7 Structural Organisation in Animals

We often saw monkeys hanging and swinging from trees by their tails. These specially adapted tails can be used for a variety of tasks, such as gathering food, climbing, and holding objects. For them It's like having an extra arm. This is how the structure of an animal helps in its day-to-day activities.

Topic Notes

- *Body Organisation*

BODY ORGANISATION 1

TOPIC 1

FROG

Probably the best example of an amphibian that you remember right from your childhood is the frog. Did you know that just like the butterfly, a frog also undergoes complete metamorphosis?

From a tadpole that lives in water, breathes through gills and has a tail. In the period of time, that same organism develops an organ system which helps them to survive in terrestrial habitat.

The frog is selected as a type of animal to introduce the student to vertebrates due to the following reasons:

(1) It is easily available.

(2) Its anatomy and physiology can be conveniently demonstrated to students because of the larger size of the body organs.

(3) The study of frog reveals as to how fish-like animals got evolved into amphibia, the first land vertebrates.

Frog

Systematic Position of Frog

Phylum	–	Chordata
Sub-phylum	–	Vertebrata
Class	–	Amphibia
Order	–	Anura
Family	–	Ranidae
Genus	–	*Rana*
Species	–	*tigrina*
Common name	–	Indian frog

Frogs belong to Class Amphibia of Phylum Chordata. Common Indian species of frog is *Rana tigrina*. They are poikilotherms/cold-blooded, *i.e.* their body temperature varies according to the environment.

Camouflage/Mimicry is the feature in which they have a protective colouration to keep their predators away from them. They play a crucial role in the ecosystem's food chain and food web.

Rana tigrina is the most widely distributed species in North India. Generally, frogs are found in ponds, tanks, pools, ditches, etc. However, they may leave their habitat and come on land to hunt for their prey. The frog not only breeds in water but also passes their early life there. The frog is called an amphibious animal because it lives both in water and on land.

Frogs are not seen during extreme heat and cold conditions as they hide in deep burrows to protect themselves. This phenomenon is termed as aestivation (summer sleep) and hibernation (winter sleep).

Important

➥ *Frog never drinks water but absorb it through the skin. Frogs mainly respire through their skin, they occasionally go into the water to moisten their skin, which is a very essential factor for such respiration.*

Morphology of Frog

(1) Texture of skin is smooth and slippery because of the presence of mucus.

(2) Body is divided into a head and a trunk. Neck and tail are absent. A pair of nostrils is present above the mouth.

(3) Nictitating membrane is the membrane that covers bulged eyes and protects them in water.

(4) Membranous tympanum (ear) receives sound signals.

(5) Swimming is made easy with the presence of webbed digits in feet. Hind limbs have five digits and are larger and more muscular as compared to forelimbs. Forelimbs have four digits and have a copulatory pad or nuptial pad on the first digit in males only. Function of forelimbs and hind limbs is to help in swimming, walking, leaping and burrowing.

(6) Frogs exhibit sexual dimorphism. During the breeding season, the male frog makes a peculiar sound with the help of their vocal sacs (known as croaking) to call the female.

Important

➥ *The frog shed off almost once a month its skin during its active life in the form of small castings. This phenomenon is known as moulting.*

➥ *The frog is capable of changing its body colour, gradually, with the change in its surroundings and climatic conditions. The phenomenon is known as protective colouration or metachrosis.*

Anatomy of Frog

Digestive system

The digestive system consists of a short alimentary canal (reduced intestine as frogs are carnivores) and digestive glands.

Following are the parts of the alimentary canal:

(1) **Mouth:** It is a wide anteriormost opening leading to a spacious buccopharyngeal cavity.

(2) **Buccopharyngeal cavity:** It is called so because the buccal cavity and pharynx have been merged into one cavity.

(3) **Oesophagus:** A short tube opening into the stomach, leading to intestine and rectum, and finally opens outside through cloaca.

(4) **Bilobed tongue:** For capturing food.

(5) **Stomach:** The stomach is divided into two parts:
(i) **Cardiac Stomach:** The anterior larger part is present near the heart.
(ii) **Pyloric Stomach:** It is the posterior narrow tapering part, which is separated from the duodenum by a muscular constriction.
It secretes HCl and gastric juice for digestion.

(6) **Small intestine:** It is the longest part of the alimentary canal suspended by mesentery, and divisible into two parts, *i.e.* Duodenum and Ileum. Duodenum receives chyme (partially digested food from stomach), bile from gall bladder and pancreatic juices from pancreas through common bile duct.

