Time : 3 Hours
Maximum Marks : 80

SCIENCE
CBSE
Sample Question Papers

Solution of Question Paper 2

Section 'A'

1. The molecular formula of two consecutive members of this series is CH_3Cl (Chloromethane) and C_2H_5Cl (Chloroethane). 1

2. When a cell reproduces, its DNA is copied and passed on to the offspring. 1

[CBSE Marking Scheme, 2017]

3. Ability of lens to converge or diverge the light rays is called power of the lens.
+ve sign indicates converging lens/ convex lens
–ve sign indicates diverging lens/ concave lens. ½ + ½ + ½ + ½

4. The measure of biodiversity of an area is the number of species found there. Since, in a forest we can find a range of different life forms of plants and animals, the forests are the biodiversity hot spots. 2

5. Gastric gland
Three components of secretion of gastric gland :
(i) Hydrochloric acid
(ii) Mucus
(iii) Pepsin ½ + ½

6. Atomic number of X = Mass number of X – No. of neutrons ½
= 35 – 18 = 17 ½

Therefore, Electronic configuration of X = 2, 8, 7 ½
Group number = 17 ½
Period = 3 ½
Valency = 8 – 7 = 1 ½

OR

(i) Mercury
(ii) Bromine
(iii) Helium or Neon or Argon. (Any one) 1 + 1 + 1

7. (i) Bleaching powder — $CaOCl_2$
(ii) $Ca(OH)_2 + Cl_2 \longrightarrow CaOCl_2 + H_2O$

(iii) Two uses other than disinfection are :

(a) Paper industries

(b) Chemical industries

1 + 1 + 1

8. Three event which occur during photosynthesis :

(i) Absorption of light energy by chlorophyll.

(ii) Conversion of light energy to chemical energy and splitting of water molecules into hydrogen and oxygen.

(iii) Reduction of carbon dioxide to carbohydrates.

1 + 1 + 1

9. The hormone which regulates carbohydrates, protein and fat metabolism in our body is thyroxine.

Thyroxine hormone is secreted by thyroid gland.

Iodised salt in diet is important because it contains iodine, which is essential for the synthesis of thyroxine hormone by the thyroid gland. In case, iodine is deficient in our diet, there is a possibility of suffering from goitre.

1 + 1 + 1

10. (i) Each piece regenerates into a new Planaria.

(ii) Its filaments breaks into smaller pieces/fragments and each fragment gives rise to a new filament.

(iii) It releases spores which germinate into new mycelium in moist conditions.

1 + 1 + 1

OR

The three parts of carpel are :

(i) **Ovary :** It contains the ovule.

(ii) **Style :** It exposes the stigma for pollination.

(iii) **Stigma :** It is sticky and receives the pollen grains during pollination.

1 + 1 + 1

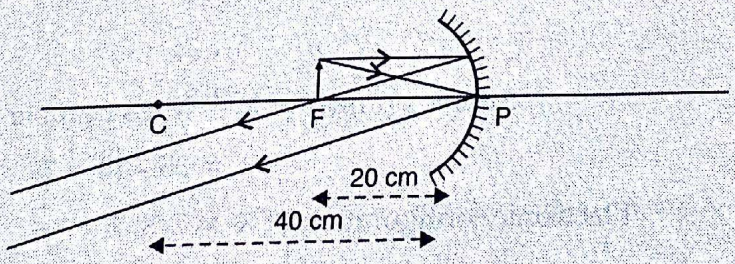
11. **Object position :** At C (centre of curvature) ½

Object distance = 40 cm ½

Position of the image – at infinity ½

Reason : Focal length of the mirror = 20 cm

If the object is moved 20 cm towards the mirror then its new position would be at the focus of the mirror. ½



1

(deduct ½ mark if arrows are missing/not marked) **[CBSE Marking Scheme, 2016]**

12. (i) These are good conductors of electricity/ low resistance, low resistivity.

(ii) Very high melting point and high resistivity.

(iii) Low melting point.

1+1+1

13. A coil of many circular turns of insulated copper wire wrapped closely in the shape of a cylinder is called a solenoid.

The field lines around a current-carrying solenoid is similar to that produced by a bar magnet. This means that a current carrying solenoid behaves as having north pole and south pole. The strong magnetic field produced inside a solenoid can be used to magnetise a piece of magnetic material like soft iron when placed inside the coil.

3

14. (i) In a food chain the energy moves progressively through the various trophic levels and is no longer available to the organisms of the previous trophic level/ energy captured by the autotrophs does not revert back to the solar input.

(ii) Pesticides used for crop protection when washed away/ down into the soil / water bodies absorbed by plants/ producers.

