

- Note:**
- (i) All questions are compulsory.
 - (ii) Use of 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 e.g. (i) (a), (ii) (b), (iii) (c)
 - (vi) Scientifically correct, labelled diagrams should be drawn wherever necessary.

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

- i. The minimum velocity of the spacecraft to escape from Earth's gravitational force must be _____ .
 - a. 112 km/s
 - b. 11.2 km/s
 - c. 1.12 km/s
 - d. 0.112 km/s
- ii. The melting point of pure ethanoic acid is _____ .
 - a. 17°C
 - b. 19°C
 - c. 15°C
 - d. 27°C
- iii. The process of separation of light into its component colours while it is passing through a medium is called _____ .
 - a. reflection
 - b. refraction
 - c. dispersion
 - d. internal reflection
- iv. The conversion of ferrous sulphate into ferric sulphate is _____ reaction.
 - a. oxidation
 - b. displacement
 - c. electrolysis
 - d. reduction

- iii. Write the modern periodic law and also give the names of 'blocks' in the modern periodic table.
- iv. Distinguish between 'alternating current' and 'direct current'.
- v. Define specific heat capacity. Write its S.I. unit.

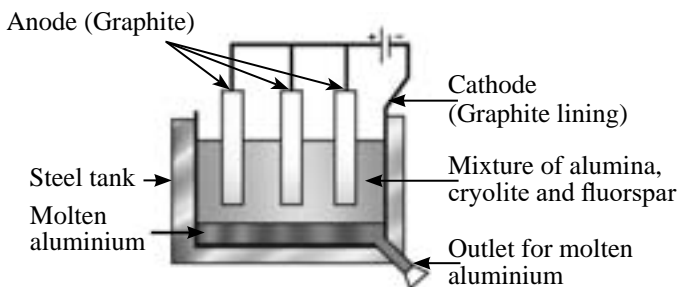
Q.3. Answer the following. (Any five) [15]

- i. An iron ball of mass 3 kg is released from a height of 125 m and falls freely to the ground. Assuming that the value of 'g' is 10 m/s², calculate:
 - a. time taken by the ball to reach the ground
 - b. velocity of the ball on reaching the ground.
- ii. An element has its electron configuration as (2, 8, 2). Answer the following.
 - 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?
- iii. a. Write the 'endothermic' or 'exothermic' nature of the reaction.
$$2\text{KClO}_3(\text{s}) \xrightarrow{\Delta} 2\text{KCl}(\text{s}) + 3\text{O}_2 \uparrow$$
 - b. Balance the given chemical equation.
$$\text{NaOH}(\text{aq}) + \text{H}_2\text{SO}_4(\text{aq}) \rightarrow \text{Na}_2\text{SO}_4(\text{aq}) + \text{H}_2\text{O}(\text{l})$$
 - c. From the given reaction, identify 'oxidant' and 'reductant'.
$$\text{CuO} + \text{H}_2 \rightarrow \text{Cu} + \text{H}_2\text{O}$$
- iv. A copper sphere of 100 g mass is heated to raise its temperature to 100°C and is released in water of mass 195 g and temperature 20°C in a copper calorimeter. If the mass of the calorimeter is 50 g, what will be the maximum temperature of water?
(Specific heat of copper = 0.1 cal/g°C)
- v. a. Draw a neat labelled diagram of 'dispersion of white light through glass prism'.
 - b. Which coloured ray is the least deviated?
 - c. Which coloured ray is the most deviated?

vi. Complete the following table for convex lens.

	Position of object	Position of image	Size of image	Nature of image
(a)	At focus F_2	Point image	Real and inverted
(b)	At $2F_1$	At $2F_2$	Real and inverted
(c)	Between F_1 & O (within focal length)	On the same side (object side)	Very large

vii. Observe the following diagram and answer the questions.

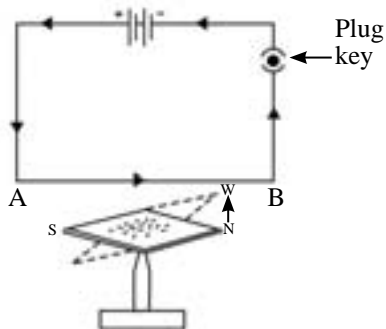


- Write the 'anode reaction'.
 - Write the 'cathode reaction'.
 - What is the purpose of mixing 'cryolite' and 'fluorspar' with 'alumina' in the electrolytic reduction of alumina?
- viii.
- What is the principle behind the working of a satellite launch vehicle?
 - Write the formula for 'escape velocity'.
 - Write the long form of 'ISRO'.

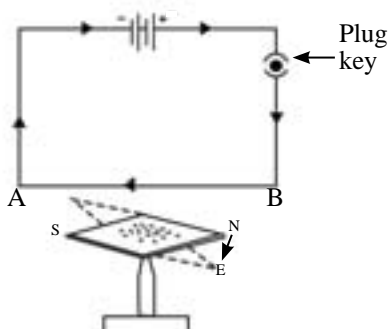
Q.4. Solve the following questions. (Any one)

[5]

i. Observe the diagrams and answer the questions.



Magnetic needle



Magnetic needle

- Which effect of electric current is shown in the above figures?
 - What will happen if the number of electric cells is increased on the magnetic needle?
 - If the distance between the conductor and magnetic needle is increased, what will be the effect on the intensity of the magnetic field?
 - If the ends of electric cell are interchanged, what will be the effect on the magnetic needle?
 - Write the names of any *two* instruments which work on magnetic effect of electric current.
- ii. Answer the following.
- Draw the electron-dot structure of Methane.
 - Define Homologous series.
 - Write the IUPAC names of the following.
 - $\text{CH}_3\text{-CH}_2\text{-COOH}$
 - $\text{CH}_3\text{-CHOH-CH}_3$
 - $\text{CH}_3\text{-CO-CH}_2\text{-CH}_3$