[ENGLISH VERSION]

Group 'A'

(All Questions are Compulsory)

1. **Multiple choice questions. Four alternative answers are given below each of the following questions. Write the correct one :** 1×15=15

1.1 Which among the following gases does not help in the depletion of ozone in the ozone layer ?

(a) CFC (b) NO_2

(c) CO_2 (d) NO

1.2 Mass of 11·2 litre of NH_3 gas at STP is
[N = 14, H = 1]

(a) 17 g (b) 8·5 g

(c) 34 g (d) 11·2 g

1.3 According to the following chemical equation
$CH_4 + 2O_2 \longrightarrow CO_2 + 2H_2O$,
what volume of O_2 will be required to completely burn 5 mole of CH_4 at STP ?

(a) 224 L (b) 448 L

(c) 44·8 L (d) 22·4 L

1.4 SI unit of thermal conductivity is

(a) Watt·metre^{-1} (b) Calorie·metre^{-1}

(c) Watt·metre·Kelvin (d) Watt·metre^{-1}·Kelvin^{-1}

1.5 The far point for a normal human eye is located at

(a) 25 cm (b) 100 cm

(c) infinity (d) 0 cm

1.6 When a light ray is perpendicularly incident on a glass slab then the angle of deviation is

(a) 0° (b) 90°

(c) 180° (d) 30°

1.7 Number of electrons constituting 1 C of charge is

(a) $1{\cdot}6\times10^{19}$ (b) $6{\cdot}25\times10^{10}$

(c) $6{\cdot}25\times10^{18}$ (d) $6{\cdot}023\times10^{23}$

1.8 Increase in temperature causes decrease in resistance for

(a) copper (b) nichrome

(c) glass (d) silicon

1.9 Mass of a β-particle in terms of the mass of an electron (m) is

(a) m (b) 2 m

(c) 3 m (d) 4 m

1.10 Atomic number of an element is 19. To which group of the modern periodic table does the element belong ?

(a) 1 (b) 2

(c) 18 (d) 9

1.11 Ammonia is dried by using

(a) $CaCl_2$ (b) CaO

(c) H_2SO_4 (d) P_2O_5

1.12 Which of the following elements is absent in duralumin ?

(a) Al (b) Zn

(c) Cu (d) Mg

1.13 Which colour appears in the solution when excess amount of aqueous ammonia is added to aqueous solution of copper sulphate ?

(a) Yellow (b) Orange

(c) Green (d) Deep blue

1.14 Which of the following has the highest electrical conductivity ?

(a) Aqueous sugar solution (b) Pure water

(c) Liquid hydrogen chloride (d) Aqueous solution of acetic acid

1.15 Each H–C–H bond angle in a molecule of methane is

(a) 109°28′ (b) 108°29′

(c) 100° (d) 180°

Group 'B'

2. **Answer the following questions (Alternatives are to be noted) :** 1×21=21

2.1 Write the name of the main component of biogas. 1

OR

Name a gas related to our breathing which when increases in the atmosphere causes global warming. 1

2.2 What is meant by the statement, that the calorific value of natural gas is 50 KJg^{-1} ? 1

2.3 Write whether the following statement is true or false :

Under the same temperature and pressure, equal volumes of all gases contain the same number of atoms. 1

2.4 Write the SI unit of the ideal gas constant. 1

2.5 Write whether the following statement is true or false :

The real expansion of any liquid depends on the expansion of the vessel in which it is kept. 1

OR

What is the relationship between thermal resistance and thermal conductivity of a conductor when thickness and cross sectional area of the conductor remains unchanged ? 1

2.6 Light of which colour gets scattered the least ? 1

2.7 Give an example of natural spectrum. 1

2.8 Name a machine where electrical energy is converted to mechanical energy. 1

2.9 How much work is done when 1 C charge is moved against a potential difference of 1 V ? 1

2.10 Write down the name of the positively charged radioactive particle. 1

OR

Which kind of nuclear reaction produces energy in a nuclear reactor ? 1

2.11 Match the Left Column with the Right Column : 1×4=4

Left Column	Right Column
2.11.1 Most electronegative element	(a) Cu
2.11.2 Extracted from red haematite	(b) Cl
2.11.3 An element the anion of which accelerates rusting of iron	(c) F
2.11.4 In the alloy brass, the metal which has a percentage amount higher than that of the other metal	(d) Fe

2.12 Which one of the following is a covalent compound ?
Potassium chloride, Sodium bromide, Carbon tetrachloride. 1

2.13 Name the electrolyte used in gold-plating. 1

OR

What are the carriers of electricity in the solution during the electrolysis of aqueous solution of an electrolyte ? 1

2.14 Why can't alternating current be used for electrolysis ? 1

2.15 Write down the formula of the black precipitate formed when H_2S gas is passed through an aqueous solution of lead nitrate. 1

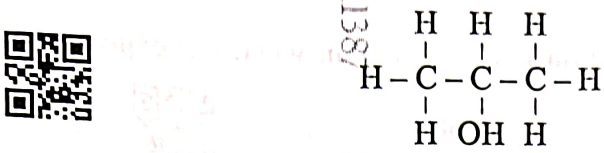
OR

Fill in the blank :

