

11th STD.

INSTANT SUPPLEMENTARY EXAM - JULY 2023

PART - III - BIOLOGY

Reg. No.

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Time Allowed : 3.00 Hours]

(with Answers)

[Maximum Marks : 70

- Instructions:** (1) Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.
- (2) Use **Blue** or **Black** ink to write and underline and pencil to draw diagrams.

PART - I
(BIO - BOTANY)

(Marks : 35)

SECTION - 1

- Note :** (i) Answer **all** the questions. (8 × 1 = 8)
- (ii) Choose the most appropriate answer from the given **four** alternatives and write the option code and the corresponding answer.

- For every CO₂ molecule entering the C₃ cycle, the number of ATP and NADPH required :
 - 2ATP + 2NADPH
 - 2ATP + 3NADPH
 - 3ATP + 2NADPH
 - 3ATP + 3NADPH
- The Pairing of homologous chromosomes in meiosis is known as _____.
 - Synergids
 - Bivalent
 - Synapsis
 - Disjunction
- Endosperm in gymnosperm is formed :
 - at the time of fertilization
 - before fertilization
 - after fertilization
 - along with the development of embryo
- Match the following .

(1) Molybdenum	(i) Chlorophyll
(2) Zinc	(ii) Methionine
(3) Magnesium	(iii) Auxin
(4) Sulphur	(iv) Nitrogenase

 - (1)-(i), (2)-(iii), (3)-(iv), (4)-(ii)
 - (1)-(ii), (2)-(i), (3)-(iii), (4)-(iv)
 - (1)-(iv), (2)-(iii), (3)-(i), (4)-(ii)
 - (1)-(iv), (2)-(ii), (3)-(i), (4)-(iii)

- Which of the following is polycarpic plant?
 - Mangifera
 - Bambusa
 - Musa
 - Agave
- Which one of the following method / methods is / are used to break the seed dormancy?
 - Scarification
 - Impaction
 - Stratification
 - All the above
- Gynoecium with united carpels is termed as :
 - Apocarpous
 - Multicarpellary
 - Syncarpous
 - None of the above
- Identify the incorrect statement about the Gram Positive bacteria.
 - Teichoic acid absent
 - High percentage of peptidoglycan is found in cell wall
 - Cell wall is thick layered
 - Lipo polysaccharides absent

SECTION - 2

- Note:** Answer **any four** questions. (4 × 2 = 8)
- What do you infer from the term "Pycnoxylic"?
 - Respiratory quotient is zero in succulent plants. Why?
 - Differentiate homeomerous and heteromerous Lichens.
 - Draw and label the parts of regions of root.
 - Give two examples for insectivorous Angiosperm plants.
 - Give the technical terms for the following :
 - Stamens are united in one bunch.
 - Stamens are attached to the petals.

SECTION - 3

Note: Answer any three questions. Question No. 19 is **Compulsory.** (3 × 3 = 9)

- 15. Write the physiological effects of cytokinins.
- 16. Draw the ultra structure of plant cell and label its parts.
- 17. Differentiate haplontic life cycle from diplontic life cycle.
- 18. Explain the structure and functions of different types of RNA.
- 19. In Botany class, teacher explains, synthesis of one glucose requires 30 ATPs in C₄ plants and only 18 ATPs in C₃ plants. The same teacher explains C₄ plants are advantageous than C₃ plants. What is the reason for this contradiction?

SECTION - 4

Note: Answer all the questions (2 × 5 = 10)

- 20. (a) Write the significances of Mitosis (Indirect cell division)

(OR)

- (b) What is the name of alternate way of glucose breakdown? Explain the process involved in it.

- 21. (a) Explain Sclereids with their types.

(OR)

- (b) Explain the different types of placentation with example.



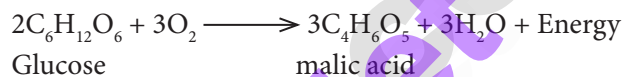
ANSWERS

PART - I ; SECTION - 1

- 1. (c) 3ATP + 2NADPH
- 2. (c) Synapsis
- 3. (b) before fertilization
- 4. (c) (1)-(iv), (2)-(iii), (3)-(i), (4)-(ii)
- 5. (a) Mangifera
- 6. (d) All the above
- 7. (c) Syncarpous
- 8. (a) Teichoic acid absent

SECTION - 2

- 9. It refers to a type of wood in Gymnosperms which is compact with narrow medullary ray. Eg : *Pinus*.
- 10. In some succulent plants like *Opuntia*, *Bryophyllum*, carbohydrates are partially oxidised to organic acid, particularly malic acid without corresponding release of CO₂ but O₂ is consumed hence the RQ value will be zero.

