SAIRAJ TEST SERIES

1ˢᵗ Preliminary Examination

Red 1

**Time : 2 Hrs.** **Science and Technology (Part 1)** **Marks : 40**

Note : (i) *All questions are compulsory.*
(ii) *Use of a calculator is not allowed.*
(iii) *The numbers to the right of the questions indicate full marks.*
(iv) *In case of MCQs (Q. No. 1(A) only the first attempt will be evaluated and will be given credit*
(v) *For every MCQ, the correct alternative (A), (B), (C) or (D) with subquestion number is to be written as an answer. For Eg. : (i) (A), (ii) (B), (iii) (C)*
(vi) *Scientifically correct, labelled diagrams should be drawn wherever necessary.*

Q.1. **(A) Write the correct alternative.** **5**

1. Heat is measured in ....
    (a) Joule   (b) Calorie
    (c) Both (a) and (b)   (d) Joule/second

2. What is the reason for the twinkling of stars?
    (a) Explosions occurring in stars from time to time
    (b) Absorption of light in the earth's atmosphere
    (c) Motion of stars
    (d) Changing refractive index of the atmospheric gases

3. The following structural formula belongs to which carbon compound?
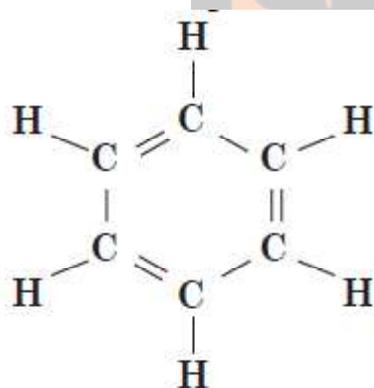
    (a) Camphor   (b) Benzene   (c) Starch   (d) Glucose

4. The distance of distinct vision for normal human eye is ....
    (a) 25 m   (b) 2.5 cm   (c) 25 cm   (d) 2.5 m

5. Which of the following process to be carried out to avoid the formation of greenish layer on brass vessels due to corrosion?
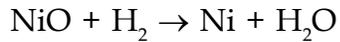   (a) Plating   (b) Anodization   (c) Tinning   (d) Alloying

Q.1. **(B)** **Answer the following question:** **5**

1. **Find the odd one out.**
   Sodium, Calcium, Magnesium, Aluminium

2. **Identify the reactants that undergo oxidation and reduction.**
   $NiO + H_2 \rightarrow Ni + H_2O$

3. **Give the name:**
   Instrument used to measure specific heat of an object by mixing method.

4. **Write the IUPAC names of the following structural formulae.**
   $CH_3 - CHOH - CH_3$

5. **Match the following:**

A	B
1. Water	(a) 1.50
2. Diamond	(b) 1.33
	(c) 2.42

Q.2 **(A) Give scientific reasons. (any two)** **4**

1. While preparing dilute sulphuric acid from concentrated sulphuric acid in the laboratory, concentrated sulphuric acid is added slowly to water with constant stirring.

2. In the electric equipment producing heat e.g. iron, electric heater, boiler, toaster, etc, an alloy such as Nichrome is used, not pure metals.

3. Lemon or tamarind is used for cleaning copper vessels turned greenish.

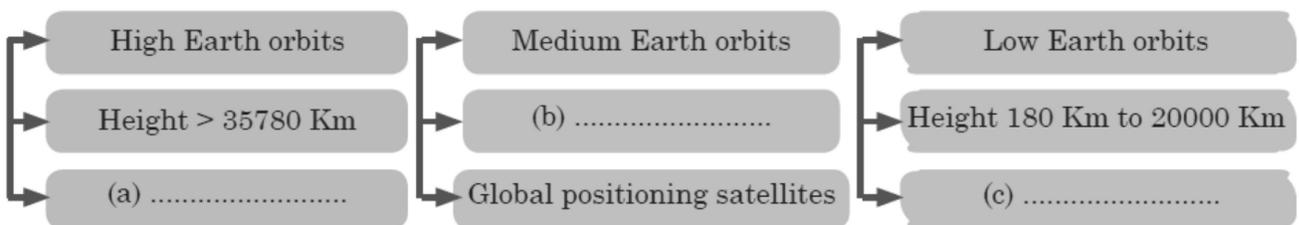**Q.2** **(B) Answer the following questions: (any three)** **6**

1. i.   What is the maximum number of electrons that can be accommodated in a shell? Write the formula.
   ii. Deduce the maximum electron capacity of the shells K, L and M.

