

# Self Assessment Paper

## SECTION- A

1. **Correct option :** (c)

*Explanation :* The given reaction is a redox reaction because oxidation and reduction both take place simultaneously. Also, it is a displacement reaction because hydrogen of  $\text{NH}_3$  has been displaced by oxygen. 1

2. **Correct option :** (a)

*Explanation :* pH value of water is 7. Acetic acid is a weaker acid while hydrochloric acid is a strong acid. Hence, the correct increasing order of acidic strength is

Water < Acetic acid < Hydrochloric acid. 1

3. **Correct option :** (c)

*Explanation :* Pentane contains four C—C and twelve C—H covalent bonds. Therefore, total 16 covalent bonds. 1

4. **Correct option :** (c)

*Explanation :* Mendeleev arranged the known elements according to increasing order of their atomic masses because according to him, fundamental property of an element was atomic mass. 1

5. **Correct option :** (c)

*Explanation :* The process of digestion starts from the mouth where salivary glands are present. Salivary glands produce amylase enzyme. So, amylase is the first enzyme to mix with food. The saliva secreted by the salivary glands in mouth contains this enzyme that breaks down starch. 1

6. **Correct option :** (b)

*Explanation :* Synapse is a junction or gap across which a nerve cell can send an impulse to another neuron. Dendrite and axon are parts of neuron. Impulse is the signal that

travels along the length of a nerve fibre and ends in the release of neuro-transmitters. 1

7. **Correct option :** (d)

*Explanation :* Out of the given four materials, the refractive index of glycerine is highest. So, greatest deviation of incident light ray is observed in case of glycerine. 1

8. **Correct option :** (b)

*Explanation :* A convex mirror forms virtual, erect and diminished image of the objects. So, distant tall building can be seen by using a convex mirror. 1

9. **Correct option :** (b)

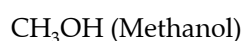
*Explanation :* This person is suffering from myopia and needs a concave lens. So, power of the lens would be in negative.

$$P = \frac{1}{f} = -\frac{1}{2} \text{ m} = -0.5 \text{ D} \quad 1$$

10. **Correct option :** (d)

*Explanation :* In series connections, the order of elements in the circuit will not affect the amount of current flowing in the circuit. 1

11. The molecular formula of first two consecutive members of this series is :



12. Plasmodium reproduces by a process known as multiple fission. Multiple fission is a type of asexual reproduction.  $\frac{1}{2} + \frac{1}{2}$

13. Transpiration

[CBSE Marking Scheme, 2016] 1

14. DNA is the carrier of hereditary information from parents to the next generation.

[CBSE Marking Scheme, 2016] 1

15. Due to its wide field of view. 1

**Commonly Made Error**

- Students often get confused between plane, convex and concave mirrors.

**Answering Tip**

- Students should understand that convex mirror forms small, erect and virtual image.

16. Galvanometer in a circuit is fitted to detect the presence or the direction of current.

[CBSE Marking Scheme, 2019] 1

17. **Correct option :** (b)

*Explanation :* Be and Al show diagonal relationship because Be resemble in their properties with Al. Metallic radius of the Be (111 pm) is less than the metallic radius of Al (143 pm). Although smaller size is the reason for the anomalous behaviour of Be but not a reason for its diagonal relation with Al. 1

18. **Correct option :** (b)

*Explanation :* There is no mixing of oxygenated and deoxygenated blood due to presence of inter-auricular and inter-ventricular septum. On the other hand, valves are present in the heart which allows the movement of blood in one direction only. 1

19. **Correct option :** (a)

*Explanation :* Amoeba is a unicellular organism. It reproduces asexually through binary fission. It is the division of one cell into two similar or identical cells. 1

20. **Correct option :** (a)

*Explanation :* When white light or sunlight passes through a prism it splits up into constituent colours.

This phenomenon is called dispersion.

**SECTION- B**

21. Gold and platinum. 1

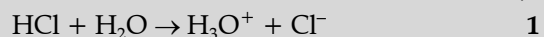
- (i) Corrosion of aluminium is useful. A protective layer of aluminium oxide is formed on the surface of the metal which renders the metal passive and prevents its further corrosion. 1
- (ii) Corrosion of iron is a serious problem. Every year large amount of money is spent to replace damaged iron and steel structures. So, here, corrosion is a serious problem. 1

[CBSE Marking Scheme, 2016]

22. Wet blue litmus paper ½

**Reason :** Hydrogen ions are produced by HCl in the presence of water. 1

It has acidic nature. ½



[CBSE Marking Scheme, 2018]

**Commonly Made Error**

- Students often write vague answers. It seems they are unaware of the concept of wet or dry litmus paper test.