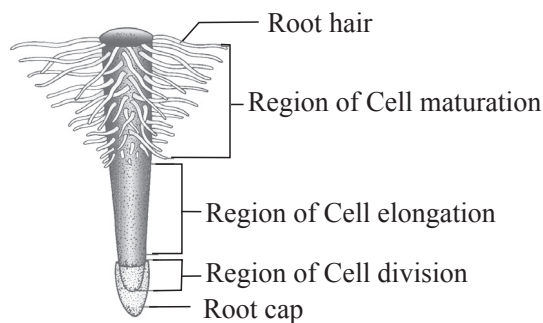


$$\text{RQ of glucose in succulents} = \frac{\text{Zero molecule of CO}_2}{3 \text{ molecules of CO}_2} = 0 \text{ (Zero)}$$

11.

Homoimerous Lichens	Heteromerous Lichens
Algal cells are evenly distributed in the thallus.	A distinct layer of algae and fungi present in the thallus.

12. Regions of root :

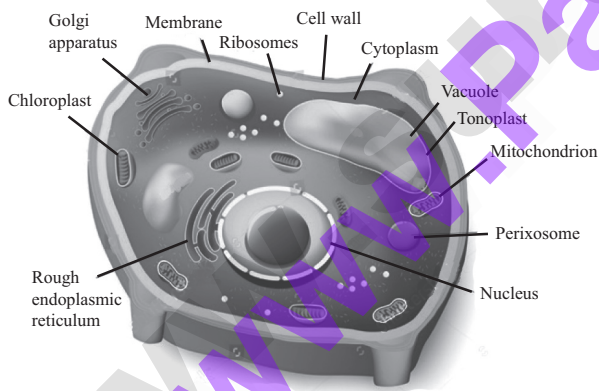


- 13. 1. Nepenthes
- 2. Drosera
- 3. Utricularia
- 4. Dionaea
- 14. (a) Monadelphous
- (b) Epipetalous

SECTION - 3

15. 1. Cytokinin promotes cell division in the presence of auxin (IAA).
2. It can break the dormancy of certain light-sensitive seeds like tobacco and induces seed germination.
3. It promotes the growth of lateral bud in the presence of apical bud.
4. Application of cytokinin delays the process of aging by nutrient mobilization. It is known as Richmond Lang effect.
5. Cytokinin (i) increases rate of protein synthesis (ii) induces the formation of inter-fascicular cambium, (iii) overcomes apical dominance (iv) induces formation of new leaves, chloroplast and lateral shoots.
6. Plants accumulate solutes very actively with the help of cytokinins.

16. Ultra Structure of Plant Cell :



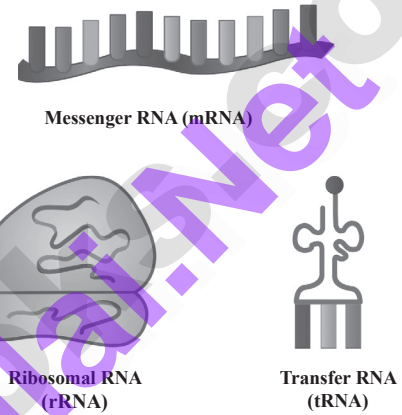
Ultra Structure of Plant Cell

17.

No.	Haplontic life cycle	Diplontic life cycle
1.	Gametophytic phase is dominant, photosynthetic and independent.	Sporophytic phase (2n) is dominant, photosynthetic and independent.

No.	Haplontic life cycle	Diplontic life cycle
2.	Sporophytic phase is represented by the zygote. Eg : <i>Volvox</i>	The gametophytic phase is represented by the single to few celled gametophyte. Eg: <i>Fucus sps.</i>

18.



Types of RNA :

I. mRNA (messenger RNA)

1. Single stranded, carries a copy of instructions for assembling amino acids into proteins.
2. It is very unstable and comprises 5% of total RNA polymer.
3. Prokaryotic mRNA (Polycistronic) carry coding sequences for many polypeptides.
4. Eukaryotic mRNA (Monocistronic) contains information for only one polypeptide.

