SECTION - A

1. Elements belonging to the first group are:
   - Metals (Alkali)
   - Have valency 1

2. A gene is the functional unit of DNA, with a specific biological function. One gene is responsible for the synthesis of one protein.

3. Old newspapers can be collected and sent to factories to be made into paper. Plastic and glass bottles can be reused to store pickles and other food materials.

4. | Sperms | Egg Cells |
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Male gamete</td>
<td>Female gamete</td>
</tr>
<tr>
<td>Small and mobile</td>
<td>Large and non-mobile</td>
</tr>
<tr>
<td>X and Y chromosome</td>
<td>Contains food stores</td>
</tr>
<tr>
<td>Main difference: contains Y chromosome</td>
<td>Contains only X chromosome</td>
</tr>
</tbody>
</table>
Since female gamete always contains X chromosome, the sex of the child is independent of mother's genes. The chromosome in the male gamete (sperm) determines the sex of the child.  
[If its X, child will be female; if its Y, child will be male]  

when the object is placed between pole and focus of concave mirror, magnified, virtual, erect image will be formed behind the mirror. [Case I]  

when the object is placed between centre of curvature and pole of the concave mirror, brought, real, inverted image is formed on a screen. [Case II]  

<table>
<thead>
<tr>
<th>Real Image [Case II]</th>
<th>Virtual Image [Case I]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can be obtained on screen</td>
<td>Cannot be obtained on screen</td>
</tr>
</tbody>
</table>

Decomposers are microorganisms, especially bacteria and fungi, that break down waste and dead remains of organisms. They convert complex organic substances into simple inorganic molecules, which go into the soil and are once again taken up by plants.
* Decomposers ensure the cyclic movement of matter in nature.
  * They prevent pollution and make sure that the earth is not covered with organic waste.

1. Sustainable management encourages all forms of growth that are needed to meet basic human needs, while conserving natural resources for future generations. It is necessary because our natural resources are exhaustible, limited, and non-renewable.

Our resources are being overexploited by the growing population, and there is no equitable distribution of resources. As a handful of rich and powerful people are exploiting them to the hilt for short-term benefits, so it is necessary.

I would suggest 'reuse', because in this practice no energy is wasted, and segregation of waste is not necessary. By practising 'reuse' strategy we are
also reducing our consumption of resources.

Homologous series are a series of carbon compounds with regularly varying chain lengths and the same functional group. Adjacent compounds differ by a single unit and the same molecular mass. $\text{CH}_3\text{-CHO}$, $\text{CH}_3\text{CH}_2\text{-CHO}$ are two consecutive members of the homologous series of aldehydes.

1. The carbon chain length determines physical properties.
2. Functional group determines chemical properties.

(i) $\text{C}_2\text{H}_4\text{O}_2$ - ethanoic acid
(ii) $\text{C}_2\text{H}_5\text{OH}$ - ethanol
(iii) $\text{C}_6\text{H}_{12}\text{O}_2$ - ethyl acetate [ethyl ethanoate - ester]

10. A, B, C and D belong to Period 3.

Electronic configuration:

\[
\begin{array}{c|c|c}
\text{A} & \text{B} \\
\hline
\text{K} & \text{L} & \text{M} \\
\text{2} & \text{8} & \text{1} \\
\text{K} & \text{L} & \text{M} \\
\text{2} & \text{8} & \text{1} \\
\end{array}
\]

Atomic no.: 11
Valency: 1

Atomic no.: 17
Valency: 1
when A and D combine:

\[ A \times D \quad [A \text{ is metal, } D \text{ is non-metal}] \]

\[ AD \]

11.

E

D

B

D is bigger in size than E, because the net nuclear charge in E is higher, so the shells are closely held together than in D.

C and F belong to inert gases [zero group elements].

12. Planaria has the is a fully differentiated multicellular organism which has the ability to grow into a new individual if it is cut up or broken into pieces. Each piece grows into a new individual. This is due to the regenerative cells which are present in its body. These cells grow, proliferate and give rise to a mass.
of cells. From this mass of cells different types of and tissues will develop. This process takes place in an organized sequence called development.

This process is different from reproduction as most organisms would not depend on being cut up in order to reproduce.

13. Placenta is a tissue made of blood that develops around the growing embryo in the uterus.

- The placenta has blood spaces on the mother's side, and
- finger like projections called villi on the embryo's side.
- The villi are richly supplied with blood vessels.
- The nutrients and food from the mother's blood reaches the embryo through the villi, which has a large surface area.
- Wastes generated by the embryo are absorbed by the placenta and released into the mother's blood.
- Placenta is necessary for the normal and healthy development of the embryo.
14. Certain traits cannot be passed on to the next generation. Such traits develop through experiences during the lifetime of an individual. They do not make any changes in the DNA or germ plasm. They make changes in only the non-reproductive cells of the body. They are non-inheritable.

For ex: Rohan knows to play the guitar because he went for guitar classes for a few years.
But his son doesn’t know to play the guitar because he hasn’t gone for training, even though his father can.