2. **Give difference between:** AC generator and DC generator

3. **Complete the table: Satellite orbits are given below:**
   Fill in their heights about the earth's surface and the satellites which revolve in these orbits.

High Earth orbits	Medium Earth orbits	Low Earth orbits
Height > 35780 Km	(b)	Height 180 Km to 20000 Km
(a)	Global positioning satellites	(c) ....

4. What are (i) free fall (ii) acceleration due to gravity?

5. **Solve the problem:**
   Doctor has prescribed a lens having power + 1.5 D. What will be the focal length of the lens? What is the type of the lens and what must be the defect of vision?

**Q.3** **Attempt the following questions: (any five)** **15**

1. **Complete the passage / paragraph and rewrite it. (***Terms : lose, valence electrons, group, lowering, increases, positive, distance, attractive force, metals***)**

   While going down a ………. a new shell gets added, resulting in an increase in the ………. between the nucleus and the valence ………. . This results in ………. the effective nuclear charge and thereby lowering the ………. force on the valence electrons. As a result of this the tendency of the atom to ………. electrons increases. Those elements, which have a tendency to lose their valence electrons and form ………. ions are considered as ………. . Hence, metallic character ………. down the group.

2. Give names of three functional groups containing three different heteroatoms.
   Write name and structural formula of one example each.

3. **Observe the following graph.** Considering the change in volume of water as its temperature is raised from 0°C, discuss the difference in the behaviour of water and other substances. What is this behaviour of water called?
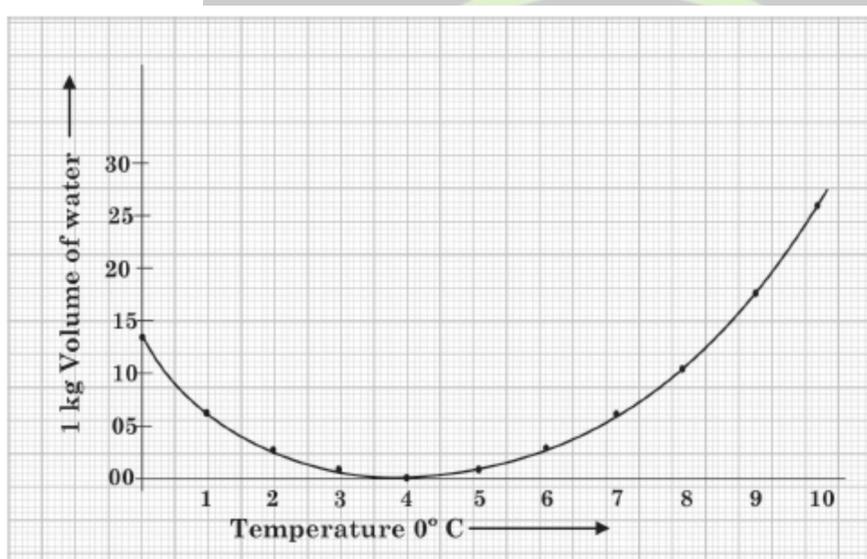
4. Surabhi from Std. X uses spectacle. The power of the lenses in her spectacle is 0.5 D. Answer the following questions from the given information:
   i.   Identify the type of lenses used in her spectacles.
   ii.   Identify the defect of vision Surabhi is suffering from.
   iii. Find the focal length of the lenses used in her spectacle.