II. tRNA (transfer RNA)

1. Translates the code from mRNA and transfers amino acids to the ribosome to build proteins.
2. It is highly folded into an elaborate 3D structure and comprises about 15% of total RNA.
3. It is also called as soluble RNA.

III. rRNA (ribosomal RNA)

1. Single stranded, metabolically stable, make up the two subunits of ribosomes.

2. It constitutes 80% of the total RNA. It is a polymer with varied length from 120 – 3000 nucleotides and gives ribosomes their shape.
3. Genes for rRNA are highly conserved and employed for phylogenetic studies.

19. C_4 plants are more advantageous than C_3 plants because of the following reasons:

1. Though C_4 plants require 30 ATP for synthesis of 1 glucose molecule in comparison to C_3 plants which require only 18 ATP, C_4 cycle is more efficient.
2. The number of CO_2 molecules fixed by C_4 cycle at a given time is more than that fixed by C_3 Cycle.
3. Fixation of carbon is very important for sugar synthesis though it may require more energy in C_4 plants.
4. C_4 plants are more advantageous than C_3 plants because most of the energy lost during photo respiration in C_3 plants.

SECTION - 4

20. (a) **Significance of Mitosis:**

Exact copy of the parent cell is produced by mitosis (genetically identical).

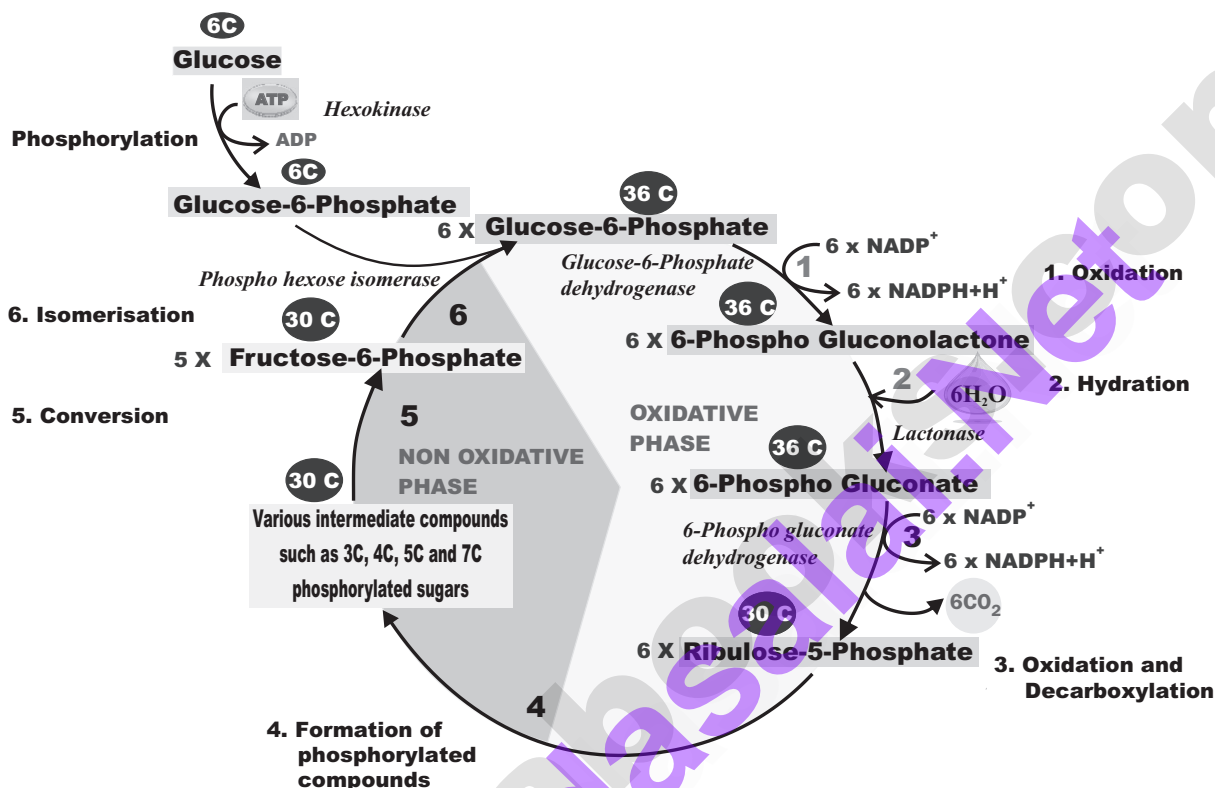
1. Genetic stability – daughter cells are genetically identical to parent cells.
2. Growth – as multicellular organisms grow, the number of cells making up their tissue increases. The new cells must be identical to the existing ones.
3. Repair of tissues - damaged cells must be replaced by identical new cells by mitosis.
4. Asexual reproduction – asexual reproduction results in offspring that are identical to the parent. Eg: Yeast and Amoeba.
5. In flowering plants, structure such as bulbs, corms, tubers, rhizomes and runners are produced by mitotic division. When they separate from the parent, they form a new individual. The production of large numbers of offsprings in a short period of time, is possible only by mitosis. In genetic engineering and biotechnology, tissues are grown by mitosis (i.e. in tissue culture).
6. Regeneration – Arms of star fish

