N 940

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2026 III 11 1100 – N 940 – SCIENCE AND TECHNOLOGY (72) – PART I (E)

(REVISED COURSE)

Time : 2 Hours (Pages 8) 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*) Scientifically correct, labelled diagrams should be drawn wherever necessary.

(A) Choose the correct alternative : 5

(*i*) The value of escape velocity of a body from the earth's surface is V_{esc} = ...

(A) $\sqrt{\frac{GM}{R}}$

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

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

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

P.T.O.

(*ii*) In ..... of the modern periodic table, are the non-metals found.

(A) *s*-block

(B) *p*-block

(C) *d*-block

(D) *f*-block

(*iii*) The resistance of the wire is 100 Ω. If it is carrying a current of 1 A for 10 seconds, the heat produced will be ..... .

(A) 10 J

(B) 10000 J

(C) 0.1 J

(D) 1000 J

(*iv*) The refractive index of diamond is ..... .

(A) 2.42

(B) 1.54

(C) 1.36

(D) 1.50

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(v) For normal human eye, the minimum distance of distinct vision is ..... .

(A) 50 cm

(B) 75 cm

(C) 25 cm

(D) 22 cm

(B) Solve the following questions : **5**

(i) Find odd man out :

Cooking of food, Ripening of fruit, Milk turned into curd, Transformation of ice into water.

(ii) By observing the correlation in the first pair, complete the second pair :

Mass : Kilogram : : Weight : .....

(iii) State whether the following statement is true or false :

'The volume of water at 4°C is maximum'.

(iv) Match the pairs :

Group 'A'		**Group 'B'**
Thermometer	(a)	Mechanical energy
	(b)	To measure temperature
	(c)	To measure electric current

(v) What is the wavelength of violet ray in dispersion of light ?

(A) **Give scientific reasons (any *two*) :** 4

(*i*) The geostationary satellites are not useful for studies of polar regions.

(*ii*) The hydrogenation of vegetable oil in presence of nickel catalyst forms Vanaspati-ghee.

(*iii*) Atomic radius goes on increasing down the 'group'.

(B) **Solve the following subquestions (any *three*) :** 6

(*i*) What is meant by an 'alloy' ? Give *two* examples.

(*ii*) Distinguish between oxidation and reduction.

(*iii*) Give the molecular formula and structural formula of Benzene.

(*iv*) An electric tungsten bulb is connected into a home circuit. The home electric supply runs at 220 volt potential difference. When switched on, a current of 0.45 A flows through the bulb. What must be the power (wattage) of the bulb ? If it is kept 'on' for 10 hours, how many units of electricity will be consumed ?

(*v*) 'A rainbow is the combined effect of refraction, dispersion and total internal reflection of light'. Explain the sentence.

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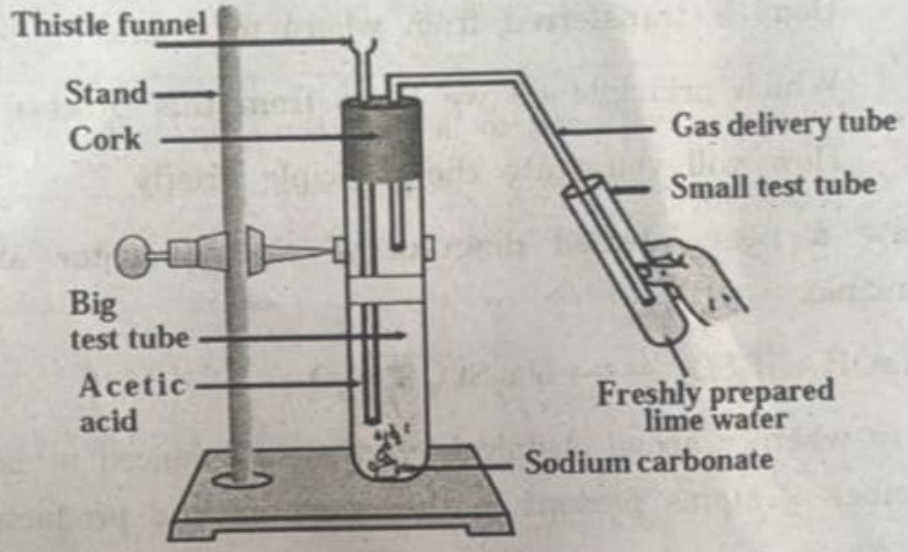
3. **Solve the following questions (any *five*) :**

(*i*) How much time a satellite in an orbit at height 35780 km above earth's surface would take, if the mass of the earth would have been four times its original mass ?

(*ii*) Observe the figure and answer the following questions :



(*a*) Which gas is released out as effervescence in the big test tube ?

(*b*) What is the colour change in the lime water ?

(*c*) Write the related chemical equation.

P.T.O.

(*iii*) Read the following paragraph and answer the questions :

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

The change in temperature continues till the temperatures of both the objects attain the same value. In the process, the cold object gains heat energy and the hot object loses heat energy. If the system of both objects is isolated from 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 from this process ?

(*c*) How will you state the principle briefly ?

(*iv*) Draw a neat labelled diagram of electric motor and write its principle.

(*v*) $2NaOH + H_2SO_4 \longrightarrow Na_2SO_4 + H_2O$

State whether above chemical reaction is balanced or not. From the number of atoms present in the reactants and products, fill in the blanks :

Elements	**Reactants (Left Side) No. of atoms**	**Products (Right Side) No. of atoms**
Na	.....	2
O	.....	.....
H	.....	.....
S	1	.....

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(*vi*) Write the names from the description :

(*a*) The metalloids in the second and third period.

(*b*) Non-metals in the third period.

(*c*) *Two* elements having valency 4.

(*vii*) Study the entries in the following table and rewrite them by putting the connected items in the single row :

I	II	III
(*a*) Weight	m/s^2	zero at the centre
(*b*) Acceleration due to gravity	Nm^2/kg^2	Same in the entire universe
(*c*) Gravitational constant	N	Changes from place to place

(*viii*) What is meant by 'mirage' ? In which condition mirage is seen ? Give such *one* more example.

4. Answer the following questions (any *one*) : 5

(*i*) (*a*) Draw a diagram of 'image formed by concave lens'. 2

(*b*) State the nature of image formed by concave lens. 1

(*c*) If the focal length of a concave lens is 25 cm, find the power of the lens. 2

(*ii*) (*a*) Write the main steps in the extraction of aluminium. 1

(*b*) What is the melting point of alumina and how is the melting point reduced ? 2

(*c*) Why anodes need to be replaced from time to time during the electrolysis of alumina ? 2