(iii) On consumption they enter our food chain and being non-biodegradable, these chemicals get accumulated progressively and enter our body. **1+1+1**

OR

(i) Releases large amount of energy on burning.

(ii) Easy to store and transport.

(iii) It does not produce smoke so it is environment friendly. **1+1+1**

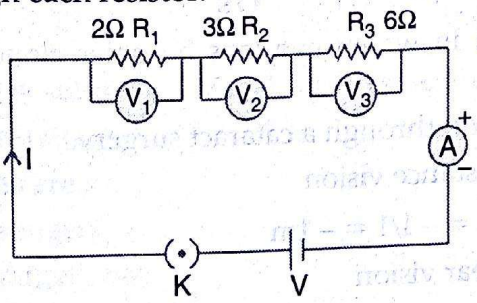
15. Decomposers are micro-organisms such as bacteria and fungi, that obtain nutrients by breaking down the remains of dead plants and animals.

Role of Decomposers :

(i) They recycle matter by breaking down the organic remains and waste products of plants and animals.

(ii) These recycled matter are washed up and enter the soil from where plants absorb the nutrients again. **1+1+1**

16. An applied potential V produces current I in the resistors R_1, R_2, and R_3, causing a potential drop V_1, V_2 and V_3 respectively, through each resistor.



Total potential, $V = V_1 + V_2 + V_3$

By Ohm's Law, $V_1 = IR_1$

$V_2 = IR_2$

$V_3 = IR_3$

Thus, $V = IR_1 + IR_2 + IR_3$

$= I(R_1 + R_2 + R_3)$

If R is the equivalent resistance, $V = IR$

Hence, $IR = I(R_1 + R_2 + R_3)$

$R = R_1 + R_2 + R_3$

This proves that overall resistance increases when resistors are connected in series.

Three resistors 2Ω, 3Ω and 6Ω, are joined in parallel combination.

Equivalent resistance,

$$\frac{1}{R_P} = \frac{1}{2} + \frac{1}{3} + \frac{1}{6}$$

$$= \frac{3+2+1}{6} = \frac{6}{6}$$

$R_P = 1\Omega$ **4+1**

17. (i) Optical centre : the central point of a lens. **1**

(ii) $f = -20$ cm ½

$h_1 = 4$ cm, $v = -10$, $u = ?$ $h_2 = ?$

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

$$\frac{1}{u} = \frac{-1}{10} + \frac{1}{20} = \frac{-1}{10} + \frac{1}{20}$$ ½

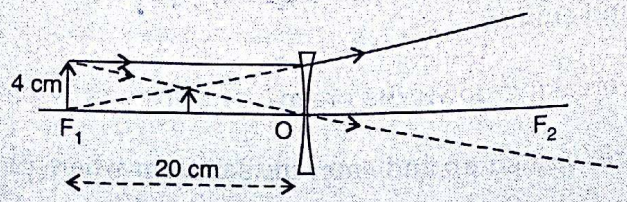
$$= \frac{-2+1}{20} = -\frac{1}{20}$$ 1

$u = -20$ cm ½

$h_i = \frac{v}{u} h_0$ ½

$= \frac{-10 \text{ cm}}{-20 \text{ cm}} \times 4 = 2 \text{ cm}$

(iii)



1

[CBSE Marking Scheme, 2016]

OR

(i) Cataract is the eye defect in which eye lens becomes cloudy or milky. This causes partial or complete loss of vision.

It is possible to restore vision through a cataract surgery.

(ii) Focal length for lens for distance vision

$= -1/1 = -1$m

Focal length for lens for near vision

$= +1/2 = +0.5$m

(iii) The focal length of eye lens cannot be decreased below a certain minimum limit. If we try to read a printed page by holding it very close to our eyes, we may see the image being blurred or feel strain in the eye. To see an object comfortably and distinctly, we must hold it at about 25 cm from the eyes. **1 + 2 + 2**

18. (i) Corrosion is a process in which metals, are deteriorated by action of air, moisture, chemical etc.

(ii) Corrosion of iron is called Rusting.

(iii) Silver turns black as it reacts with H_2S present in air and form a layer of Ag_2S.

(iv) Corrosion of iron is a serious problem because it leads to wastage of tonnes of iron every year and lot of money is spent to repair or replace it.

(v) The iron articles should be painted. **1 + 1 + 1 + 1 + 1**

19. (i) Combustion : Combustion is a chemical reaction that produces heat and light.

$CH_4 + O_2 \longrightarrow CO_2 + H_2O + \text{Energy} + \text{Light}$

(ii) Addition : Addition reactions occur when an atom is added to a compound that has a double or triple bond.

$CH_2 = CH_2 + H_2 \xrightarrow{Ni} C_2H_6$

(iii) Substitution : In this reaction, a more reactive element displaces a less reactive element from a compound. It is also known as displacement reaction.