(OR)

(b) **Pentose Phosphate pathway:**

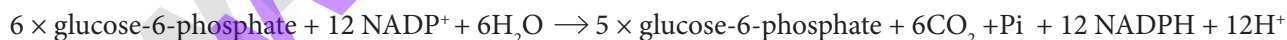
1. During respiration breakdown of glucose in cytosol occurs both by glycolysis (about 2/3) as well as by oxidative pentose phosphate pathway (about 1/3). Pentose phosphate pathway was described by Warburg, Dickens and Lipmann (1938).
2. Hence, it is also called **Warburg-Dickens-Lipmann pathway**. It takes place in cytoplasm of mature plant cells. It is an alternate way for breakdown of glucose.
3. It is also known as Hexose monophosphate shunt (HMP Shunt) or Direct Oxidative Pathway. It consists of two phases, oxidative phase and non-oxidative phase.

4. The oxidative events convert six molecules of six carbon glucose-6-phosphate to 6 molecules of five carbon sugar ribulose-5 phosphate with loss of 6CO₂ molecules and generation of 12 NADPH+ H⁺ (not NADH).



Pentose phosphate pathway or HMP shunt

5. The remaining reactions known as non-oxidative pathway, convert Ribulose-5-phosphate molecules to various intermediates such as ribose-5-phosphate (5C), xylulose 5-phosphate (5C), glyceraldehyde-3-phosphate (3C), sedoheptulose-7-Phosphate (7C), and erythrose-4-phosphate (4C).
6. Finally, five molecules of glucose-6-phosphate is regenerated. The overall reaction is:



The net result of complete oxidation of one glucose-6-phosphate yield 6CO₂ and 12 NADPH + H⁺. The oxidative pentose phosphate pathway is controlled by *glucose-6-phosphate dehydrogenase* enzyme which is inhibited by high ratio of NADPH to NADP⁺.

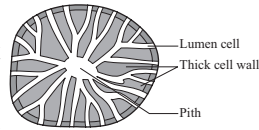
21. (a) Sclereids:

1. Sclereids are dead cells. They are isodiametric but some are elongated too.
2. The cell wall is very thick due to lignification. Lumen is very much reduced.
3. The pits may simple or branched.
4. Sclereids are mechanical in function. They give hard texture to the seed coats, endosperms etc.

Types of Sclereids

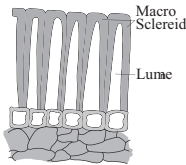
(a) Brachysclereids or Stone cells:

Isodiametric sclereids, with hard cell wall. It is found in bark, pith cortex, hard endosperm and fleshy portion of some fruits. Ex: Pulp of *Pyrus*.



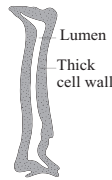
(b) Macrosclereids:

Elongated and rod shaped cells, found in the outer seed coat of leguminous plants. Ex: *Crotalaria* and *Pisum sativum*.



(c) Osteosclereids (Bone cells):

Rod shaped with dilated ends. They occur in leaves and seed coats. Ex: seed coat of *Pisum* and *Hakea*



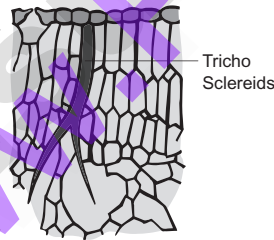
(d) Astrosclereids:

Star cells with lobes or arms diverging from a central body. They occur in petioles and leaves. Ex: *Tea*, *Nymphaea* and *Trochodendron*.



