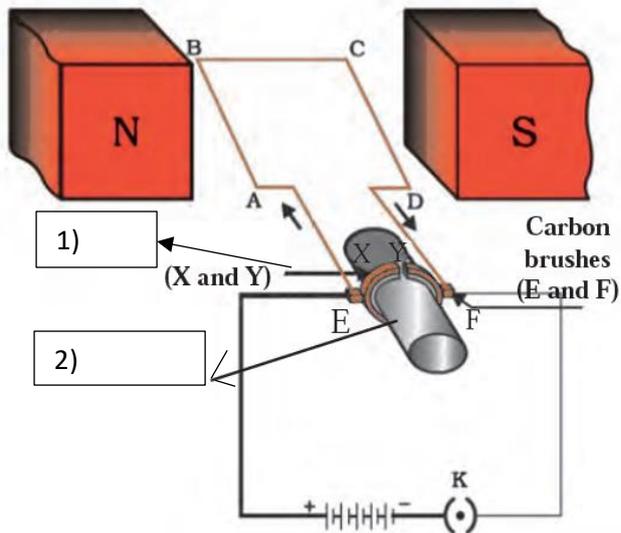
'A'
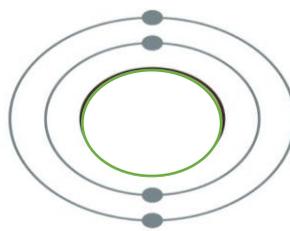
'B'

1) Identify elements 'A' and 'B'
2) Whether these elements belongs to the same group or not? Justify your answer.
3) Which element is more electro positive. Explain it with reason.

Q.4 Answer any 1 of the following. (5)

1) Observe the figure given below and answer the questions given below.

a) Identify the device given in the figure.
b) Name the rule use to find out the direction of force.
c) State the rule.
d) Write any 2 uses of the given device.
e) Label the given parts – 1) _____

2) _____

2) The observations made by Ravi while performing the experiment are given below Based on these write answers to the questions.

Ravi found that the light ray travelling from denser medium to a rarer medium, bends away from the normal. If the angle of incidence (i) is increased by Ravi, the angle of refraction (r) will also increase according to Snell's law. For a particular value of angle of incidence, the value of angle refraction equal to 90°.

For angles of incidence larger than the particular value, the angle of refraction is larger than 90°. Such rays return back to the denser medium.

(a) Name this particular value of 'i'.
(b) Name the process of reflection of incident ray into a denser medium.
(c) Draw the diagrams of three observations made by Ravi.

****