(7) **Rectum (Large intestine):** The ileum leads into a broad, thin-walled short but wider tube, known as rectum or large intestine. The rectum stores the faecal matter and water is absorbed by its wall.

(8) **Cloaca:** It is the last part of alimentary canal. The urinary bladder opens into cloaca. The cloaca opens out through a cloacal aperture, situated at the posteriormost end of abdomen.

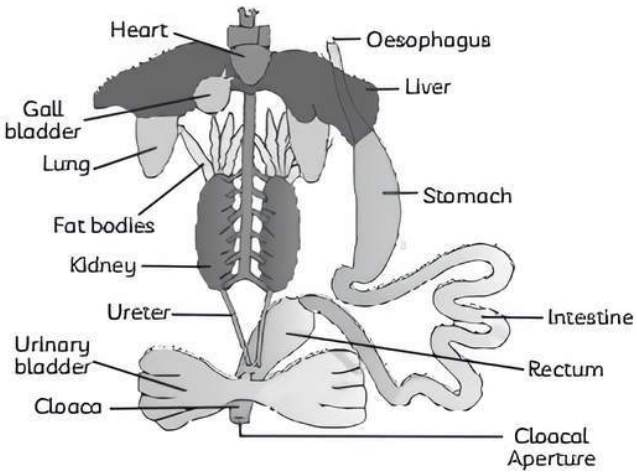
Following are the digestive glands of digestive system:

(1) **Liver:** It is the largest gland of the body. It secretes bile stored by gall bladder. Bile emulsifies fat.

(2) **Pancreas:** It is a branched flat elongated pale yellow gland lying in mesentery extended in the loop between stomach and duodenum. The pancreas is made up of lobules, connective tissues and inner core of islets of Langerhans. It produces digestive juice containing digestive enzymes. Pancreatic juice digest carbohydrates and proteins.

Important

➥ *Villi and microvilli: Finger-like folds in inner walls of intestine which increase absorption area.*



Diagrammatic representation of internal organs of frog showing complete digestive system

Respiratory system

Being amphibious in nature, the frog can utilise free oxygen and also the dissolved oxygen in water The adult frog respires in three different manners:

(1) **Cutaneous respiration:** The skin of a frog provides an extensive surface for the exchange of gases. It is thin, richly supplied with blood and kept moist by the mucus and water. The cutaneous respiration is always carried out. During hibernation and aestivation, it is the only method of respiration in a frog.

(2) **Buccopharyngeal respiration:** This type of respiration occurs when the animal is on the land or partially immersed in water. There are two external nares situated at the tips of the snout. Each naris (nostril) leads into a nasal chamber that opens into the buccopharyngeal cavity by an internal naris.

(3) **Pulmonary respiration:** It is less frequent than the cutaneous and buccopharyngeal respiration. It occurs when need for oxygen is increased. It occurs by lungs.

Lungs: Elongated sac-like structures, air enters through nostrils into the buccal cavity and then to lungs.

Blood vascular (Circulatory) system

(1) Blood vascular system is of closed type as the blood flows in the blood vessels. It represents

single circulation. It means both oxygenated and the deoxygenated blood enters the heart and gets mixed in the ventricle.

(2) Blood vascular system comprises blood, heart and blood vessels. The blood is a mobile connective tissue, composed of a fluid, the plasma and the cells and the blood corpuscles.

(3) Heart is three-chambered consisting of two atria and one ventricle. It is covered by pericardium (membrane).

(4) Sinus venosus (triangular structure) joins the right atrium which receives blood through vena cava. Ventricle joins conus arteriosus (sac-like).

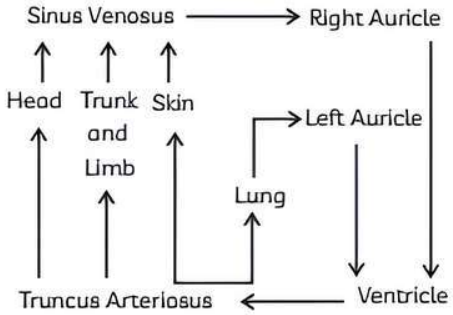
(5) Arterial system carries the blood to all parts of the body by arteries.

(6) Venous system carries blood from different parts of the body to heart through veins.

(7) Blood contains plasma, RBCs (red blood cells) or erythrocytes, WBCs (white blood cells) or leucocytes and platelets. RBCs are nucleated and contain haemoglobin. Blood transports nutrients, gases and water.

