

### Section-A

Select and write the most appropriate option out of the four options given for each of the questions 1-20.

1. Oxidation is a process which involves : (1)  
 (a) addition of oxygen                      (b) addition of hydrogen  
(c) removal of oxygen                      (d) both (b) and (c)
2. The most abundant metal in the earth's crust is : (1)  
(a) Iron     (b) Aluminium  
(c) Calcium                                        (d) Sodium
3. Common name of  $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$  is : (1)  
(a) washing soda                              (b) baking soda  
(c) bleaching powder                        (d) tartaric acid
4. Which of the following is the correct arrangement of the given metals in descending order of their reactivity? (1)  
Zinc, Iron, Magnesium, Sodium  
(a) Zinc > Iron > Magnesium > Sodium  
(b) Sodium > Magnesium > Iron > Zinc  
(c) Sodium > Zinc > Magnesium > Iron  
 (d) Sodium > Magnesium > Zinc > Iron
5. Example of an amphoteric oxide is : (1)  
(a)  $\text{Na}_2\text{O}$     (b)  $\text{K}_2\text{O}$   
 (c)  $\text{Al}_2\text{O}_3$     (d)  $\text{MgO}$
6. Which of the following pairs will give displacement reactions? (1)  
 (a)  $\text{FeSO}_4$  solution and Copper metal      (b)  $\text{AgNO}_3$  solution and Copper metal  
(c)  $\text{CuSO}_4$  solution and Silver metal      (d)  $\text{NaCl}$  solution and Copper metal

7. An aluminium strip is kept immersed in freshly prepared ferrous sulphate solution taken in a test tube, the change observed is that : (1)
- (a) Light green solution slowly turns brown
  - (b) Lower end of test tube become slightly warm
  - (c) A colourless gas with the smell of burning sulphur is observed
  - (d) Light green solution changes to blue
8. In amoeba, food is digested in the: (1)
- (a) food vacuole
  - (b) mitochondria
  - (c) pseudopodia
  - (d) chloroplast
9. What are the products obtained by anaerobic respiration in yeast? (1)
- (a) Lactic acid + Energy
  - (b) Carbon dioxide + Water + Energy
  - (c) Ethanol + Carbon dioxide + Energy
  - (d) Pyruvate
10. A cell divided into several cells during reproduction in *Plasmodium* is called : (1)
- (a) budding
  - (b) multiple fission
  - (c) binary fission
  - (d) reduction division
11. Which of the following can be inherited from parents to offspring : (1)
- (a) Swimming technique
  - (b) Big nose
  - (c) Sculpted body
  - (d) Archery
12. Which of the following events in the mouth cavity will be affected if salivary amylase is lacking in the saliva? (1)
- (a) Starch breaking down into sugars.
  - (b) Proteins breaking down into amino acids.
  - (c) Absorption of vitamins.
  - (d) Fats breaking down into fatty acids and glycerol.

13. Usually a beam of light incident on a concave mirror forms a real image on reflection. The reflected beam is : (1)
- (a) parallel (b) converged  
(c) diverged (d) not certain
14. The danger signals installed at the top of tall buildings are red in colour. These can be easily seen from a distance because, among all other colours, the red light : (1)
- (a) is scattered the most by smoke or fog  
(b) is scattered the least by smoke or fog  
(c) is absorbed the most by smoke or fog  
(d) moves slowest in the air
15. The cleaners of nature (ecosystem) are : (1)
- (a) Producers (b) Consumers  
(c) Herbivores (d) Decomposers
16. Biodegradable wastes include: (1)
- (a) Aluminium foils (b) Glass bottles  
(c) Pesticides (d) Wood shavings

**Question No. 17 to 20 consist of two statements-Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:**

- (a) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).
- (b) Both Assertion (A) and Reason (R) are true, and Reason (R) is not the correct explanation of Assertion (A).
- (c) Assertion (A) is true but Reason (R) is false.
- (d) Assertion (A) is false but Reason (R) is true.
17. Assertion (A): Chemical reaction changes the physical and chemical properties of a substance. (1)

Reason (R) : Chemical change involves a change in the chemical composition of matter, and new substance is formed.