(e) Trichosclereids:

Hair like thin walled sclereids. Numerous small angular crystals are embedded in the wall of these sclereids, present in stems and leaves of hydrophytes. Example: *Nymphaea* leaf and Aerial roots of *Monstera*.



(OR)

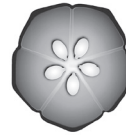
(b) The mode of distribution of placenta inside the ovary is called placentation. Placenta bears the ovules.

Different types as follows:

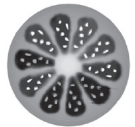
1. **Marginal:** It is with the placentae along the margin of a unilocular ovary. Eg: Fabaceae.



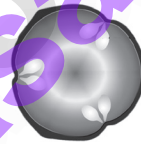
2. **Axile:** The placentae arises from the column in a compound ovary with septa. Eg: *Hibiscus*, tomato, lemon.



3. **Superficial:** Ovules arise from the surface of the septa. Eg: Nymphaeaceae.



4. **Parietal:** It is the placentae on the ovary walls or upon intruding partitions of a unilocular, compound ovary. Eg: Mustard, Argemone, cucumber.



5. **Basal:** It is the placenta at the base of the ovary. Eg: Sunflower, Marigold.



6. **Free-central:** It is with the placentae along the column in a compound ovary without septa. Eg: Caryophyllaceae, Dianthus, Primrose.



11th STD. INSTANT SUPPLEMENTARY EXAM - JULY 2023
PART - III (BIO - ZOOLOGY)

Time Allowed : 3.00 Hours]

(with Answers)

[Maximum Marks : 35

Instructions: (1) Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.

(2) Use **Blue** or **Black** ink to write and underline and pencil to draw diagrams.

PART - II

(Bio-Zoology) (Marks : 35)

SECTION - 1

Note : (i) Answer **all** the questions. (8 × 1 = 8)

(ii) Choose the most appropriate answer from the given **four** alternatives and write the option code and the corresponding answer.

- Which of the following have the highest number of species in nature?
(a) Insects
(b) Birds
(c) Angiosperms
(d) Fungi
- Who coined the term “biodiversity”?
(a) Walter Rosen
(b) AG. Tansley
(c) Aristotle
(d) AP de Candole
- The main function of cuboidal epithelium is :
(a) Protection
(b) Secretion
(c) Absorption
(d) Both (b) and (c)
- Erythroblastosis foetalis is due to the destruction of _____.
(a) Foetal RBCs
(b) Foetus suffers from atherosclerosis
(c) Foetal WBCs
(d) Foetus suffers from minamata

- The end product of ornithine cycle is :
(a) carbon-di-oxide
(b) uric acid
(c) urea
(d) ammonia
- Skeletal muscles are attached to the bones by :
(a) tendon
(b) ligament
(c) pectin
(d) fibrin
- Which part of the human brain is concerned with the regulation of body temperature?
(a) Cerebellum
(b) Cerebrum
(c) Medulla oblongata
(d) Hypothalamus
- The gland, which is related to immunity is _____.
(a) Pineal gland
(b) Adrenal gland
(c) Thymus gland
(d) Parathyroid gland

SECTION - 2

Note : Answer **any four** questions. (4 × 2 = 8)

- Air moving from nose to the trachea passes through a number of structures. List them in the order of the structures.
- Name the different types of Movement seen in human body.
- Differentiate between Peristomium and Prostomium in earthworm.

- 12. Why are villi present in the small intestine and not in the stomach?
- 13. Why is blindspot called so?
- 14. What are the duties of a worker bee?

SECTION - 3

Note: Answer any three questions. Question No. 19 is Compulsory. (3 × 3 = 9)

- 15. Differentiate protonephridia from metanephridia.
- 16. Write the causes for Diabetes mellitus and Diabetes insipidus.
- 17. What are heart sounds? When and how are these sounds produced?
- 18. List the unique features of bird's endoskeleton.
- 19. What is lymph? Write its functions.

SECTION - 4

Note: Answer all the questions (2 × 5 = 10)

- 20. (a) Explain the female reproductive system of frog.

