Maharashtra State Board Class X Science and Technology Paper II Board Paper -2017

Time: 2 hrs M			Max. Marks: 40	
No ^r i. ii.	Note: i. Draw well-labelled diagrams wherever necessary. i. All questions are compulsory.			
1.	(A) A 1.	 Answer the following sub-questions : Fill in the blanks and rewrite the completed statemer (i) Nervous system is absent in (ii) Both the parents contribute equal amount of 	n ts. [2]	
	2.	 State whether the following statements are true or fa (i) The general formula of alkanes is C_nH_{2n+2}. (ii) Carbohydrates are body building nutrients. 	alse: [2]	
	3.	Considering the relationship in the first pair, comp pair: Root : Vegetative propagation : : Flower :	lete the second [1]	
	(B) R 1.	The exchange of respiratory gases in the cells of plan process of (a) Osmosis (b) Diffusion (c) Glycolysis (d) exhalation	er options: [5] Its occurs by the	
	2.	A solution of in water is green in colo (a) $CuSO_4$ (b) $FeSO_4$ (c) $ZnSO_4$ (d) $Al_2(SO_4)_3$	ur.	
	3.	type of reproduction takes place in H (a) Budding (b) Binary fission	ydra.	

- (c) Multiple fission
- (d) None of the above

- 4. The process of absorption of water into raisins occurs through its membranes. This process is known as ______.
 - (a) Absorption
 - (b) Osmosis
 - (c) Adsorption
 - (d) Diffusion
- 5. When zinc powder is added to acetic acid ______
 - (a) the mixture becomes warm
 - (b) a gas is evolved
 - (c) the colour of the mixture becomes yellow
 - (d) a solid settles at the bottom

2. Attempt any five of the following:

- 1. Draw a neat labelled diagram of the human excretory system.
- 2. Differentiate between Mendel's monohybrid cross and dihybrid cross.
- 3. Explain the following reaction with the help of a balanced chemical equation: Magnesium reacts with hot water.
- 4. What is recycling? Give one example.
- 5. What are vestigial organs? Give one example.
- 6. Write a short note on Catenation.

3. Attempt any five of the following questions :

- 1. Write the names of the indicated parts 1 to 6 in the following diagram:
- 2. What is the need to use eco-friendly technology?
- 3. State the IUPAC names of the following compounds :
 - i. CH_3 - CH_2 - CH_2 -OH
 - ii. HCOOH
 - iii. $CH_3-CH_2-CH=CH_2$.
- 4. What is embryology? How does it study lead us to understand evolution?
- 5. What are the two types of nerves? Write their functions.
- 6. What would be the consequences of the deficiency of haemoglobin in the human body?

4. Attempt any one of the following :

- 1. Answer the following questions with respect to the sexual reproduction in plants:
 - i. State the name of the functional unit concerned with sexual reproduction.
 - ii. Name the part made up of the stigma, style and ovary.
 - iii. Name the swollen lower part of the carpel.
 - iv. Name the male part of the flower.
 - v. Where are the pollen grains produced?

[10]

[15]

[5]

- 2. In the extraction of aluminium:
 - i. Name the process of concentration of bauxite.
 - ii. Write the cathode reaction in electrolytic reduction of alumina.
 - iii. Write the function and chemical formula of cryolite.
 - iv. Write a chemical equation for the action of heat on aluminium hydroxide.
 - v. Why is it necessary to replace anodes time to time?

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1.

(A)

(1)

- (i) Nervous system is absent in <u>plants</u>.
- (ii) Both parents contribute an equal amount of <u>genetic</u> material to their offspring.

(2)

(i) True

The general formula of alkanes is CnH_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) FeSO₄

Aqueous solution of FeSO₄ is green.

(3) (a) Budding

Hydra uses regenerative cells for reproduction by budding.

- (4) (b) OsmosisWater penetrates the membranes and enters the raisins by osmosis.
- (5) (b) A gas is evolved. $Zn + 2CH3COOH \rightarrow Zn (CH3COO)2 + H_2$

2. (1)



(2)

Monohybrid Cross	Dihybrid Cross	
A cross between two pure organisms to	A cross between two pure organisms to	
study the inheritance of a single pair of	study the inheritance of two pairs of	
contrasting characters.	contrasting characters.	
It produces a phenotypic monohybrid	It produces a phenotypic dihybrid ratio	
ratio 3:1 in the F_2 generation.	9:3:3:1 in the F_2 generation.	
It produces a genotypic ratio 1:2:1 in the	It produces a genotypic ratio	
F_2 generation.	1:2:1:2:4:2:1:2:1 in the F ₂ generation.	
Example: Cross between tall and dwarf	Example: Cross of pea plants with round	
pea plants	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. Mg + $2H_2O \rightarrow Mg(OH)2 + H_2$
- (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: $Al2O_3 \Rightarrow 2Al3 + 3O_2 Cathode: 2Al3 + 6e \rightarrow 2Al$
- (iii) Cryolite lowers the fusion temperature from 2050°C to 950°C and enhances conductivity.

Chemical formula of cryolite: Na3AlF6

(iv) 2 Al (OH)₃ $\xrightarrow{1000^{\circ}\text{C}}$ Al₂O₃ + 3H₂O

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