18. Assertion (A): In internal fertilization male and female gametes fuse inside the female body. (1)  
Reason (R) : In all fishes fertilization takes place internally.
19. Assertion (A): On changing the direction of flow of current through a straight conductor, the direction of a magnetic field around the conductor is reversed. (1)  
Reason (R) : The direction of magnetic field around a conductor can be given in accordance with left hand thumb rule:
20. Assertion (A): Ozone is formed in upper atmosphere by  $O_2$  in presence of UV radiations. (1)  
Reason (R) : Ozone depletion will lead to UV rays reaching earth which may cause skin cancer.

### SECTION-B

**Question No. 21 to 26 are very short answer questions.**

21. A solution of potassium chloride, when mixed with silver nitrate solution, an insoluble white substance is formed. Write the chemical reaction involved and also mention the type of the chemical reaction? (2)
22. By changing their shape muscle cells help in movement. How do muscle cells change their shape? (2)
23. Write full form of ATP and DNA. (2)

OR

Diffusion pressure alone is insufficient to meet the oxygen requirement of multicellular organisms like human. State reason.

24. a) With the help of labelled ray diagram show the path followed by a narrow beam of light when it passes through a glass prism. (2)  
b) Write your observations when white light passes (refracted) through a glass. prism.
25. Name a device that you can use to maintain a potential difference between the ends of a conductor. Explain the process by which this device does so. (2)

OR

Water has absolute refractive index 1.33 and alcohol has refractive index 1.36. Which of the two medium is optically denser? Give reason for your answer.

26. In the following food chain, 100 J of energy is available to the lion. How much energy was available to the producers? Explain. (2)

Plants → Deer → Lion

### SECTION-C

Question No. 27 to 33 are short answer questions.

27. A white colour powder compound 'X' is used for making toys. It gets hardened to solid mass of compound 'Y' when mixes with water. When 'Y' is heated at 373K it changes to compound 'X' again. (2+1=3)
- Identify and write the chemical name and formula of 'X' and 'Y'.
  - Give the chemical equation for the above chemical reaction to form compound Y.
28. Give reason for the following : (3)
- Hydrogen gas is not evolved when most of the metals react with nitric acid.
  - Zinc oxide is considered as an amphoteric oxide.
  - A piece of calcium start floating in water when it is drop in water.

OR

A metal 'X' combines with a non-metal 'Y' by the transfer of electrons to form a compound 'Z'.

- State the type of bond in compound Z.
  - What will be the physical nature of compound Z?
  - Will this compound dissolve in kerosene or petrol?
29. (a) Name the endocrine gland which secretes growth hormone.
- (b) What will be the effect of the following on a person :
- deficiency of growth hormone?
  - excess secretion of growth hormone?

30. Mendel carry out an experiment to study inheritance of two traits in garden pea : (2+1=3)

- (a) What were his findings with respect to inheritance of traits in F1 and F2 generation?
- (b) State the ratio of different traits obtained in the F2 generation in the above mentioned experiment.

31. (a) What is refraction of light? (1+2)

(b) If the refractive index of water is  $\frac{4}{3}$  and that of glass is  $\frac{3}{2}$ . What will be the refractive index of glass w.r.t. water?

32. Two identical resistors are first connected in series and then in parallel. Find the ratio of equivalent resistance in two cases. (3)

33. (a) Column A contains some part of electrical devices and Column B contains the material used for making these devices. Match Columns A and B. (2+1)

**Column A**

1. Filament of electrical bulb

2. Heating elements

3. Connection wire

4. Welding wires

**Column B**

(a) Copper

(b) Lead-tin alloy

(c) Tungsten

(d) Nichrome

(b) How much current will an electric bulb of  $600 \Omega$  draw from a 110V source?

