



SECTION A

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

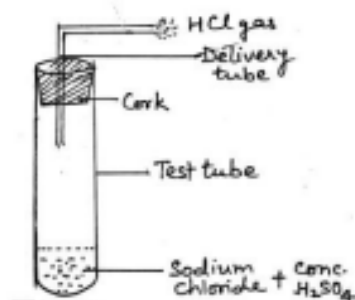
- | | |
|---|---|
| 1. c) in water treatment | 1 |
| 2. c) To avoid its decomposition by sunlight | 1 |
| 3. d) rate of the reaction | 1 |
| 4. c) ii and iii | 1 |
| 5. c) Ingredient of food | 1 |
| 6. b) (ii) and (iii) | 1 |
| 7. a) C ₂ H ₅ OH | 1 |
| 8. b) CO ₂ is necessary for photosynthesis | 1 |
| 9. c) Lime water | 1 |
| 10. d) 100%, 75% and 25%, 50%, 25%. | 1 |
| 11. c) chemotropism | 1 |
| 12. b) A and C | 1 |
| 13. c) Brightness of bulb B will be more than that of A | 1 |
| 14. d) straight line | 1 |
| 15. c) 300% | 1 |
| 16. c) will increase | 1 |
| 17. c) A is true but R is false | 1 |
| 18. a) Both A and R are true and R is the correct explanation of A. | 1 |
| 19. b) Both A and R are true but R is not the correct explanation of A. | 1 |
| 20. a) Both A and R are true and R is the correct explanation of A. | 1 |

SECTION - B

Q. no. 21 to 26 are very short answer questions.

- | | |
|--|---|
| 21. (i) 2 formula units of CaSO ₄ /Calcium sulphate share 1 molecule of water of crystallization. | 1 |
| (ii) due to its alkaline nature . | 1 |

OR



1

- | | |
|---|-------|
| ii) Wet litmus paper, it is due to the formation of H ⁺ ion in the presence of water | ½ + ½ |
|---|-------|

22. Brain is protected in a bony box /cranium/ of the skull 1/4
 with in which it is contained in a fluid-filled balloon/meninges/ provides 1/2
 shock absorption
 Spinal cord is protected in a hard bumpy structure called the 3/4
 backbone or vertebral column passing through the middle of your back
 Because these are delicate organs which are so important for a 1/2
 variety of functions.
23. Because metabolic processes generate harmful nitrogenous wastes 1
 which need to be removed for the healthy functioning of the body.
 Regulation depends on factors such as the amount of excess water in the 1
 body which regulates the rate of re-absorption of water
 and on how much of dissolved waste there is to be excreted.
24. Because both carbon dioxide and oxygen have to be transported by the 1
 blood, the heart has different chambers to prevent the oxygen rich blood
 from mixing with the carbon dioxide-rich blood.
 Since ventricles have to pump blood into various organs, they have 1
 thicker walls.
25. The red colour having the maximum wavelength deviates the least 1
 and forms the upper part of the spectrum whereas violet having
 the least wavelength deviates the most. 1
 Reason: Refractive index of glass is inversely proportional to wavelength. 1

OR

- In a normal human eye, **image is formed on the retina.** 1
 In case of myopia, image of distant object is formed in front of the retina
 and in hypermetropia, image of nearby object is formed behind the retina. 1
26. Ozone (in higher atmosphere) is formed as a product of UV radiation acting 1
 on oxygen molecule. The higher energy UV radiations split apart some
 molecular oxygen into free oxygen which combines with the other molecular
 oxygen to form ozone. 1
 $O_2 \rightarrow O + O$
 $O + O_2 \rightarrow O_3$ 1/2
- It shields the surface of the earth having organisms from the highly 1/2
 damaging UV radiation. Eg:- from skin cancer.

SECTION - C

Q.no. 27 to 33 are short answer questions.