(8) Venous connection between the liver and intestine is called hepatic portal system and that between the kidney and lower parts of the body is called renal portal system.

Blood circulation: It can be represented by the following graphical flow chart:



Control and coordination system

Control and coordination system of frogs is highly evolved. It includes both neural system and endocrine glands. The pituitary, thyroid, parathyroid, thymus, pineal body, pancreatic islets, adrenals, and gonads are the most significant endocrine glands in frogs.

Nervous system

Nervous system of a frog consists of:

(1) Central nervous system

(i) Brain: Enclosed in cranium (bony brain box), composed of three parts, i.e. Forebrain which consists of olfactory lobe, cerebral hemisphere and diencephalon. Midbrain consists of optic lobes and Hindbrain consists of cerebellum and medulla oblongata.

(ii) Spinal cord: Located in the vertebral column and joins the medulla oblongata via foramen magnum of the cranium.

(2) Peripheral nervous system: It consists of cranial nerves (10 pairs, arise from brain) and spinal nerves (9 pairs).

(3) Autonomic nervous system: It includes the nerves and ganglia that control and coordinate such organs which are not under voluntary control. It comprises sympathetic and parasympathetic nervous systems.

Sense Organs

Sense organs receive stimuli (changes in environment) from the outside or inside of the animals and pass impulses to the nervous system. Frog has five types of sense organs:

(1) Tangoreceptor: Organs of touch – Sensory papillae

(2) Olfactoreceptors: Organs of smell – Nasal epithelium

(3) Gustatoreceptors: Organs of taste – Taste buds.

(4) Photoreceptors: Organs of vision or sight – Eyes

(5) Statoacoustic receptors: Organs of hearing and balancing – Tympanum with internal ears.

Reproductive system

Frogs have well-organised male and female reproductive systems and exhibit dimorphism. In male frogs, vocal sacs and copulatory pads or nuptial pads are present. In female frogs, vocal sacs and copulatory pads are absent.

Male reproductive system of a frog consists of:

(1) Ovoid testes

(2) Mesorchium: Testis attached to the upper part of the kidneys by a double fold of peritoneum known as the Mesorchium.

(3) Vasa efferentia: Rise from testes and are 10 to 12 in number.

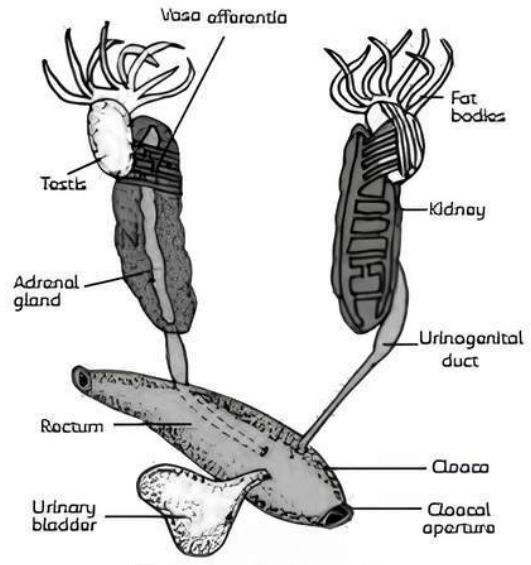
(4) Bidder's canal: Vasa efferentia arrive on the side of the kidneys and open into Bidder's Canal.

Female reproductive system of a frog consist of:

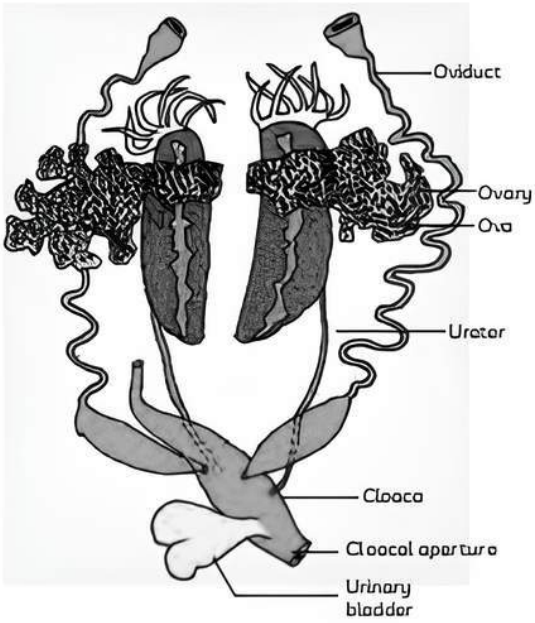
(1) A pair of ovaries are located near the kidneys but have no functional relationship with them.