**SECTION-D**

Question number 34 to 36 are long answer questions.

34. (a) 3mL of ethanol is taken in a test tube and warmed gently in a water bath. A 5% solution of alkaline potassium permanganate ( $\text{KMnO}_4$ ) is added first drop by drop to this solution, then in excess. (3+2=5)

(i) Name the product formed in this reaction.

(ii) Write chemical equation of this reaction.

(iii) State the role of alkaline potassium permanganate in this reaction.

(b) Why pure Ethanoic acid is known as 'glacial acetic acid'?

OR

A compound 'X' on heating with excess conc. sulphuric acid at 443 K gives an unsaturated compound 'Y'. 'X' also reacts with sodium metal to evolve a colourless flammable gas 'Z'.

(3+1+1)

- (i) Identify 'X', 'Y' and 'Z'.
- (ii) Write the equation of the chemical reaction of formation of 'Y' and also
- (iii) Write the role of sulphuric acid in this reaction.

35. What happens when :

(1x5=5)

- (a) accidentally, Planaria gets cut into many pieces
- (b) Bryophyllum leaf falls on the wet soil
- (c) on maturation sporangia of Rhizopus bursts?
- (d) a mature Spirogyra filament attains considerable length? *tray*
- (e) Female gamete/egg is not fertilised. *reproduction*

OR

- (a) What is vegetative propagation? Give one example. (2+3)
  - (b) Write three advantages of vegetative propagation.
36. (a) A 2.0 cm Tall object is placed perpendicular to the principal axis of a convex lens of focal length 10 cm. The distance of the object from the lens is 20 cm. Find the nature and position of the image. (3)
- (b) Draw a neat labelled ray diagram for the above situation to support your answer. (2)

OR

A spherical mirror produces an image of magnification-1 on a screen placed at a distance of 40 cm from the mirror. (1+2+2)

- (i) What type of mirror is it?
- (ii) What is the nature and size of the image formed?
- (iii) How far is the object located from the mirror?

**SECTION-E**

Question No. 37 to 39 are case-based/data-based questions with 2 to 3 short sub-parts.

37. Anvi is a young scientist with a burning curiosity. In her experiments, she discovers carbon's enchanting secret: ignites in oxygen, creating heat, light and carbon dioxide. Saturated hydrocarbons lit a clean flame, while unsaturated ones paint the air yellow, filling it with black smoke (sooty flame) Anvi's journey of discovery is a fiery adventure. (1+1+2)

- (a) Complete the reaction:  $\text{CH}_3\text{CH}_2\text{OH} + \text{O}_2 \rightarrow ?$
- (b) State whether this combustion is an oxidation reaction or reduction reaction and why?
- (c) What is the reason for incomplete combustion? Name a clean fuel.

OR

(c) State the molecular formula and the structural formula of the compound: But-2-yne.

38. Sex determination is the method by which distinction between males and females is established in a species. The sex of an individual is determined by specific chromosomes are called sex chromosomes. The normal chromosomes other than the sex chromosomes of an individual are known as autosomes. (1+1+2)

- (a) A couple has two daughters. What is the probability of their having a girl next time?
- (b) What is the number of autosomes present in liver cells of a human female?
- (c) Mention the sex chromosome pair present in a zygote which determines the sex of (i) a female child and (ii) a male child.

OR

(c) Differentiate between asexual and sexual reproduction in reference to gamete formation.

39. In a house 3 bulbs of 100 watt each lighted for 5 hours daily, 2 fans of 50 watt each used for 10 hours daily and an electric heater of 1.00 kW is used for half an hour daily. (1+1+2)

- (a) What would be arrangement of the 3 electric bulbs so that the electrical power consumed by them is minimum?
- (b) State one difference between kilowatt and kilowatt hour.
- (c) Calculate the total energy consumed by bulbs and fans in one day for the house.

OR

- (c) What is heating effect of current? List two electrical appliances which work on this effect.