**Answering Tip**

- The concept of ionization of acids in aqueous medium to give hydrogen or hydronium ions should be kept in mind.

OR

- (i) Non-metals do not displace hydrogen from dilute acids because unlike metals, non-metals do not have a tendency to lose electrons but to gain electrons. 1

- (ii) Like metals, hydrogen can lose an electron to form positive  $\text{H}^+$  ion. 1

- (iii) Aluminium is covered with a strong protective layer of oxide which protects the metal from further corrosion. 1

23. Isomers are the compounds which have the same molecular formula but different structural formula. 1

**Isomers of Butane :**

- (i) 
$$\begin{array}{cccc} \text{H} & \text{H} & \text{H} & \text{H} \\ | & | & | & | \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{C}-\text{H} \\ | & | & | & | \\ \text{H} & \text{H} & \text{H} & \text{H} \end{array}$$
  $\frac{1}{2}$

- (ii) 
$$\begin{array}{c} \text{H} \\ | \\ \text{H}-\text{C}-\text{H} \\ | \\ \text{H} \quad | \quad \text{H} \\ | \quad | \quad | \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{H} \\ | \quad | \quad | \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$$
  $\frac{1}{2}$

iso-butane

**We cannot have isomers of the first three members of the alkane series because of the following laws of isomers :**

- (i) The parent chain should have the most number of carbon atoms.
- (ii) The branching cannot be done from the first on the last atom carbon atom of the structure.

[CBSE Marking Scheme, 2015] 1

## Solutions

**24. Steps involved in sexual reproduction :**

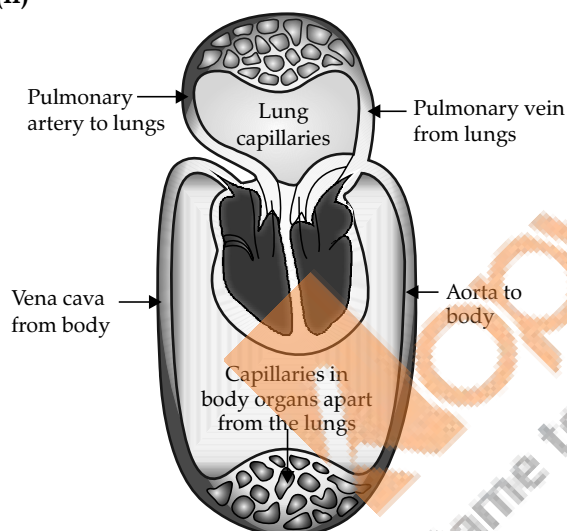
- (i) Formation of gametes through meiosis.
- (ii) Transfer of male gametes into the female body.
- (iii) Fusion of male and female gametes. The process is known as fertilization.
- (iv) Formation of offspring from a single celled zygote-Post fertilization changes.

**Advantages of sexual reproduction :**

- (i) It is a source of genetic variations among individuals of a population.
- (ii) It gives rise to individuals that are most adapted to the environment. 2 + 1

**25. (i) Capillaries****(ii) Diagram. [CBSE Marking Scheme, 2016]****Detailed Answer :**

- (i) The exchange of material between the blood and surrounding cells take place in the capillaries.
- (ii)



**Schematic representation of transport of exchange of oxygen & carbon dioxide**

**1 + 2**

**OR**

- (i) **Homologous organs** : Forelimb of human and bird are homologous organs. They have same structural design and developmental origin, but they have different functions and appearance. Homologous organs help us to understand that the organism have evolved from a common ancestor. The more common characteristics the two species have, the more closely they are related.
- (ii) **Analogous organs** : Analogous organs are those organs which have different basic structural design and development origin but have similar appearance and perform similar functions.

**Example :** The wings of birds and bats look similar but have different design in their structure. They have a common function of flying, but their origins are not common. So, birds and bats are not closely related.

- (iii) **Fossils** and their study is useful in knowing about the species which are no longer alive.

They provide evidence and missing links between two classes. They are helpful in forming a sequence of organisms in the pathway of evolution.

Thus, fossils have an importance in deciding evolutionary relationship. *Archaeopteryx* is a fossil bird. It had feathers, fused bones and beak which are exclusively bird structures. It also had some features which are found in reptiles e.g., teeth in jaw, claws on free fingers and a long tail. This fossil provides a clue that birds have evolved from reptiles. 1 + 1 + 1

**[CBSE Marking Scheme 2015]**

26. Power of lens = Ability to converge/diverge light rays passing through it / reciprocal of the focal length in metres /  $\frac{1}{f}$  (in meters).