(OR)

- (b) What is ANS? Explain the components of ANS.

- 21. (a) Explain the conditions which create problems in oxygen transport.

(OR)

- (b) Explain the life cycle of Bombyx mori.

ANSWERS

SECTION - 1

- 1. (a) Insects
- 2. (a) Walter Rosen
- 3. (d) Both (b) and (c)
- 4. (a) Foetal RBCs
- 5. (c) urea
- 6. (a) tendon
- 7. (d) Hypothalamus
- 8. (c) Thymus gland

SECTION - 2

- 9. 1. External nostrils 2. Nasal cavity
- 3. Pharynx 4. Larynx
- 5. Trachea

10. Types of movement :

The different types of movements that occur in the cells of our body are amoeboid, ciliary, flagellar and muscular movement.

- 1. Amoeboid movement
- 2. Ciliary movement
- 3. Flagellar movement
- 4. Muscular movement

- 11. 1. In earthworm the first segment of the body called the peristomium has the mouth.
- 2. Overhanging the mouth is a small flap called the upper lip or prostomium.

- 12. 1. The villi are the units of absorption consisting of the lacteal duct in the middle surrounded by a fine network of blood capillaries.
- 2. Digestion is completed in the small intestine and maximum absorption takes place in the small intestine only.
- 3. Hence, the villi are found only in small intestine. A very small amount of substance is absorbed from the stomach

- 13. The optic nerves and the retinal blood vessels enter the eye slightly below the posterior pole, which is devoid of photo receptors; hence this region is called blind spot.

- 14. 1. Each worker has to perform different types of work in her life time.
- 2. During the first half of her life, she becomes a nurse bee attending to indoor duties such as secretion of royal jelly, prepares bee-bread to feed the larvae, feeds the queen, takes care of the queen and drones, secretes bees wax, builds combs, cleans and fans the bee hive.
- 3. Then she becomes a soldier and guards the bee hive. In the second half her life lasting for three weeks, she searches and gathers the pollen, nectar, propolis and water.

SECTION - 3

15.

	Protonephridia	Metanephridia
1.	It consists of tubular excretory structures which end in specialised cells such as flame cells inside the body and open out by means of excretory pores.	They are excretory glands with a ciliated funnel like opening into the body cavity and connected to a duct which opens outside the body.
2.	It mainly helps in osmoregulation.	It helps in excretion and osmoregulation
3.	It is found in acoelomates and coelomates. Eg: Flat worms	It is found in coelomates only Eg: Annelids, Arthropods.
4.	They are primitive in nature.	They are advanced than protonephridia.

16. Diabetes mellitus:

1. Diabetes mellitus is otherwise known as Hyperglycaemia.
2. It is caused due to reduced secretion of insulin. As the result, blood glucose level is elevated. Diabetes mellitus is of two types, Type I Diabetes and Type II Diabetes.
3. Type I diabetes (or) Insulin dependent diabetes, caused by the lack of insulin secretion due to illness or viral infections.
4. Type II diabetes (or) Non-Insulin dependent diabetes, caused due to reduced sensitivity to insulin, often called as insulin resistance.
5. **Symptoms :**
 - (i) Polyurea (excessive urination),
 - (ii) Polyphagia (excessive intake of food),
 - (iii) Polydipsia (excessive consumption liquids due to thirst),
 - (iv) Ketosis (breakdown of fat into glucose results in accumulation of ketone bodies) in blood.

Diabetes insipidus :

1. It is caused due to hyposecretion of vasopressin (ADH) from neurohypophysis.
2. **Symptom :** Frequent urination (polyurea) and excessive consumption of liquids due to thirst (polydipsia).

17.

1. Rhythmic contraction and expansion of heart is called heart beat.
2. The contraction of the heart is called systole and the relaxation of the heart is called diastole.
3. The heart normally beats 70-72 times per min in a human adult.
4. During each cardiac cycle two sounds are produced that can be heard through a stethoscope.
5. The first heart sound lub is associated with the closure of the tricuspid and bicuspid valves at the beginning of ventricular systole whereas second heart sound dub is associated with the closure of the semilunar valves at the end of ventricular systole. These sounds are of clinical diagnostic significance.