$2\ NH_3 + CO_2 \longrightarrow$ ——— $+ H_2O$ 1

2.16 Give the relevant equation when two gases combine to form a solid material. 1

2.17 Write down the IUPAC name of the following organic compound : 1



OR

Write the structural formula of ethanoic acid. 1

2.18 Write one use of PVC (Polyvinyl Chloride). 1

Group 'C'

3. **Answer the following questions (Alternatives are to be noted) :** 2×9=18

3.1 What is the concept of sustainable development ? 2

3.2 A certain gas kept at 0°C is heated. What is the temperature of the gas when both its volume and pressure become double compared to their respective initial values ? 2

OR

2 g of a gas at temperature 7°C and pressure 2 atm occupies a volume of 820 ml. Determine the molar mass of the gas.
[R = 0·082 L atm $mole^{-1} K^{-1}$] 2

3.3 Calculate the velocity of a light ray through a glas slab of refractive index 1·5. [c = 3×10^8 ms^{-1}] 2

OR

A convex lens forms a 10 times magnified image of an object. If the length of the object is 5 cm, determine the length of the image. 2

3.4 A wire of resistance 5 Ω is stretched 20%. If the volume of the wire remains constant and its cross section remains same along its length after stretching, find the new resistance of that wire. 2

3.5 Liquid hydrogen chloride cannot conduct electricity, but molten sodium chloride can conduct electricity — explain. 2

OR

Show with a suitable example of an ionic compound that its ions do not obey the octet rule. 2

3.6 Give one example each of a solid and a liquid covalent compound. 2

3.7 Name a gas which can be prepared in Kipp's apparatus. Write the balanced chemical equation of the reaction for the preparation of the gas. 2

3.8 Why does a copper vessel turn green in colour when it is exposed to open air ? 2

OR

Write two reasons why curd and sour fruits are not kept for long in copper and brass utensils. 2

3.9 CH_3COOH is an organic compound but $NaHCO_3$ is not — give one reason for each. 2

OR

Show with the help of the structural formula of ethylene that it is an unsaturated hydrocarbon. 2

Group 'D'

4. **Answer the following questions (Alternatives are to be noted) :** 3×12=36

4.1 State and explain Charles' law. Obtain the value of absolute zero in Celsius scale from Charles' law. 1+2

4.2 How much $KClO_3$ must be heated to obtain the same amount of oxygen as is obtained by heating 216 g HgO ?
[Hg = 200, K = 39, Cl = 35·5, O = 16] 3

OR

By heating 200 g of a certain metal carbonate, 112 g of metal oxide and a gaseous compound are produced. Vapour density of the gaseous compound is 22. How many moles of the gaseous compound are produced in the reaction ? 3

4.3 The coefficient of linear expansion of iron is 12×10^{-6}/°C — explain it. Give an example of volume expansion of a liquid on heating. 2+1

OR

Define the apparent expansion coefficient of liquid and the real expansion coefficient of liquid. Write the relationship between the two. 2+1

4.4 Establish the relationship between radius of curvature (r) and focal length (f) in case of convex mirror. Write one use of concave mirror. 2+1

OR

For the same angle of incidence the angles of refraction for three different media A, B and C are 30°, 45° and 60° respectively. In which medium is the velocity of light minimum and why ? 3

4.5 Write two causes of short-sightedness or myopia. Which type of lens is used to rectify it ? 2+1

4.6 Two conductors have an equivalent resistance of 25 Ω when joined in series and 6 Ω when joined in parallel. Calculate the value of resistance of each conductor. 3

OR

Calculate the cost of electrical energy consumed in operating ten 50 W bulbs for 10 hours per day in a month of 30 days if 1 B.O.T unit is charged at ₹5. 3

4.7 Mention any two of the advantages of using alternate current over direct current. Why is hydro power generation more eco-friendly than thermal power generation ? 2+1

4.8 Explain nuclear fission. Why is nuclear fission essential for nuclear fusion reaction ? 2+1

4.9 What is meant by electronegativity of an element ? In what pattern does electronegativity of Group 1 elements of the long periodic table change from top to bottom of the group ? 2+1

OR

What is the important conclusion of Moseley's experiment ? What is the importance of this conclusion with respect to the periodic table ? 2+1

4.10 What are the substances present along with pure alumina in the molten mixture which is electrolysed for the extraction of aluminium by electrolysis ? What are used as the cathode and anode in this electrolysis ? 2+1

4.11 Write how nitric oxide is manufactured by oxidising ammonia with the help of aerial oxygen mentioning the catalyst and the conditions of the reaction. Write also the balanced chemical equation of the reaction. 2+1

4.12 Write the balanced chemical equation of the addition reaction of hydrogen with acetylene mentioning any two conditions of the reaction. 3

OR

Write the balanced chemical equation of the reaction of sodium bicarbonate with acetic acid. Which of Jute and polyethene is environment friendly for packaging and why ? 2+1