27. (i) Colourless to yellow 1/2
 Reason : yellow ppt of lead iodide is formed 1/2
 (ii) Brown to black 1/2
 Reason : Copper oxide is produced on heating. 1/2
 (iii) Blue to colourless 1/2
 Reason : Zinc Sulphate is formed. 1/2
28. Chemical Name – Sodium Carbonate decahydrate 1/2
 Common Name – Washing Soda 1/2

Chemical Formula - $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$ 1/2

(b) $\text{NaCl} + \text{H}_2\text{O} + \text{CO}_2 + \text{NH}_3 \rightarrow \text{NH}_4\text{Cl} + \text{NaHCO}_3$



$\text{Na}_2\text{CO}_3 + 10\text{H}_2\text{O} \rightarrow \text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$ 1

c) pH paper turns blue 1/2

29. HCl Provides acidic medium in stomach to activate protein digesting enzyme – pepsin /pepsinogen 1
Kills disease germs 1/2
Bile provides alkaline medium to activate the enzymes in pancreatic juice/ trypsin, amylase and lipase 1
helps in emulsification of fats. 1/2

OR

The inner lining of small intestine has numerous finger-like projections called villi 1
which increase the surface area for absorption. 1/2
Villi are richly supplied with blood vessels 1
which take the absorbed food to each and every cell of the body for utilization. 1/2

30. $m = -v/u = (-3h/h_2)$

$$\Rightarrow v = 3u$$

$$\Rightarrow v = -36 \text{ cm} \quad \text{1}$$

Now, $1/f = 1/v + 1/u$

$$\Rightarrow 1/f = -1/36 - 1/12$$

$$\Rightarrow f = -9 \text{ cm}$$

$$\Rightarrow R = 2f = -18 \text{ cm} \quad \text{1}$$

Thus, the radius of curvature is 18 cm.

31. (a) (i) One dioptre is the power of a lens of focal length one metre.

(ii) Using $P = 1/f$

$$-2.0 = 1/f(\text{m})$$

$$\text{or } f = -0.5 \text{ m} \quad \text{1}$$

(b) This is due to the phenomenon of refraction of light. A ray of light starting from the lemons kept in water reaches the water - air interface and bends away from normal. To the observer, it appears as the light ray is coming from the point above the actual point. This apparent position makes them

- appear bigger in size. 1
- (c) The light ray will travel fastest in medium with least refractive index
i.e medium A. 1
32. (a) North pole to south pole. 1
- (b) The strength of magnetic field is higher in this region. 1
- (c) A.C. voltage can be stepped up and transmitted over long distances
without much loss of energy. 1

OR

- (a) (i) Electric meter: It is used to record the consumption of electrical
energy in kWh in the circuit. 1
- (ii) Earthing: It prevents electric shock. The earth wire is joined to the
metal case of the appliance and provides a low resistance conducting
pattern for the current. 1
- (b) An excess number of devices should not be connected to the same socket.
The appliances that are malfunctioning should not be connected to the
socket. 1
33. Substances that are broken down by biological processes/action by microbes/
some bacteria and fungi are biodegradable; Not broken down by biological
processes/action by microbes /some bacteria and fungi are non-biodegradable. 2
- The substances may be inert and simply persist in the environment for long 1/2
- Or may harm the various members of the ecosystem. 1/2

SECTION D

Q.no. 34 to 36 are Long answer questions.

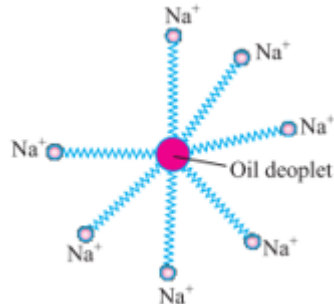
34. a) i) Methanoic acid ii) Pentyne iii) 2,2-Dimethylpropane iv) Cyclopropane
4 x 1/2 = 2
- b) (I) Esterification :
- $$\text{CH}_3\text{COOH} + \text{C}_2\text{H}_5\text{OH} \xrightarrow[\text{Heat}]{\text{Conc. H}_2\text{SO}_4} \text{CH}_3\text{COOC}_2\text{H}_5 + \text{H}_2\text{O}$$
- Ester 1
- ii) Addition Reaction :
- $$\text{CH}_2=\text{CH}_2 + \text{H}_2 \xrightarrow{\text{Pt./Pd or Ni}} \text{CH}_3-\text{CH}_3$$
- 1
- c) Because 'X' is an unsaturated carbon compound 1