$CH_4 + Cl_2 \xrightarrow{\text{Sunlight}} CH_3Cl + HCl$

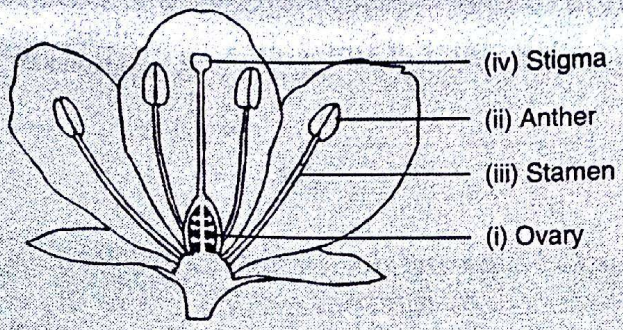
(iv) Esterification : Oxidation is the addition of oxygen to a substance or loss of electron from a substance.

$CH_3COOH + C_2H_5OH \xrightarrow{H+} CH_3COOC_2H_5 + H_2O$

(v) **Oxidation :** The reaction in which a carboxylic acid combines with an alcohol to form an ester is called esterification.

$C_2H_5OH \xrightarrow{\text{alk. } KMnO_4} CH_3COOH$ **1 + 1 + 1 + 1 + 1**

20. (i)



2½

(ii) A-Pollen grain
B-Pollen tube
C-Ovary
D-Female gamete

[CBSE Marking Scheme, 2016] 2½

21. (i) Hormones are the chemical substances which co-ordinate and control the activities of living organisms and also their growth.

Characteristics of hormones are :

(a) They are chemical messengers.
(b) Regulate behaviour of target cells.
(c) They stimulate the target organs.
(d) They are proteinaceous or non-proteinaceous in nature.

(ii) **(a)** Dwarfism
(b) Tallness/Gigantism
(c) Diabetes
(d) Goitre

3 + 2

OR

(i) Plant hormones are known as phytohormones. **1**
(ii) Auxin is synthesized at the shoot-tip of plant body. **1**
(iii) Examples : **1**
(a) Auxins play a role in the development of seedless fruits.
(b) Gibberellin stimulates stem elongation.
(c) Ethylene promotes ripening of fruits.

Section 'B'

3

22. **Physical Properties :**
(i) Smell like vinegar
(ii) Colourless liquid

Chemical Properties :
(i) Turns blue litmus red.
(ii) Gives brisk effervescence with sodium carbonate.

23. (i) Take a dry boiling tube. **1 + 1**
(ii) Keep mouth of test-tube away from yourself.

24. **Importance of Stomata :** **1 + 1**
(i) Helps in exchange of gases like O_2 and CO_2.
(ii) Removes extra water from leaves by transpiration.

1 + 1

25. **(i)** Conditions for the seed germination should be optimum *i.e.*, warmth, moisture and air.

(ii) Care should be taken to separate two cotyledons or that the embryonal axis is intact. **1 + 1**

26. Range of Ammeter a_n = 3 ampere

No. of divisions in ammeter = 30

$$\text{Least count of ammeter} = \frac{\text{Range}}{\text{Total division}} = \frac{3}{30}$$

$$= 0.1 \text{ A}$$ **2**

OR

Homologous organs :

(a) Have the same structural design and developmental origin.

(b) But they have different functions and appearance.

(c) **Example :** The forelimb of a frog, a man, a lizard and a frog seem to be built from the same basic design of bones, but they perform different functions.

Analogous organs :

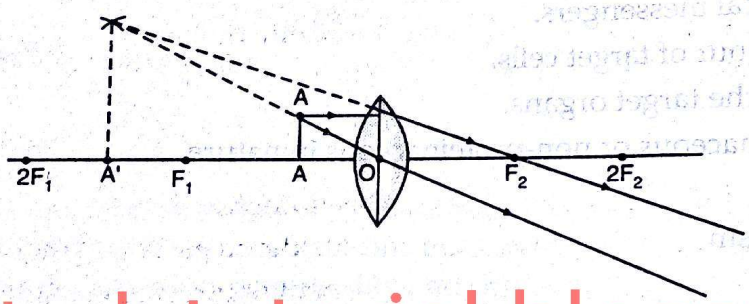
(a) Have different basic structural design and developmental origin.

(b) But they have similar appearance and perform similar functions.

(c) **Example :** The wings of birds and bats look similar. But in birds, wings are covered by feathers all along the arm but the wings of bats are skin folds stretched between elongated fingers. **2**

27. **(i)** Position of object is between lens and focal length of a convex lens.

(ii)



1 + 1