### SECTION - A

<table>
<thead>
<tr>
<th>Question</th>
<th>Expected Answer</th>
<th>Marks</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1.</td>
<td>Propene</td>
<td>½</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>C₃H₆</td>
<td>½</td>
<td>1</td>
</tr>
<tr>
<td>Q2.</td>
<td>a) To produce sperms</td>
<td>½</td>
<td></td>
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<tr>
<td></td>
<td>b) To produce male sex hormone / testosterone</td>
<td>½</td>
<td>1</td>
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<tr>
<td>Q3.</td>
<td>It shields the surface of the earth from ultraviolet rays coming from the Sun.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Q4.</td>
<td>i) Virtual</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>ii) Erect</td>
<td></td>
<td></td>
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<td></td>
<td>iii) Same size as the object</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>iv) As far behind the mirror as the object is in front of it.</td>
<td></td>
<td></td>
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<td></td>
<td>v) Laterally inverted</td>
<td>½×4</td>
<td>2</td>
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<tr>
<td>Q5.</td>
<td>Because large number of life forms / range of life forms (such as bacteria, fungi, fern, nematodes, insects, birds, reptiles, mammals, gymnosperms and angiosperms) are found there. / A region with large biodiversity of endangered species, many of them being highly endemic and such regions being subjected to large scale destruction are designated as “Hot spots” by ecologists.</td>
<td>1</td>
<td></td>
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<tr>
<td></td>
<td>Two ways –</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>i) Not allowing cutting of trees</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>ii) To promote / make people aware about the importance of forests and wildlife</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
iii) Not using wild life products / fur coat or any other named product.

Q6. • A type of management which encourages utilization of resources that meet current basic human needs while preserving the resources for the needs of future generations. 1

• Reuse is better as it does not consume energy. 1 2

Q7. • Example:

$$\begin{align*}
\text{R} & \quad \text{R} \\
\text{C} & \quad \text{C} \\
\text{H} & \quad \text{H} \\
\text{H}_2 & \quad \text{Ni catalyst} \\
\text{R} & \quad \text{C} \quad \text{C} \quad \text{R} \\
\text{R} & \quad \text{R} \quad \text{R} \quad \text{R}
\end{align*}$$

• Addition of hydrogen to the molecule of an unsaturated hydrocarbon / compounds is hydrogenation. ½

• Essential condition for hydrogenation is the presence of a catalyst like Ni / Pd / Pt. 1

• Change observed in the physical property during hydrogenation is the change of the unsaturated compound from the liquid state to the corresponding saturated compound in the solid state / its boiling or melting point will increase. 1 3

Q8. • Soaps are sodium or potassium salts of long chain carboxylic acids. ½

• Detergents are ammonium or sulphonate salts. ½

• Cleansing action of soap – One part of soap molecule is ionic / hydrophilic and dissolves in water. The other part is non-ionic / carbon chain / hydrophobic which dissolves in oil. 1
<table>
<thead>
<tr>
<th>31/1/1</th>
<th>Expected Answer / Value point</th>
<th>Marks</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Thus soap molecules arrange themselves in the form of a micelle / diagram of a micelle.</td>
<td>½</td>
<td></td>
</tr>
<tr>
<td></td>
<td>On rinsing with water, soap is washed off, lifting the oily dirt particles with it.</td>
<td>½ 3</td>
<td></td>
</tr>
</tbody>
</table>

Q9. 18 groups ½

7 periods ½

a) Atomic size increases. ½
    Metallic character increases. ½
b) Atomic size decreases. ½
    Metallic character decreases. ½ 3

Q10. (i) K / Potassium. 1
    (ii) Be and Ca. 1
    KX or KCl ½
    Ionic / Electrovalent. ½ 3

Q11. A process where a DNA molecule produces two similar copies of itself in a reproducing cell. 1
    Importance –
    (i) It makes possible the transmission of characters from parents to the next generation. 1
    (ii) It causes variation in the population. 1 3
### Q12.

![Diagram of plant structures with labels Bud and Tentacles]

- **Drawing**: 2
- **Two labeling – Bud, Tentacles**: \( \frac{1}{2}, \frac{1}{2} \) \( \text{Total} \ 3 \)

### Q13.

- **Four methods** –
  1. Mechanical or barrier method OR Male or female condoms
  2. Use of hormonal preparations OR Oral Pills / i-pill / Saheli
  3. Use of loop OR Copper T OR IUCD
  4. Surgical method OR Tubectomy / Vasectomy

- **Effect on health and prosperity:**
  1. Health of women is maintained
  2. Parents can give more attention to their children
  3. More resources can be made available.

  (any two) \( \frac{1}{2} \times 2 \) \( \text{Total} \ 3 \)

### Q14.

- **Acquiring knowledge / skills in one’s lifetime such as learning dance, music, physical fitness or any other suitable example.**

  (any two) \( \frac{1}{2}, \frac{1}{2} \)