OR

- a) correct structure (1 mark each)
- b) Cleansing action of soaps: In soaps carbon chain dissolves in oil and the
ionic end dissolves in water to form micelle 1/2

The dirt particles always stick to the oily or greasy layer present on the cloth. When a dirty cloth is dipped into a soap solution, the non-polar hydrocarbon end of micelles attach to the grease or oil present in dirt and polar end remains in water layer. The mechanical action of rubbing removes the micelles with trapped oily layer from the dirty surface. A stable emulsion of oil in water is formed. The emulsified oil containing dirt can now be readily washed with water.

1



1/2

Hard water contains Ca^{2+} / Mg^{2+} ions that react with soap and form precipitates called scum.

1/2

•By using detergents in hard water

1/2

35. (a) The production of new individuals from the vegetative parts of a plant like root, stem or leaves.

1

Advantages:- plants raised by vegetative propagation can bear flowers and fruits earlier than those produced from seeds/ make possible the propagation of plants/banana/ orange/ rose/jasmine that have lost the capacity to produce seeds/plants produced by these methods are genetically similar enough to the parent plant.(any two)

2

(b) During puberty the resources of the body are mainly directed at achieving sexual maturation. While that is happening, the growth of the body is not likely to be a major priority. Thus the rate of general body growth begins to slow down during sexual maturation.

2

OR

(a) Egg lives for one day; the thick and spongy lining of the uterus slowly breaks and comes out through the vagina as blood and mucous which takes place roughly every month and is called menstruation.

1

(b) Since the sexual act is an intimate connection of bodies, bacterial diseases like gonorrhoea and syphilis and viral infections like warts, HIV-AIDS, etc... can be transmitted; /(STDs)

1

(c) Fragmentation:- In simple multicellular organisms like spirogyra, the body simply breaks up into smaller pieces upon maturation forming fragments; these fragments grow into new individuals.

1

Regeneration:- the ability of many fully differentiated organisms to give rise to new individual organisms from their body parts/ the ability of an organism to regain its lost body parts to form a complete organism; it is carried out by specialized proliferating cells which form mass of cells.

These undergo changes in an organized manner to become various cell types and tissues.

2

$$\begin{aligned} 36. (a) \text{ Power supplied to the circuit:} \\ &= 1.2 \times 1000 \text{ W} + 200 \text{ W} + 60 \text{ W} + 60 \text{ W} \\ &= 1200 \text{ W} + 200 \text{ W} + 60 \text{ W} + 60 \text{ W} \\ &= 1520 \text{ W} \\ &= 1.52 \text{ kW} \end{aligned}$$

1

$$(b) (i) \text{ Current in the refrigerator} \\ = \frac{\text{Power}}{\text{Voltage}} = \frac{200 \text{ W}}{240 \text{ V}} = 0.83 \text{ A}$$

$$\begin{aligned} (ii) \text{ Energy used} &= \text{Power} \times \text{Time} \\ &= 1.2 \text{ kW} \times 3 \text{ h} \\ &= 1.2 \times 1000 \frac{\text{J}}{\text{s}} \times 3 \times 60 \times 60 \text{ s} \\ &= 1200 \times 3 \times 3600 \text{ J} \\ &= 12960000 \text{ J} \\ &= 1.3 \times 10^7 \text{ J} \end{aligned}$$

$$(iii) \text{ Current, } I = \frac{P}{V} = \frac{60}{240} = 0.25 \text{ A}$$

$$\text{Resistance} = \frac{V}{I} = \frac{240}{0.25} = 960 \Omega$$

(1+2+1)

SECTION - E

Q.no. 37 to 39 are Case - Based/Data -Based questions with 2 to 3 short sub - parts. Internal choice is provided in one of these sub-parts.