Ex: A group of beetles are healthy and well developed due to availability of food resources. However, its progeny lived during a famine, where very little food was available so they were thinner.

Even though parent population was healthy, the progeny was not, because of environmental factors. They are called acquired traits.
15. In the sexual mode of reproduction, both the parent contribute an equal amount of genetic material to the child. The DNA of the child is influenced by the DNA of the parents. So each trait contains two versions in the child: maternal version and paternal version. However which trait is expressed, depends on the percentage.

Example

In Mendel's experiment, he crossed two pure tall pea plants. One was purely dominant and the other purely recessive. He found that all the progeny were tall. No one was medium or short. So he supposed that may be only tallness trait was inherited.

But when he crossed two plants of F1 generation, it was found that 75% were tall and 25% short. Out of this 25% was pure dominant tall, 50% were hybrids and 25% pure recessive short. So he understood that both traits were inherited but only one was expressed in each plant. So which trait expresses itself
Concave mirror

Object: blue
Focus: at center of curvature
Image: beyond C

Inverted, real, enlarged.

Through optical center never undeviated

Parallel to principal axis

Directed towards focus.
Dispersion: Light is made up of different colours. Each colour has a different wavelength. Depending on wavelength, each colour travels with a different speed in a particular medium. Each colour therefore gets refracted by different amounts on going from one medium to another and follows a different path. Therefore a band of several colours form when white light falls on a prism.

(ii) Rainbow
While light is made up of seven colours: Red, Orange, Yellow, Green, Blue, Indigo and Violet. Red has the longest wavelength and is least deviated and Violet has the shortest wavelength and is most deviated.

Energy flow in a food chain is unidirectional. Only 1% of solar energy falling on leaves of producers get converted into food energy through photosynthesis and is made available to next level of consumers. After consumers eat producers a lot of energy is lost to the environment in the form of heat. Energy is used by the consumer for digestion, growth, reproduction and other activities. Only 10% of energy is turned into its own body and made available for the next level of consumers. So once energy is taken up by producers from solar energy, it cannot be returned back into solar energy. Once energy enters a trophic level, it is then not available to the previous trophic level. So little energy is available after every trophic level, and the energy can only go to
Sometimes pesticides and other chemicals enter a food chain unknowingly. This is called biological magnification. Since they are non-biodegradable, they will remain in the body of the organism and pass on to the next trophic level. Since human beings occupy the top position in any food chain, highest concentration of chemicals...
are in us.
Pesticides are widely used in crop fields. Due to rainfall or excessive irrigation, they get washed into water bodies. The aquatic organisms take up the pesticides. Then when we eat these aquatic organisms and the crops grown in such crop fields, pesticides enter our body unknowingly.

20. Carbon cannot gain or lose electrons because its atom has 6 electrons in its valence shell.
- If carbon were to lose 4 electrons, it would become $C^{4+}$ cation. Then, 6 protons would be left holding only 2 electrons.
- If carbon were to gain 4 electrons and become $C^{4-}$ anion, the 6 protons would have to hold on to 10 electrons i.e., 4 extra electrons. Large amounts of energy are required to gain or lose 4 electrons. So, carbon cannot gain or lose electrons to become stable.

In ionic compounds, covalent bonds are formed which gives rise to charged particles. By losing/gaining electrons between atoms in carbon compounds, covalent compounds are formed where electron pairs are shared by valence shells. They can be: single
In carbon compounds, electrons are not lost or gained. So charged particles/ions are not released. Therefore, carbon compounds are not good conductors of electricity.

Female reproductive system:

1. Ovaries
2. Uterus
3. Oviduct
4. Eggs develop in ovaries.
5. Fertilization takes place in oviduct.
6. Fertilized egg implants on the wall of the uterus.
(i) In order to receive the fertilized egg, the wall of the uterus thickens and becomes spongy. The wall is richly supplied with blood vessels to provide nutrition to the zygote once it gets fertilized.

(ii) If zygote is not formed, the egg lives in the uterus for one day. After that, the blood vessels and spongy materials on the wall of the uterus shed itself and comes out through the vagina as blood and mucous. This is called menstruation.

5. a. A. Pollen grain
   B. Pollen tube
   C. Ovary
   D. Egg cell inside ovule

b. Pollination refers to the transfer of pollen grains from the anther to the stigma of the carpel through agents. Pollination is necessary, so that the male gamete reaches the egg cell and gets fertilized.
In flowers fertilization takes place inside the ovary when the pollen grain falls on the stigma through pollination, it develops a pollen tube and travels along the style and enters the ovary. The male gamete enters ovule through the pollen tube and fuses with the egg cell to form a zygote.
(i) Ovule develops into seed.
(ii) Ovary develops into fruit.

(i) Optical center - The centre most past inside the lens. Light ray moves undeviated through this spot.

(ii) Centres of curvature - The surface two refracting surfaces of the lens form part of two hollow spheres. The centres of these spheres are the centers of curvature.

(iii) Principal axis - Imaginary line joining the centres of curvature with the optical centre and extended on both sides.
The refracting surface of any form cast of spherical at least one hollow sphere. The aperture is the circular outline of the net.