SI unit of power is Dioptre.

$$\text{Power of 1}^{\text{st}} \text{ lens, } P_1 = \frac{100}{f} = \frac{100}{40 \text{ cm}} = +2.5 \text{ D}$$

**Nature :** Converging lens/Convex lens

$$\text{Power of 2}^{\text{nd}} \text{ lens, } P_2 = \frac{100}{f} = \frac{100}{-20 \text{ cm}} = -5 \text{ D}$$

**Nature :** Diverging lens / Concave lens

**[CBSE Marking Scheme, 2018] 1 + 1 + 1**

$$27. \text{ Given, } P_1 = 1000 \text{ W} = \frac{1000}{1000} \text{ kW} = 1 \text{ kW,}$$

$$t_1 = 5 \text{ h} \quad \frac{1}{2}$$

$$P_2 = 400 \text{ W} = \frac{400}{1000} \text{ kW} = 0.4 \text{ kW,}$$

$$t_2 = 10 \text{ h} \quad \frac{1}{2}$$

$$\text{No. of days, } n = 30$$

$$E_1 = P_1 \times t_1 \times n \\ = 1 \text{ kW} \times 5 \text{ h} \times 30 = 150 \text{ kWh} \quad \frac{1}{2}$$

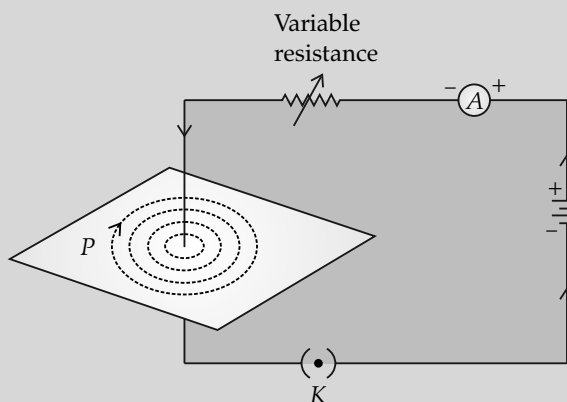
$$E_2 = P_2 \times t_2 \times n \\ = 0.4 \text{ kW} \times 10 \text{ h} \times 30 \\ = 120 \text{ kWh} \quad \frac{1}{2}$$

$$\therefore \text{ Total energy consumption} \\ = (150 + 120) \text{ kWh} = 270 \text{ kWh} \quad \frac{1}{2}$$

$$\therefore \text{ Total cost} = 270 \times 6 = ₹ 1620 \quad \frac{1}{2}$$

28. Factors on which the magnetic field produced by a current carrying conductor depends :

- (i) Current passing through the conductor.  $\frac{1}{2}$   
 (ii) Distance of the magnetic compass from the conductor.  $\frac{1}{2}$   
 Right Hand Thumb Rule gives the direction of magnetic field. 1



[CBSE Marking Scheme, 2012] 1

#### Commonly Made Error

- Students identified incorrect rule. It seems they are confused. Many of them forgot to draw the diagram.

#### Answering Tip

- Understand the concept of magnetic field produced by a current carrying straight conductor. Lay stress on the rules which gives direction of its magnetic field.

29. The law of conservation of energy states that energy can neither be created nor be destroyed. But, it can only be converted from one form to another. Despite this fact, the world is facing energy crisis. The reason behind it is that energy is converted into non-usable forms. Fossil fuels like coal, petroleum etc. are the sources of energy which have accumulated in nature over a long time and cannot be replaced. We should worry about such sources because these sources of energy are getting depleted and sooner or later, will no longer be available to us.  $1\frac{1}{2} + 1\frac{1}{2}$

OR

Three ways to maintain a balance between environment and development to survive :

- (i) Forest resources should be used in an environmentally and developmentally sound manner.  
 (ii) Instead of using non-renewable natural resources, use of renewable natural resources should be preferred.  
 (iii) Waste water generated by industries should be recycled. 1 + 1 + 1

30. (i) Flow of energy is unidirectional.  
 (ii) Terrestrial plants take about 1% of the Sun's energy and change it to chemical energy.  
 (iii) A great amount of energy is lost as heat/ used for digestion/doing work/growth and reproduction.  
 (iv) Only 10% of organic matter is present at each trophic level (and available to the next trophic level).  
 (v) Food chains are mainly of 3-4 trophic levels (because of 10 percent law).  
 (vi) The number of producers are maximum (the number reduces in subsequent trophic levels).  
 (vii) Food webs are more common (as compared to isolated food chains).  
 (viii) Biological magnification can be observed.

