

Maharashtra State Board
Class X Science and Technology Part-I
Answer Paper Set-1

Marks : 40

Q. 1. A)

5 Marks

- i. Released. 1
- ii. Decomposition Reaction 1
- iii. According to Dobereiner's triad rule :
Atomic Mass of Sodium = _____ 1
- iv. Hubble telescope : At 569 km above the earth's surface.
Orbit of Hubble telescope : Low Earth Orbit 1
- v. When a light ray passes from a rarer medium to a denser medium,
it bends towards the normal. 1

B)

5Marks

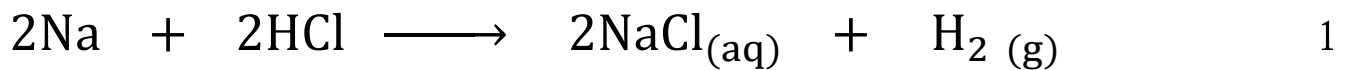
- i. b) Magnetic field in B is stronger. 1
- ii. a) moved towards the screen. 1
- iii. a) Cu, Fe, Zn, Al 1
- iv. b) Benzene 1
- v. d) 54 N 1

1. i. When electrons flows through the resistor (during flowing electric current) electron possesses kinetic energy. $\frac{1}{2}$
- ii. During the flow of electron there is decrease in kinetic energy of electrons due to collision on atoms, ions and molecules. 1
- iii. According to the law of conservation of energy decrease in kinetic energy gets converted into heat. $\frac{1}{2}$
2. a) Critical angle $\frac{1}{2}$
- $r = 90^\circ$ $\frac{1}{2}$
- b) Internal reflection $\frac{1}{2}$
- As light is going from denser to rarer medium, if the value of angle of incidence increases then the value of angle of reflection also increases. But after specific angle of incidence (critical angle) the light gets reflected back into the dense medium. $\frac{1}{2}$
3. d) Changing refractive index of gases in the atmosphere. $\frac{1}{2}$
- Atmosphere is unstable due to changing density and temperature of air, hence refractive index of air keeps changing continuously. $\frac{1}{2}$

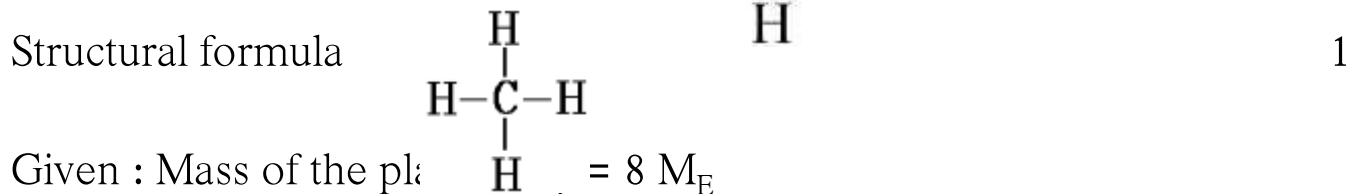
The position and brightness of the star keep changing continuously
and the star appears to be twinkling. 1

4. Metal 'A' is more reactive than metal 'B'. 1

Atomic number of metal 'A' is 11, hence it is Na.



5. Methane (CH_4)



6. Given : Mass of the planet $= 8 M_E$

Radius of the planet, $R_P = 2 R_E$

Escape velocity for the Earth, $V_{\text{esc } cE} = 11.2 \text{ km/s}$

Escape velocity for the planet, $V_{\text{esc } cP} = ?$

$$V_{\text{esc } cP} = \sqrt{\frac{2GM_P}{R_P}} \quad \frac{1}{2}$$

$$= \sqrt{\frac{2G(8M_E)}{2R_E}} \quad \frac{1}{2}$$

$$= \sqrt{\frac{8}{2} \times \frac{2GM_E}{R_E}}$$

$$= \sqrt{\frac{8}{2}} \times \sqrt{\frac{2GM_E}{R_E}} \quad \frac{1}{2}$$

$$= \sqrt{4} \times V_{\text{escE}} \quad \because V_{\text{escE}} = \sqrt{\frac{2GM_E}{R_E}}$$

$$= 2 \times 11.2$$

$$V_{\text{escP}} = 22.4 \text{ km/s} \quad \frac{1}{2}$$

Escape velocity for the planet = 22.4 km/s

7. Space expeditions : Study missions planned for establishing artificial satellites in the Earth's orbit, using it for research or for the benefit of life, or sending spacecraft to the various components of the solar system or outside. 1