(2) A pair of oviducts open into the cloaca separately.

At any given time, a mature female can lay between 2,500 and 3,000 ova. Fertilization occurs in water and is done externally. Development is indirect, it involves a larval stage called tadpole. Tadpole undergoes metamorphosis to form an adult.



Male reproductive system

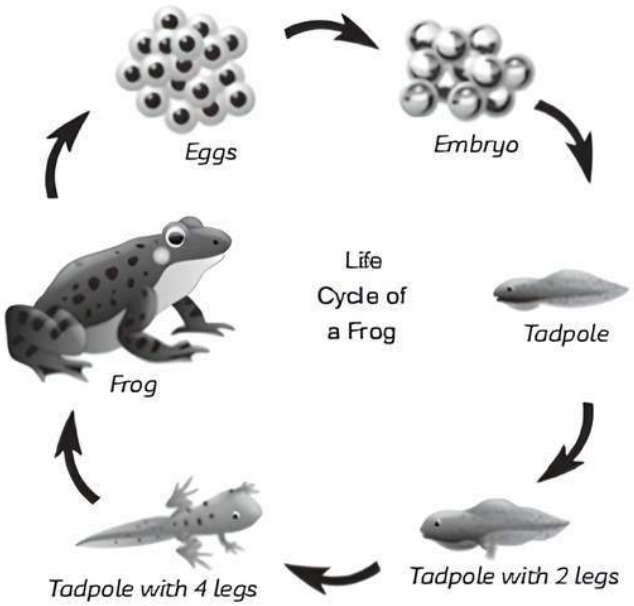


Female reproductive system

Importance of Frogs

They eat insects and protect the crop, maintain ecological balance as they serve as an important link of food chain and food web in the ecosystem. The muscular legs of the frog are consume as food by men in some countries.

Frogs were exported in large quantities but it is now legally banned. Froglets (very small frogs) are used as fish bait. Due to habitat loss and large scale use of this animal, it has become a threatened species. Since the frog is an important animal in the food chain, it helps to maintain our ecosystem. So, it should be protected. Use of frogs for dissection purposes is banned by the animal welfare organisation.



Life cycle of a frog

OBJECTIVE Type Questions

[1 mark]

Multiple Choice Questions

1. The layers of the dermis of a frog are:

(I) Spongiosum
(II) Megaspongiosum
(III) Microspongiosum
(IV) Compactum

Select the correct option:

(a) (I) and (II) (b) (II) and (III)
(c) (I) and (IV) (d) All of these

Ans. *(c) (I) and (IV)*

Explanation: The layers of the dermis of a frog are:

(1) The upper layer is stratum spongiosum
(2) The lower layer is stratum compactum.

2. The number of heart chambers in the frog is:

(a) one (b) two
(c) three (d) four

Ans. *(c) Three*

Explanation: In frogs, the number of heart chambers is three consisting of two auricles and one ventricle. Heart of frogs is covered by pericardium membrane.

3. In frogs, the number of cranial and spinal nerves are:

(a) ten and nine, respectively
(b) ten pairs and nine pairs, respectively
(c) nine and ten, respectively
(d) nine pairs and ten pairs, respectively

Ans. *(b) ten pairs and nine pairs, respectively*

Explanation: The peripheral nervous system of a frog consists nerves which arise from the central nervous system and extending into the organs of the body. Ten pairs of cranial nerves arise from the brain and nine pairs of spinal nerves supply the trunk and limb regions.

4. Which layer of the skin in frogs contains poison glands?

(a) Stratum spongiosum

(b) Stratum corporum

(c) Stratum compactum

(d) Stratum spongifera

Ans. *(a) Stratum spongiosum*

Explanation: Stratum spongiosum layer of the skin in frogs contains poison glands. These glands are used for the protection from predators as they produce a wide variety of compounds that are toxic to potential predators as well as humans. Poisonous amphibians are often bright and colourful to warn potential predators.

5. Which of the following features are shown by *Rana tigrina*?

(I) Poikilotherms **(II) Camouflaging**

(III) Aestivation **(IV) Hibernation**

Select the correct option:

(a) Only (I) **(b) (I) and (III)**

(c) Only (IV) **(d) All of these**

Ans. *(d) All of these*

Explanation: The common Indian species of frog is *Rana tigrina*. They are poikilotherms/ cold-blooded, *i.e.* their body temperature varies according to the environment. Camouflage/ Mimicry is the feature in which they have a protective colouration to keep their adversaries at bay. They play a crucial role in the ecosystem's food chain and food web.