18. 1. The endoskeleton is fully ossified (bony).
 2. The long bones are hollow with air cavities (pneumatic bones).
 3. It helps to fly in air with low weight. (2nd point continuation)
19. About 90% of fluid that leaks from capillaries eventually seeps back into the capillaries and the remaining 10% is collected and returned to blood system by means of a series of tubules known as lymph vessels or lymphatics. The fluid inside the lymphatics is called lymph.

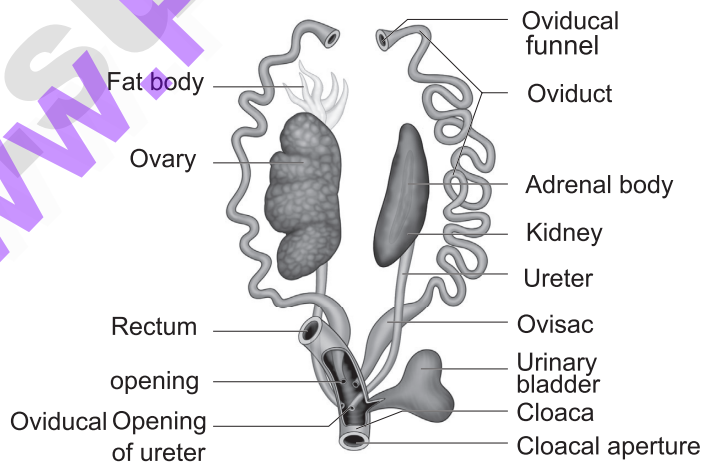
Functions of lymph :

1. The narrow passages in the lymph nodes are the sinusoids that are lined with macrophages. The lymph nodes successfully prevent the invading microorganisms from reaching the blood stream.
2. Fats are absorbed through lymph in the lacteals present in the villi of the intestinal wall.

SECTION - 4

20. (a) Female reproductive system of frog:

- (i) The Female frog consists of paired ovaries, attached to the kidneys, and dorsal body wall by folds of peritoneum called mesovarium.
- (ii) There is a pair of coiled oviducts lying on the sides of the kidney.
- (iii) Each oviduct opens into the body-cavity at the anterior end by a funnel like opening called ostia.
- (iv) Unlike the male frog, the female frog has separate genital ducts distinct from ureters. Posteriorly the oviducts dilated to form ovisacs before they open into cloaca.
- (v) Ovisacs store the eggs temporarily before they are sent out through the cloaca. Fertilization is external.



Female reproductive system of frog

(OR)

- (b) The autonomic neural system is auto functioning and self governed. It is a part of peripheral neural system that innervates smooth muscles, glands and cardiac muscle. This system controls and coordinates the involuntary activities of various organs. ANS controlling centre is in the hypothalamus.

Autonomic neural system comprises the following components:

1. Preganglionic neuron whose cell body is in the brain or spinal cord; its myelinated axon exits the CNS as part of cranial or spinal nerve and ends in an autonomic ganglion.
2. Autonomic ganglion consists of axon of preganglionic neuron and cell bodies of postganglionic neuron.
3. Postganglionic neuron conveys nerve impulses from autonomic ganglia to visceral effector organs.
4. The autonomic neural system consists of Sympathetic neural system and Parasympathetic neural system.

21. (a) (i) Higher Altitudes :

When a person travels quickly from sea level to elevations above 8000 ft. The individual responds with symptoms of acute mountain sickness (AMS) - headache, shortness of breath, nausea and dizziness due to poor binding of O₂ with haemoglobin. This is because the atmospheric pressure and partial pressure of oxygen are low at high altitudes. When the person moves on a long-term basis to mountains from sea level the body begins to make respiratory and haematopoietic adjustments. To overcome this situation kidneys accelerate production of the hormone erythropoietin, which stimulates the bone marrow to produce more RBCs.

(ii) Deep Sea :

When a person descends deep into the sea, the pressure in the surrounding water increases which causes the lungs to decrease in volume. This increases the partial pressure of the gases within the lungs. It also tends to drive additional oxygen into the circulation. The risk is that increased pressure can also drive nitrogen gas into the circulation. This increase in blood nitrogen content can lead to nitrogen narcosis.

When the diver ascends to the surface too quickly a condition called 'bends' occurs. Nitrogen comes out of solution while still in blood forming bubbles. Small bubbles in the blood are not harmful, but large bubbles can lodge in small capillaries, blocking blood flow or can press on nerve endings. Decompression sickness is associated with pain in joints and muscles and neurological problems including stroke. The risk of nitrogen narcosis and bends is common in scuba divers.