5. Process depicting from the following image.

        (i)   (ii)
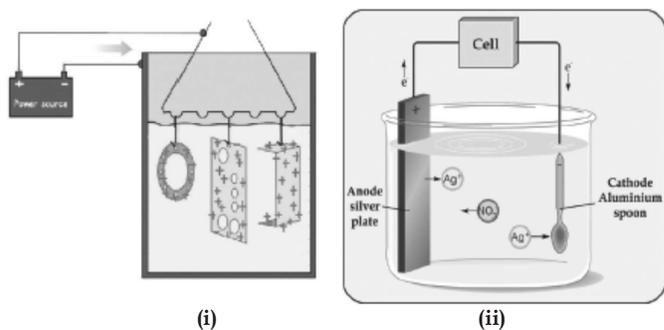
6. Write proper answer in the square.

If F = x   Then F = [   ]
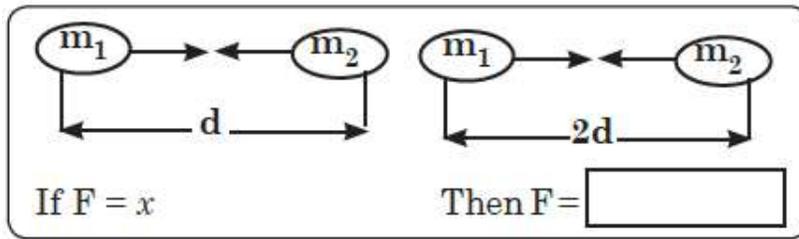
7. **Solve the problem:**
If mass of a planet is eight times the mass of the earth and its radius is twice the radius of the earth, what will be the escape velocity for that planet?
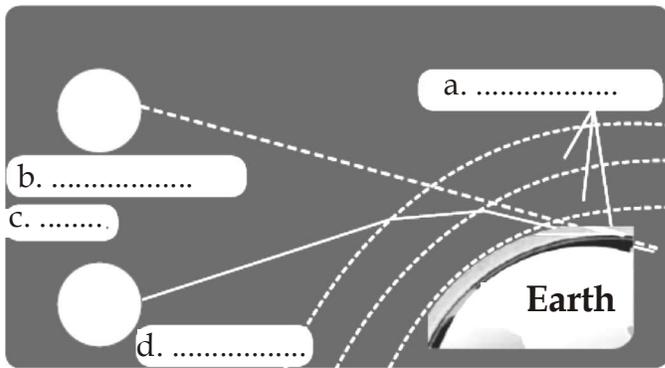
8. Which device is used to produce electricity? Describe with a neat diagram.
   a. Electric motor
   b. Galvanometer
   c. Electric Generator (DC)
   d. Voltmeter

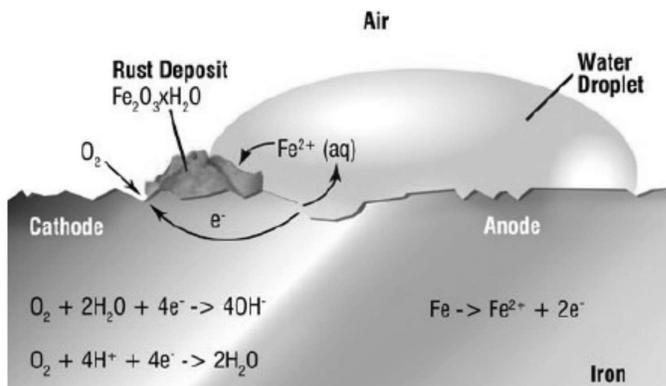**Q.4   Answer the following questions: (any one)**   5
1. **Observe the diagram and answer the following questions.**

   i.   Which natural phenomenon is explained in the figure?
   ii.   Complete the diagram.
   iii. How does it occur? Explain.
   iv.   How does it affect duration of a day?

2. **Observe the following picture and write down the chemical reaction with explanation.**

$O_2 + 2H_2O + 4e^- \rightarrow 4OH^-$

$O_2 + 4H^+ + 4e^- \rightarrow 2H_2O$

$Fe \rightarrow Fe^{2+} + 2e^-$

Best of Luck 👍