IV. Aperture - It is the diameter of the circular outline of the refracting surface.

V. Principal focus - Point on the principal axis through which the refracted ray passes or appears to pass, when the incident ray is parallel to principal axis.

VI. Focal length - Distance between the optical centre and the principal focus.

b. \[ f = 12 \text{ cm} \]

\[ v = 48 \text{ cm} \]

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

\[ \frac{1}{12} - \frac{1}{48} = \frac{1}{u} \]
\[-\frac{1}{u} = \frac{1}{48} - \frac{1}{12}\]

\[-\frac{1}{48} = -\frac{3}{48}\]

\[u = -\frac{48}{3} = -16 \text{ cm}\]

24. (a) The iris and pupil control the amount of light entering our eye.

The iris is a dark muscular diaphragm behind the cornea with a hole in its centre called the pupil. The iris contracts or relaxes in order to enlarge or make smaller the pupil. Accordingly, the pupil regulates the amount of light entering our eye.

When pupil is enlarged, a large amount of light enters our eye. When it is small, a smaller amount of light enters our eye.

In bright areas, the pupil becomes small and in dim rooms the pupil enlarges.
b. Retina is the light sensitive screen on the back of the eye ball. It is the thin membrane on which the images are formed. It contains light sensitive cells called rods and cones which get activated on illumination. These cells convert light energy into electrical impulses which are carried to brain via the optic nerves.

c. There are around 4.5 million corneally blind people, out of which 60% are below 12 years of age. All these people can be cured by a corneal transplantation. We should organize groups to motivate community members to donate their eyes after death, because of such a situation. A pair of eyes can give sight to two corneally blind people. The community must be made aware of the fact that any person of any age or sex, who doesn’t have any communicable disease, can donate their eyes. Such groups should motivate people to register in eye banks, who will
remove the eyes, once the person is dead. People should be educated about this at a young age, so that they will be motivated to donate not just eyes, but other organs also like kidneys, liver, heart and lungs after their death. Such noble acts can better the lives of so many disabled.
परिवारिंद्रों के साहित निर्देश

1. अथ उपलब्ध हो, के सभी ग्रह युगल प्रदर्शित करें। के सभी ग्रह युगल प्रदर्शित करें।
2. उपलब्ध हो, के सभी ग्रह युगल प्रदर्शित करें। के सभी ग्रह युगल प्रदर्शित करें।
3. उपलब्ध हो, के सभी ग्रह युगल प्रदर्शित करें। के सभी ग्रह युगल प्रदर्शित करें।
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df  

9. उपलब्ध हो, के सभी ग्रह युगल प्रदर्शित करें। के सभी ग्रह युगल प्रदर्शित करें।
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12. उपलब्ध हो, के सभी ग्रह युगल प्रदर्शित करें। के सभी ग्रह युगल प्रदर्शित करें।

Instructions to Candidates

1. Make sure that the answer-book contains all pages and the property sealed in number (1)这块纸页的封页及随后的封页。
2. DO NOT make any special marks or marks in or outside the answer-book, supplementary answer-book, graph-paper, map etc.
3. DO NOT write your roll no., name of your school or place of examination in any of your answers.
4. You must write the supplementary answer-book serial no. in the attendance sheet.
5. Write on each ruled line on both sides and do not waste pages by leaving a wide margin.
6. DO NOT tear out or fold the pages of the answer-book and do not leave any blank pages unmarked. An supplementary answer-book (if any) should be asked for unless this answer-book is finished.
7. Numbers your answers according to their numbers in the question paper.
8. Draw a line when a question (or a part thereof) is finished.
9. Securely tag your answer-book with supplementary answer-book (if any), graph-paper, map etc. if used by you, but DO NOT write your Roll No. on the supplementary answer-book, graph-paper, map etc.
10. Use only blue-black or royal-blue ink.
11. For rough calculation etc. appropriate margin on the right-hand side of the page may be drawn. The rough calculations etc. should be endorsed out afterwards.
12. DO NOT leave the examination hall without handing over the answer-book to the Asst. Supd.
13. If during the course of examination, a candidate is found indulging in any of the following, he/she shall be deemed to have used unfair means at the examinations, and as such neither result shall not be declared but shall be marked as UNFAIR MEANS (U.F.M.)
   (a) having in possession papers, books, notes or any other material or information relevant to the examination in the paper concerned
   (b) giving or receiving assistance directly or indirectly of any kind or attempting to do so
   (c) writing questions or answers on any material other than the answer-book given by the Centre Superintendent for writing answers
   (d) tearing of any pages of the answer-book or supplementary answer-book etc.
   (e) communicating or contacting or trying to do so with any person, other than the Examination Staff, during the examination time in the examination centre
   (f) taking away the answer-book out of the examination hall/room
   (g) using or attempting to use any other undetectable method or means in connection with the examination
   (h) smuggling out Question Paper or its part or smuggling out answer-book supplementary answer-sheet or part thereof and
   (i) iffracting any of the officials connected with the conduct of the examinations or threatening any of the candidates.