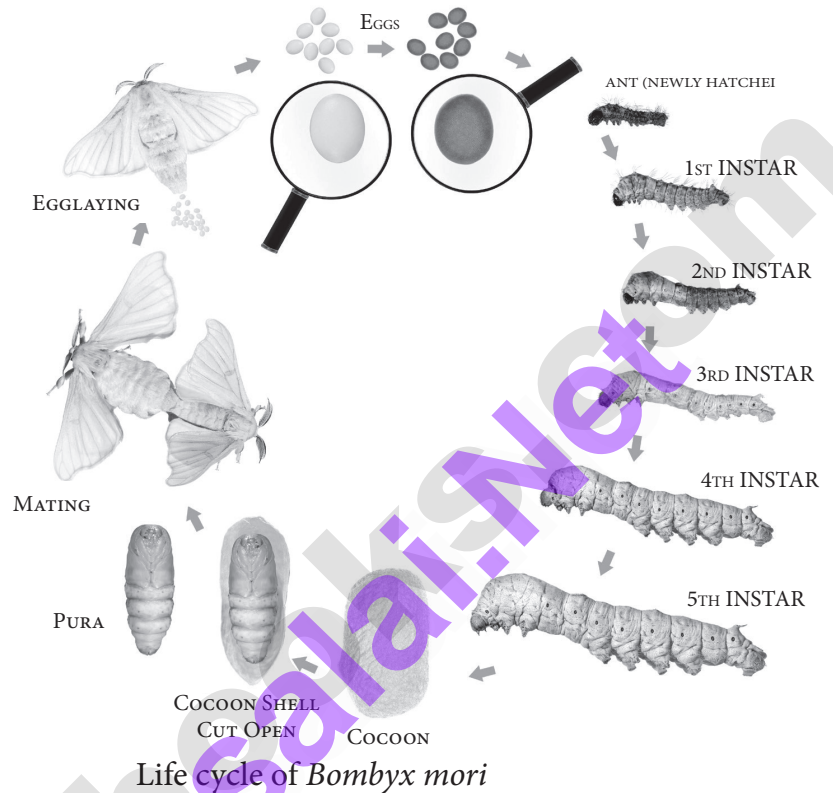
Carbon-di-oxide poisoning :

During carbon-dioxide poisoning, the demand for oxygen increases. As the O₂ level in the blood decreases it leads to suffocation and the skin turns bluish black.

(OR)

(b)

1. The adult *Bombyx mori* is about 2.5 cm in length and pale creamy white in colour.
2. Due to heavy body and feeble wings, flight is not possible by the female moth. This moth is unisexual in nature and does not feed during its very short life period of 2-3 days.
3. Male moth copulates with female for about 2-3 hours and if not separated, they may die.
4. A single female moth lays 400 to 500 eggs depending upon the climatic conditions. Two types:
 - (i) Diapause type: Laid by silkworms inhabiting the temperate regions
 - (ii) Non-diapause type: Laid by silk worms inhabiting subtropical region like India.



5. The eggs after ten days of incubation hatch into larva called as caterpillar.
6. The newly hatched caterpillar is about 3 mm in length and is pale, yellowishwhite in colour.
7. The caterpillars are with well developed mandibulate type of mouth-parts to feed easily on the mulberry leaves.
8. After 1st, 2nd, 3rd and 4th moultings caterpillars get transformed into 2nd, 3rd, 4th and 5th instars respectively. It takes about 21 to 25 days after hatching.
9. The fully grown caterpillar is 7.5 cm in length and develops salivary glands, stops feeding and undergoes pupation.
10. The caterpillars stop feeding and move to the corner of the leaves and secretes a sticky fluid by their silk gland.
11. The secreted fluid comes out through spinneret (a narrow pore situated on the hypopharynx) and forms silk thread which hardens on exposure to air and is wrapped around the body of caterpillar in the forms of a covering called as cocoon.
12. It is the white coloured bed of the pupa whose outer threads are irregular while the inner threads are regular.
13. The length of thread for the formation of cocoon is about 1000-1200 metres which takes 3 days to complete.
14. The pupal period lasts for 10 to 12 days and the pupae comes out as a adult moth.