Frogs are not seen during extreme heat and cold conditions as they hide in deep burrows to protect themselves. This phenomenon is termed as aestivation (summer sleep) and hibernation (winter sleep).

6. Which of the following given statement(s) is/are wrong in the case of frog?

(I) Tympano sacs raise pitch of the sound during croaking.

(II) Tongue is used to capture the prey.

(III) Colour of the skin is imparted by pigment cells.

Select the correct option:

(a) Only (I) **(b) (I) and (III)**

(c) Only (II) **(d) All of these**

Ans. *(a) Only (I)*

Explanation: Out of all the statements mentioned above, statement (I) is wrong and it can be corrected as: Vocal sacs raise the pitch of the sound during croaking.

7. Which of the following are the modes of locomotion in frogs?

(a) Swimming **(b) Leaping**

(c) Walking **(d) All of these**

Ans. *(d) All of these*

Explanation: The frog usually shows three types of locomotion:

(1) **Swimming:** The body of the frog is boat-shaped. During swimming, the hind limbs are alternately folded and strengthened quickly. The backward stroke of hind limbs pushes the body forward and thus, the animal swims.

(2) **Leaping:** The frog moves on land by leaping. In leaping, the hind limbs are folded and strengthened alternately. When the hind limbs are extended, the frog's body is pushed forward and upward in the air.

(3) **Walking:** During walking, each limb is lifted, swing forward and placed on the ground again.

8. ..... is the hormone which helps in the metamorphosis of a tadpole.

(a) Aldosterone **(b) Thyroxine**

(c) Calcitonin **(d) Cortisol**

Ans. *(b) Thyroxine*

Explanation: Metamorphosis is the process of transformation of an animal with two or more distinct stages. During a frog's metamorphosis, an egg will hatch into a tadpole, which will then develop back legs first, then front legs, and become a full-grown adult frog. The process of metamorphosis is stimulated by a hormone called thyroxine.

9. Which of these describes the skin of a frog?

(I) Thick **(II) leathery**

(III) Smooth **(IV) Slippery**

(V) Hard **(VI) Dry**

Options:

(a) (I), (II) and (III) **(b) (II), (III) and (IV)**

(c) (III) and (IV) **(d) (V) and (VI)**

Ans. *(b) (II), (III) and (IV)*

Explanation: The skin of a frog is smooth and slippery due to the presence of mucus. The skin has a moist characteristic which is maintained. A frog does not drink water but has the ability to absorb water through its skin.

10. **Which of these statements is true with respect to the anatomy of a frog?**

(a) The oviduct and ureters are merged in a female frog.

(b) The urinary and genital ducts are separate in male frogs.

(c) The urinary bladder is ventral to the rectum.

(d) Frogs are uricotelic.

Ans. *(c) The urinary bladder is ventral to the rectum*

Explanation: In frogs, the urinary bladder is thin -walled and is situated ventral to the rectum. In female frogs, the oviduct and ureters are separate, whereas, in male frogs, the urinary and genital ducts fuse to form urinogenital ducts.

11. **Which of these statements is true about the frog?**

(a) It lives both on land and in seawater.

(b) They cannot survive in freshwater.

(c) *Rana tigrina* is a rare species.

(d) They belong to the Class Amphibia.

Ans. *(d) They belong to the Class Amphibia.*

Explanation: Frog belongs to Class Amphibia. It lives on land and in freshwater. The species *Rana tigrina* is the most common in India. Frogs are chordates and are poikilotherms. This means they do not have a constant body temperature

12. **Statement A: The frog is a warm-blooded animal.**

Statement B: Frog's body temperature changes with the temperature of its surroundings.

(a) Both A and B are correct.

(b) Both A and B are incorrect.

(c) Only A is correct.

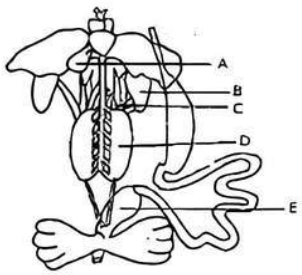
(d) Only B is correct.

Ans. *(b) Only B is correct.*

Explanation: The frog is a poikilotherm or animal with cold blood. As the temperature of their environment fluctuates, so does their body temperature. This is a result of the food's delayed oxidation in its tissues.

13. **The figure given here shows a diagrammatic representation of the internal organs of a frog.**

Identify A to E and select the correct option.