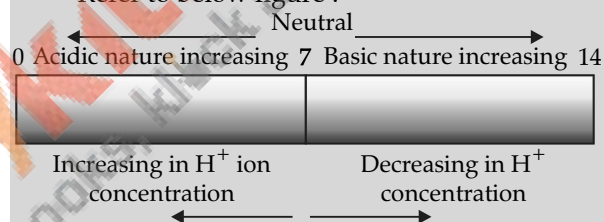
(Any three) 3

[CBSE Marking Scheme, 2019]

### SECTION- C

31. (i) Scale for measuring  $[H^+]$  concentration in a solution is called pH scale.

Refer to below figure :



- (ii) pH of Neutral solution is 7.  
 pH of Acidic solution is 0 to below 7.  
 pH of Basic solution is 7 to 14.

[CBSE Marking Scheme, 2016] 1 + 2 + 2

OR

- (i)  $CaOCl_2(s) + CO_2(g) \longrightarrow CaCO_3(s) + Cl_2(g)$   
 (Bleaching powder) (Carbon dioxide) (Calcium carbonate) (Chlorine)  
 (ii)  $CuSO_4 \cdot 5H_2O \xrightarrow{\text{Heat}} CuSO_4 + 5H_2O$   
 (Blue) (White)  
 (iii)  $Ca(OH)_2 + Cl_2 \longrightarrow CaOCl_2 + H_2O$   
 (Dry slaked lime) (Chlorine) (Bleaching powder)  
 (iv)  $Ca(OH)_2 + CO_2 \longrightarrow CaCO_3 + H_2O$   
 (Lime water) (Calcium carbonate) (Milky)  
 (v)  $2NaOH + Zn \xrightarrow{\text{Heat}} Na_2ZnO_2 + H_2$   
 (Sodium zincate) (Hydrogen)

[CBSE Marking Scheme, 2016] 1 × 5

32. (i) A and B belong to group 1 and 2 because they form basic oxides. C belongs to group 13 as it has 3 valence electrons. D belongs to group 14 as it forms almost neutral oxide. E and F belong to group 15 and 16 as they form acidic oxides, G belongs to group 17 as it has 7 valence electrons, and H to group 18. They belong to 3<sup>rd</sup> period of the periodic table.
- (ii) H belongs to noble gas
- (iii) A has largest atomic radius
- (iv) E and F are likely to be non-metals
- (v) D is likely to be metalloid or semi-metal.

1 + 1 + 1 + 1 + 1

#### Commonly Made Error

- Students write irrelevant stories. Be specific. Read question carefully and write only what is asked.

#### Answering Tip

- Do not overlook any part of a question and avoid being in a hurry to conclude the answer.

33. (a) Functions :

- Ovary– (i) Production of female gamete.
- (ii) Production of female hormone.

1

- Fallopian tube– (i) Site of fertilization
- (ii) Transfer of female gamete from ovary. 1
- Uterus– (i) Implantation of zygote/fertilised egg/embryo.
- (ii) Provide nourishment to the developing embryo. 1

(b) Menstruation–

- (i) It is the periodic breakdown of uterine lining and its removal along with blood and mucus in (post pubertal stage of a human female). 1
- (ii) Uterine lining is required to nourish the embryo that is formed if fertilization takes place. In absence of fertilization, the lining is not required and hence is shed in the form of menstruation. 1

[CBSE Marking Scheme, 2016]

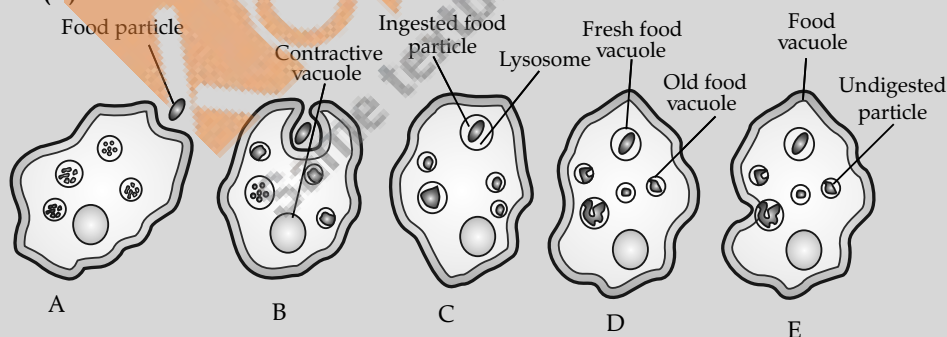
OR

- (i) Natural selection 1
- (ii) Genetic drift 1
- (iii) Law of Dominance 1
- (iv) Acquired characters are not inherited. 1
- (v) Gene flow. 1

[CBSE Marking Scheme, 2018]

34. (a) (i) Starch (ii) ATP

(b)



#### Holozoic nutrition in Amoeba

Protozoans like Amoeba capture food with the help of temporary finger-like processes called pseudopodia.