37. a) Anode- thick block of impure copper 1/2

cathode – thin strip of pure copper 1/2

With time , cathode becomes thicker and anode becomes thinner 1

b) For the refining of zinc:

Anode- thick block of impure zinc 1/2

cathode – thin strip of pure zinc 1/2

Electrolyte – acidified zinc sulphate solution 1

OR

b) i) $\text{Cu}^{2+} + 2e \rightarrow \text{Cu}$ 1

ii) The insoluble impurities settle down at the bottom of the anode and are known as anode mud. 1

38. (a) Yes, brown hair is recessive trait; it will express only in homozygous condition. $\frac{1}{2}$

(b)(let B and b are the factors) BB or Bb 1

(c) bb x Bb $\frac{1}{2}$

gametes	B	b
b	Bb	bb
b	Bb	bb

Genetic cross: 1

Probability:- 50% of the offsprings can have brown hair (bb) $\frac{1}{2}$

OR

(c) brother is heterozygous black (Bb) and wife is brown (bb) brother Bb x bb wife. $\frac{1}{2}$

gametes	b	b
B	Bb	Bb
b	bb	bb

Genetic cross: 1

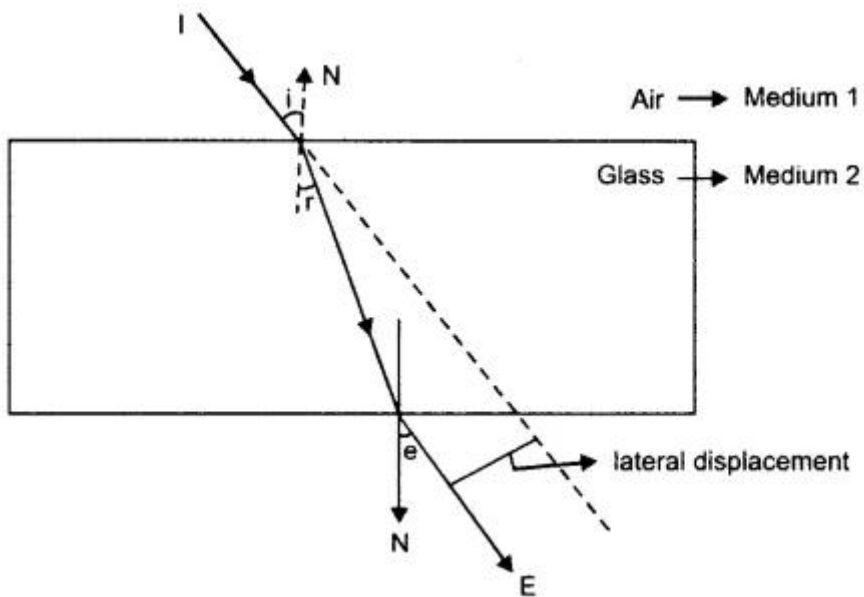
As per the cross 50% of the offsprings can have brown hair (bb) $\frac{1}{2}$

39. (i) **A medium in which the speed of light is more is known as Optically Rarer medium** . Air is optically rarer medium as compared to glass and water.

A medium in which speed of light is less is known as optically denser medium. 1

(ii) The refraction of light (or change in the direction of path of light in other medium) occurs because **light travels with different speeds in different media**. 1

(iii)



1

OR

A swimming pool always looks shallower than it really is because the light coming from the bottom of the pool bends at the surface due to refraction of light. 1

Formation of a rainbow is an example of refraction as the sun rays bend through the raindrops resulting in the rainbow. 1