- **Reason:**
  1. Such characters / experiences acquired during one’s lifetime do not bring any change in the DNA of the reproducing cell / germ cell. 1
| Q15. | (i) No, the structure of the eye in each of the organisms is different. ½, ½ |
|      | (ii) Fossils of certain dinosaurs / reptiles show imprints of feathers along with their bones but they could not fly presumably using the feathers for insulation; 1 |
|      | ● Later they developed / evolved and adapted feathers for flight, thus becoming the ancestors of present day birds. (OR any other suitable evidence/example) 1 3 |

| Q16. | The candidate may choose any two of the following rays: |
|      | i) A ray parallel to the principal axis, after reflection, will pass through the principal focus of a concave mirror. |
|      | ii) A ray passing through the principal focus of a concave mirror after reflection will emerge parallel to the principal axis. |
|      | iii) A ray passing through the centre of curvature of a concave mirror after reflection is reflected back along the same path. |
|      | iv) A ray incident obliquely to the principal axis towards the pole of a concave mirror is reflected obliquely, making equal angles with the principal axis. (any two) 1×2 |

or a similar representation 1 3

**Note:** The candidate must draw the ray diagram as per the two rays chosen by him/her. In the diagram shown above (i) and (iii) rays have been chosen/used.
| Q17. | The sun is near the horizon at the sun-rise and also at the sun-set
| | ![Diagram](https://byjus.com) |
| | Light from the Sun near the horizon passes through thicker layers of air and also covers longer distance |
| | Most of the blue light and the shorter wavelengths of sunlight are scattered away by the particles. Light of larger wavelength reaches us giving the reddish appearance |
| Note: | If explained by the above diagram (fully labelled), full credit may be given. |

| Q18. | (a) No, it pollutes air. |
| Advantage: | Segregation of wastes into biodegradable and non biodegradable wastes at the initial stage of disposal saves time and energy. |
| (b) | By putting wastes in proper dustbins |
| Or any other |  |

| Q19. | Carbon has 4 electrons in its outermost shell, and needs to gain or lose 4 electrons to attain noble gas configuration. |
| | Losing or gaining 4 electrons is not possible due to energy considerations; hence it shares electrons to form covalent bonds. |

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Two reasons for large number of carbon compounds:

- Catenation: The unique ability of carbon to form bonds with other atoms of carbon giving rise to long chains of different types of compounds. 1
- Tetravalency: Since carbon has a valency of 4, it is capable of bonding with four other atoms of carbon or atoms of elements like oxygen, hydrogen, nitrogen, sulphur, chlorine, etc. 1

The reason for the formation of strong bonds by carbon is its small size which enables the nucleus to hold on to the shared pairs of electrons strongly. 1 5

Q20.

- Functions:
  - Ovary: (i) Production of female hormone/oestrogen and progesterone. ½
  - (ii) Production of female gamete/egg/germ cell. ½
  - Oviduct: (i) Transfer of female gamete from the ovary. ½
  - (ii) Site of fertilization. ½
  - Uterus: (i) Implantation of zygote/embryo. ½
  - (ii) Nourishment of developing embryo. ½
  - Placenta is a special disc like tissue embedded in the mother’s uterine wall and connected to the foetus/embryo. 1
  - Placenta provides a large surface area for glucose and oxygen/nutrients to pass from the mother’s blood to the embryo/foetus. 1 5

Q21.

- 23 pairs of chromosomes 1
- One pair, two types ½, ½
- Flow chart ½
Parents

Justification: Women produce only one type of ovum / (carrying X chromosome) and males produce two types of sperms (carrying either X or Y chromosome) in equal proportions. So, the sex of a child is a matter of chance depending upon the type of sperm fertilizing the ovum.

Q22. a) Statement of laws of refraction of light (two laws)

When a ray of light travels from vacuum or air into a given medium, then the ratio of \( \sin i \) to \( \sin r \) is called absolute refractive index of the medium.

Absolute refractive index of a medium = \( \frac{\text{Speed of light in vacuum} (C)}{\text{Speed of light in the medium} (C_m)} \)

(b) \( n_a = 2.0; \quad n_b = 1.5 \quad v_b = 2 \times 10^8 \text{ m/s} \)

i) \( n_a = \frac{c}{v_b} \)

\( \therefore \quad c = n_a v_b = 1.5 \times 2 \times 10^8 \text{ m/s} = 3 \times 10^8 \text{ m/s} \)

ii) \( n_A = \frac{c}{v_A} \)

\( \therefore \quad v_A = \frac{c}{n_A} = \frac{3 \times 10^8 \text{ m/s}}{2} = 1.5 \times 10^8 \text{ m/s} \)
Q23.  
- **For magnified erect image** – Object is between the optical centre and principal focus of a convex lens ½

![Diagram](image1)

- **For magnified inverted image** – Object between F and 2F of a convex lens ½

![Diagram](image2)

Here \( u = -20 \text{ cm} \); \( f = +10 \text{ cm} \); \( v = ? \)

\[
\frac{1}{f} = \frac{1}{v} - \frac{1}{u}
\]

\[
\therefore \frac{1}{v} = \frac{1}{f} + \frac{1}{u}
\]

\[
\frac{1}{v} = \frac{1}{10} + \frac{1}{-20}
\]

\[
\frac{1}{v} = \frac{1}{10} - \frac{1}{20} = \frac{2}{20} - \frac{1}{20} = \frac{1}{20}
\]

\[
\therefore v = +20 \text{ cm}
\]

Q24.  
Defect – Myopia / Nearsightedness

Correction – By using a concave lens of suitable power

1
Q34. Two observations:

- Brisk effervescence ½
- Evolution of a colourless/odourless gas. ½

\[ \text{CH}_3\text{COOH} + \text{NaHCO}_3 \rightarrow \text{CH}_3\text{COONa} + \text{H}_2\text{O} + \text{CO}_2 \]
Q35. Binary Fission

Initial Stage  Final Stage

Elongation of the nucleus

Q36. (a) Away from the lens

(b) Increases

(c) No image on the screen