Need and importance: Opinion in reference to defense, communication, weather, observation, direction etc. 1

Q. 3. (Any Five)

15 Marks

1. Given : $t = 2 \text{ s}$; $g = 10 \text{ m/s}^2$; $u = 0$; $a = g$

$$s = ? ; \quad v = ?$$

$$s = ut + \frac{1}{2} gt^2 \quad \frac{1}{2}$$

$$= 0 \times 1 + \frac{1}{2} (10)(1)^2 \quad \frac{1}{2}$$

$$= 0 + \frac{1}{2} (10)$$

$$s = 5 \text{ m} \quad \frac{1}{2}$$

$$v = u + gt \quad \frac{1}{2}$$

$$= 0 + 10 \times 1$$

$$v = 10 \text{ m/s}$$

 $\frac{1}{2}$

Height of table = 5 m ;

Velocity of ball while reaching the ground = 10 m/s

 $\frac{1}{2}$

2. i. AgNO_3 and NaCl are reactants and AgCl व NaNO_3 are products. 1
- ii. Reactants and the product NaNO_3 are in aqueous form. 1
- iii. Product AgCl is formed in the form of precipitate. 1
3. i. A – Saturated hydrocarbons $\frac{1}{2}$
- B – Unsaturated hydrocarbons $\frac{1}{2}$
- ii. A – Propane $\frac{1}{2}$
- B – Propene $\frac{1}{2}$
- iii. A - C_3H_8 : Number of $-\text{CH}_2-$ is 3 $\frac{1}{2}$
- B - C_3H_6 : Number of $-\text{CH}_2-$ is 1 $\frac{1}{2}$
4. i. A force is exerted on the current carrying conductor in the presence of a magnetic field.

- ii. The Fleming's Left and Rule is used. $\frac{1}{2}$
- iii. Electric Motor $\frac{1}{2}$
- Scientifically and technically correct figure. 1
5. i. Specific heat 1
- ii. Specific heat : The amount of heat energy required to raise the temperature of a unit mass of an object by 1°C .
- 1
- iii. According to the principle of heat exchange :
- Heat energy lost by the hot object = Heat energy gained by the cold
object
- In this activity heat absorbed by iron sphere is transmitted more in the wax, hence sphere goes deepest in to wax, while lead sphere absorbs less heat, resulting in less transmission of heat in the wax hence sphere goes the least depth in the wax. 1
6. Magnetic separation method, froth floatation method (Flow chart expected.) 1
- i. In froth floatation method $\frac{1}{2}$

ii. the finely ground ore is put into a big tank containing ample amount of water. $\frac{1}{2}$

Certain oils such as pine oil, eucalyptus oil, is added in the water for the formation of froth. $\frac{1}{2}$

Due to agitation a foam is formed from oil, water and air bubbles together and floats on the surface of water. $\frac{1}{2}$

7. Electrochemical $\frac{1}{2}$

$4 e^{-}$ $\frac{1}{2}$

With water $\frac{1}{2}$

Fe^{3+} $\frac{1}{2}$

$Fe_2O_3 \cdot H_2O_{(s)}$ $\frac{1}{2}$

(Marks should be given for complete process and correct answers)

Prevention by colouring with acrylic paints, Zn plating, galvanizing, anodizing, alloying etc.) $\frac{1}{2}$

(Any one way of prevention expected.)

Q. 4 (Any One)

5 Marks

1.
 - i. Atomic number 12 1
 - ii. Valency 2 1
 - iii. Group 2 1
 - iv. Period 3 1
 - v. ${}_4\text{Be}$ 1
2.
 - i. Compound microscope 1
 - ii. Scientifically and technically correct figure. 1
(Object, Objective lens, Eye piece, Image)
 - iii. Magnification is obtained by the combined effect of two lenses. The magnification occurs in two stages. The image formed by the first lens acts as the object for the second lens. Clear image can be obtained by adjusting the distance between two lenses. 1
 - iv. To study small sized objects like blood cells, animal and plant cells, bacteria.
 - v. Any relevant remedy (For example, Selection of lens with appropriate focal length) 1

*** THE END ***