As soon as Amoeba comes in contact with a food particle or prey, it throws pseudopodia all around the food particle. The tips of encircling pseudopodia fuse and the prey comes to lie in a vesicle or phagosome. This method of intake of food is called circumvallation. Amoeba can also ingest food by other methods like import circumfluence and invagination. 3

- (c) In Paramecium, the food is taken in at a specific spot and is moved to this spot by the movement of cilia, which cover the entire surface of the cell. [CBSE Marking Scheme, 2014] 1

35. (i) Distance between optical centre and focus of the lens. 1

(ii)  $f = -30$  cm;  $u = ?$ ;  $h_1 = 5$  cm;  $h_2 = ?$ ;  $v = -15$  cm

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$

$$\Rightarrow \frac{1}{u} = \frac{1}{v} - \frac{1}{f} \quad \frac{1}{2}$$

$$\Rightarrow u = \frac{vf}{f-v} = \frac{-15 \text{ cm} \times -30 \text{ cm}}{-30 \text{ cm} - (-15 \text{ cm})}$$

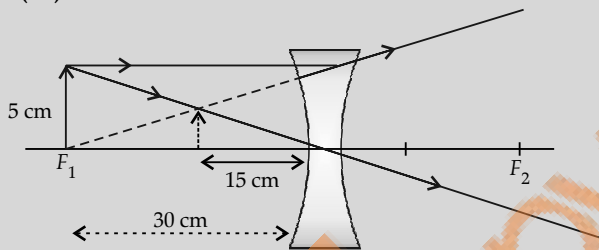
$$= -30 \text{ cm} \quad 1\frac{1}{2}$$

$$m = \frac{v}{u} = \frac{h_2}{h_1}$$

$$\Rightarrow h_2 = \frac{v}{u} \times h_1$$

$$= \frac{-15 \text{ cm}}{-30 \text{ cm}} \times 5 \text{ cm} = 2.5 \text{ cm} \quad 1$$

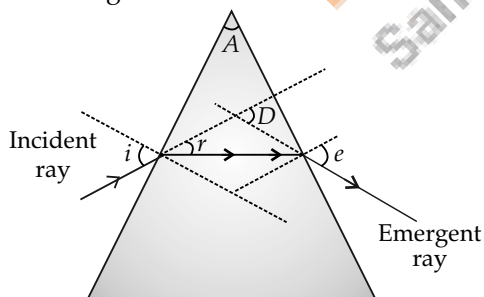
(iii)



[CBSE Marking Scheme, 2016] 1

OR

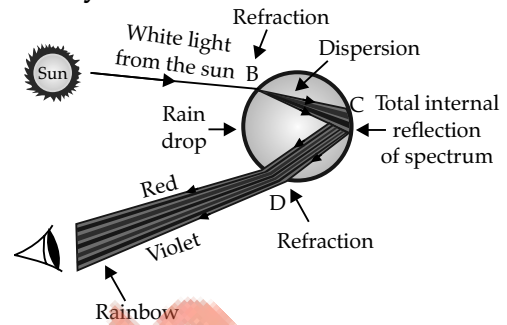
(a) Emergent ray bends at an angle to the direction of the incident ray and the angle between them is known as angle of deviation. Angle D is the angle of deviation. 1



1

(b) When a beam of light enters a prism, it gets refracted and splits into its constituent colours. This splitting of the light ray occurs because of the different angles of bending of each colour. Hence, each colour passing through the prism bends at different angles with the respect to the incident beam. This gives rise to the formation of the colour spectrum. 1

(c) Diagram to show the formation of rainbow in the sky :



2

36. Direction of current will be from East to West direction.

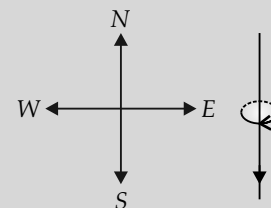


Current

Maxwell's right hand thumb rule



**Statement :** Imagine that you are holding the current carrying wire in your right hand so that your thumb points in the direction of current, then the direction of your fingers encircling the wire will give the direction of magnetic field.



[CBSE Marking Scheme, 2016] 5

