BOARD ACTIVITY SHEET: July 2022

Science and Technology Part - 1

Time: 2 Hours **Max. 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 each 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) Choose the correct alternative and write the correct option: **[5]**

i. The formula for escape velocity is _____

(A) $\sqrt{\frac{2M}{R}}$ (B) $\sqrt{\frac{2GM}{R}}$

(C) $\sqrt{\frac{GM}{R^2}}$ (D) $\sqrt{\frac{Gm}{R^2}}$

ii. To prevent rusting, a layer of _____ metal is applied on iron sheets.
(A) potassium (B) sodium
(C) magnesium (D) zinc

iii. Carbonate ores are strongly heated in a limited supply of air to transform them into oxides, this process is called _____.
(A) leaching (B) calcination
(C) roasting (D) tinning

iv. For a particular value of 'i', the value of 'r' becomes equal to 90°. This value of 'i' is called the _____.
(A) critical angle (B) angle of deviation
(C) angle of refraction (D) angle of emergence

v. The _____ controls the amount of light entering the eye.
(A) iris (B) pupil
(C) cornea (D) retina

(B) Answer the following **[5]**

i. Match the correct pair:

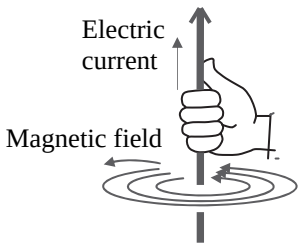
Column 'A'		Column 'B'
Electric	a.	The ohm
	b.	The ampere
	c.	The volt

ii. What is the height of the low earth orbit satellite above the earth's surface?

iii. State true or false :
When the incident ray is parallel to the principal axis, the refracted ray does not pass through the principal focus.

iv. Find the odd man out :
Methane, Ethene, Propane, Butane:

v. Identify the law from the given figure :



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

i. Generally, most of the carbon compounds are bad conductors of electricity.

ii. A magnetic needle shows decreasing deviation of its angle as distance from a current conductor is increased.

iii. We see the sun even before it emerges above the horizon.

(B) Answer any *three* of the following questions: **[6]**

i. How much heat energy is necessary to raise the temperature of 10 kg of water from 30°C to 100°C?
(Specific heat capacity of water (c) = 1 kcal/kg •°C)

ii. Will the value of g be the same everywhere on the surface of the earth? Justify your answer.

iii. Identify the exothermic and endothermic reactions :

a. $HCl \rightarrow NaOH \longrightarrow NaCl + H_2O + heat$

b. $2KClO_{3(s)} \xrightarrow{\Delta} 2KCl_{(s)}\ 3O_2\uparrow$

c. $CaO + H_2O \longrightarrow Ca(OH)_2 + heat$

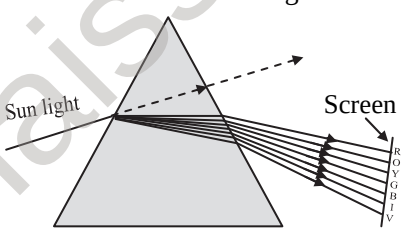
d. $CaCO_{3(s)} \xrightarrow{\Delta} CaO_{(s)} + CO_2\uparrow$

iv. Give one function of each of the following satellites:
a. Communication satellite b. Earth observation satellite

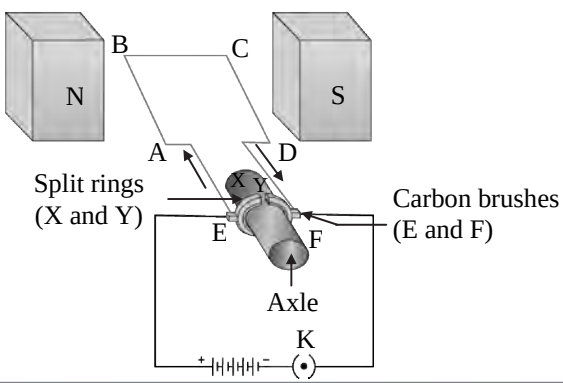
v. State any two uses of ethanol.

Q.3. Answer any *five* of the following questions: **[15]**

i. Identify the phenomenon shown in the figure below. State and explain it :



ii. Observe the following diagram and answer the questions given below :
a. Identify the device shown in the figure.
b. On which rule is the working of the above device based?
c. Give any two uses of this device.



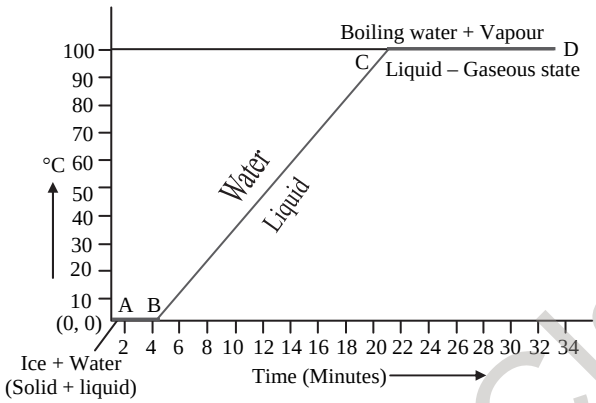
iii. a. The atomic number of nitrogen is 7. How many electrons are present in the valence shell of nitrogen?
b. Molecular formula of nitrogen is N_2. Draw the electron-dot structure and line structure of a nitrogen molecule.

iv. The mass and weight of an object on the earth are 5 kg and 49 N respectively. What will be their values on the moon? Assume that the acceleration due to gravity on the mode is 1/6th of that of the earth.

v. To which group does the halogen family belong? Write any four halogens.

vi. What is redox reaction? Explain with the help of a balanced chemical equation.

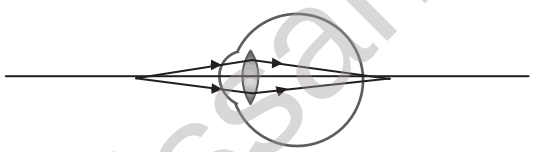
vii. Explain the following temperature vs. time graph :



viii. An element has its electronic configuration as 2, 8, 2. Answer the following questions :
a. What is the atomic number of this element?
b. What is the group of this element?
c. To which period does this element belong?

Q.4. Attempt any *one* of the following questions: **[5]**

i. a. What is the minimum distance of distinct vision for normal human eye?
b. Identify the defect of vision shown in the figure :



c. Focal length of a convex lens is 25 cm. What is its power?
d. Define power of a lens.

ii. State the general properties of ionic compounds.