

Maharashtra State Board
Class X Science and Technology Paper II
Board Paper – 2017 Solution

1.

(A)

(1)

(i) Nervous system is absent in plants.

(ii) Both parents contribute an equal amount of genetic material to their offspring.

(2)

(i) True

The general formula of alkanes is C_nH_{2n+2} .

(ii) False

Proteins are body-building nutrients. Carbohydrates are energy-giving nutrients.

(3) Root : Vegetative propagation :: Flower : Sexual reproduction

(B)

(1) (b) Diffusion

Air enters the stomatal opening in plant cells, after which the exchange of respiratory gases occurs by diffusion.

(2) (b) $FeSO_4$

Aqueous solution of $FeSO_4$ is green.

(3) (a) Budding

Hydra uses regenerative cells for reproduction by budding.

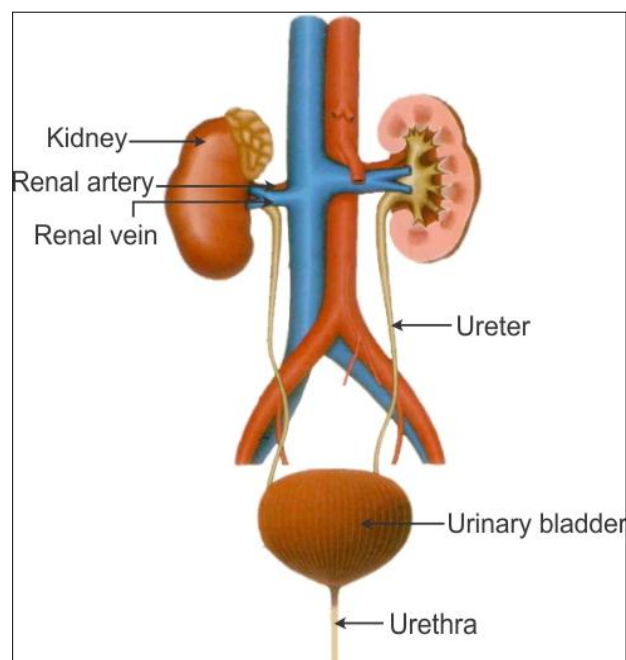
(4) (b) Osmosis

Water penetrates the membranes and enters the raisins by osmosis.

(5) (b) A gas is evolved.

$Zn + 2CH_3COOH \rightarrow Zn(CH_3COO)_2 + H_2$

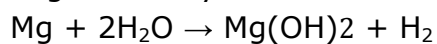
2.
(1)



(2)

Monohybrid Cross	Dihybrid Cross
A cross between two pure organisms to study the inheritance of a single pair of contrasting characters.	A cross between two pure organisms to study the inheritance of two pairs of contrasting characters.
It produces a phenotypic monohybrid ratio 3:1 in the F ₂ generation.	It produces a phenotypic dihybrid ratio 9:3:3:1 in the F ₂ generation.
It produces a genotypic ratio 1:2:1 in the F ₂ generation.	It produces a genotypic ratio 1:2:1:2:4:2:1:2:1 in the F ₂ generation.
Example: Cross between tall and dwarf pea plants	Example: Cross of pea plants with round and yellow seeds and plants with wrinkled and green seeds

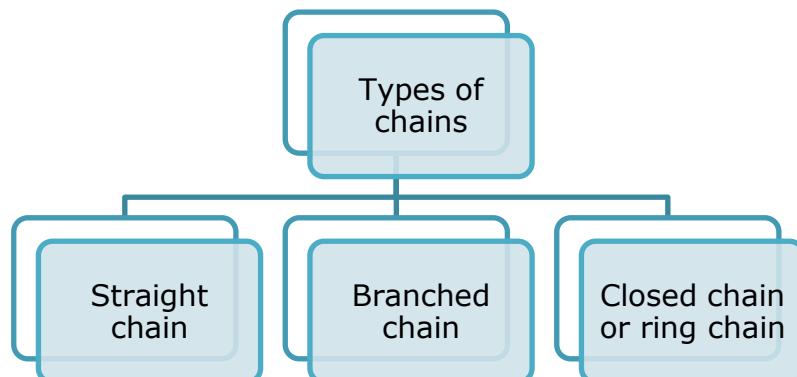
(3) Magnesium does not react with cold water but reacts with hot water to form magnesium hydroxide with the evolution of hydrogen gas.



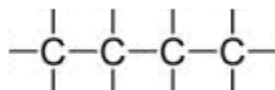
(4) Recycling is a type of green technology which uses old material to make new products. Example: Used papers are recycled to make cardboards.

(5) Vestigial organs are structures which have no apparent function in a particular organism. Examples: Tail bone, wisdom teeth

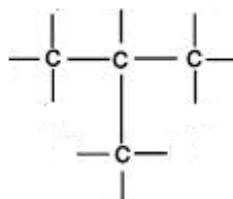
(6) Catenation: The property of carbon element due to which its atoms can join one another to form long carbon chains is called catenation.



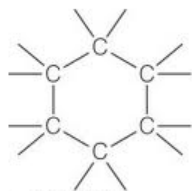
A) Straight chain of carbon atoms



B) Branched chain of carbon atoms



C) Closed chain or ring chain of carbon atoms



3.

(1)

1. Medulla oblongata
2. Pons varolii
3. Corpus callosum
4. Cerebrum
5. Pineal body

(2) Eco-friendly technology will help towards a cleaner environment and reduce the rapid depletion of resources.

(3)

- (i) 1-Propanol
- (ii) Methanoic acid
- (iii) 1-Butene

(4) Embryology deals with the study of the development of an organism from an embryo.

Embryology of different vertebrates provides very strong evidence of different vertebrates showing striking similarities. There is an obvious similarity between embryos of fish, amphibians, reptiles, birds and mammals. A comparison of embryos of vertebrates shows that all have gill slits even though they do not remain later in life (except fish). This indicates a fundamental step which is common to all vertebrates and supports the idea of a common ancestor. Other features which do not exist in the adult form but appear in the embryos include limb buds in dolphins and human tail buds.

This shows that these species share an ancestor, so their developmental processes are similar regardless of other changes which have taken place since their divergence.

(5) Two types of nerves are efferent nerves and afferent nerves. Efferent nerves carry impulses from the brain to the sensory organs. Afferent nerves carry impulses from the sensory organs to the brain.

(6) Haemoglobin is the respiratory pigment which transports oxygen to the body cells for cellular respiration. Therefore, the deficiency of haemoglobin in the blood can affect its oxygen-supplying capacity which leads to a deficiency of oxygen in the body cells. It can also lead to a disease called anaemia.

4.

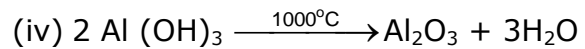
(1)

- (i) Flower
- (ii) Pistil
- (iii) Receptacle
- (iv) Stamen
- (v) Anther

(2)

- (i) Bayer process
- (ii) Alumina: $\text{Al}_2\text{O}_3 \rightleftharpoons 2\text{Al} + 3\text{O}_2$ —
Cathode: $2\text{Al} + 6\text{e}^- \rightarrow 2\text{Al}$
- (iii) Cryolite lowers the fusion temperature from 2050°C to 950°C and enhances conductivity.

Chemical formula of cryolite: Na_3AlF_6



(v) The anode is replaced from time to time because it gets oxidised by oxygen which evolves at it.