	A	B	C	D	E
(a)	Gall bladder	Liver	Ovary	Testis	Rectum
(b)	Liver	Pancreas	Fat bodies	Testis	Gall bladder
(c)	Pancreas	Lung	Testis	Kidney	Liver
(d)	Gall bladder	Lung	Fat bodies	Kidney	Rectum

Ans. *(d) A - Gall-bladder; B - Lung, C - Fat bodies; D - Kidney; E - Rectum*

Explanation: The parts labelled are as follows:

A - Gall-bladder

B - Lung

C - Fat bodies

D - Kidney

E - Rectum

Assertion-Reason (A-R)

Given below are two statements labelled as Assertion (A) and Reason (R). Select the most appropriate answer from the options given below:

(a) Both A and R are true and R is the correct explanation of A

(b) Both A and R are true but R is not the correct explanation of A.

(c) A is true but R is false.

(d) A is false but R is true.

14. **Assertion (A): Frogs are dioecious.**

Reason (R): Thus, they are referred as hermaphrodites.

Ans. *(c) A is true but R is false.*

Explanation: Frogs are not considered as hermaphrodites (bisexual) because they have well-developed male and female reproductive organs in separate individuals (dioecious). They show sexual dimorphism.

⚠ Caution

- *Students usually get confused with terms hermaphrodite, bisexual and dioecious.*
- *Hermaphrodite - An organism that has both male and female sex organs. It can also be called as bisexual. Whereas dioecious organisms have either male or female sex organs.*

15. **Frogs play a central role in many ecosystems. They control the insect population, and they're a food source for many larger animals. To keep things in balance, frogs use lots of survival tools. Some run away, play dead or swell up when threatened. Others have more sophisticated defences. Many use colour as a warning or as camouflage. For example, the four-eyed frog, Physalaemus nattereri, has two spots**

that look like eyes near its back legs. It shows these spots to predators, making it look like a more threatening animal.

Assertion (A): Frogs maintain ecological balance.

Reason (R): They are an important part of the food chain.

Ans. *(a) Both A and R are true and R is the correct explanation of A.*

Explanation: Frogs help to maintain ecological balance by forming an important part of the food chain. Throughout their life cycle, they act as both predators and prey. As tadpoles, they eat algae, helping regulate blooms and reducing the chances of algal contamination. Once full-grown, they feed on lots of insects, which help to control bug populations.

16. Assertion (A): Frogs are important for mankind.

Reason (R): Frogs eat insects and protect the crop.

Ans. *(a) Both A and R are true and R is the correct explanation of A.*

Explanation: Frogs are advantageous to humans because they consume insects and protect crops. Frogs help to preserve ecological balance by acting as a vital link in the ecosystem's food chain and food web. Man consumes the muscular legs of frogs in several regions.

17. Assertion (A): There is a hepatic portal system in frogs.

Reason (R): It is a venous connection between the liver and intestine.

Ans. *(a) Both A and R are true and R is the correct explanation of A.*

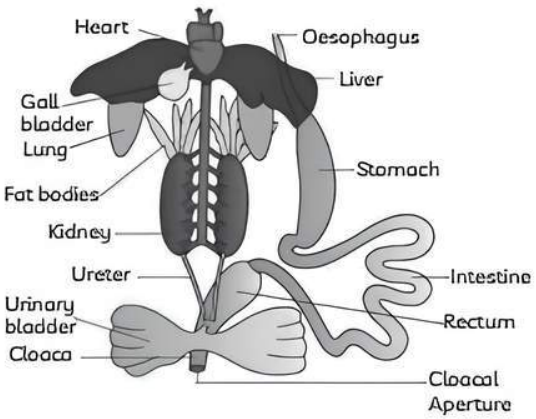
Explanation: The venous system in frogs has a hepatic portal system. The alimentary canal and its accompanying glands send blood to the liver via this route. It is made up of a big hepatic portal vein that receives tributaries from a variety of organs.

CASE BASED Questions (CBQs)

[4 & 5 marks]

Read the following passages and answer the questions that follow:

18. *The given diagram represents the internal organs of a frog showing a complete digestive system.*



(A) Choose the correct statement from the following:

(a) The tongue of a frog is trilobed.

(b) The digestive system of a frog is similar to digestive system of humans in certain structures.

(c) The alimentary canal of a frog is large.

(d) Nutrients from the digested food are absorbed in the large intestine.

(B) Which of the following character is considered as unique and distinguishing as well as sexual character of a male frog?

(a) Presence of a webbed digits

(b) Presence of a copulatory pad

(c) Presence of a Reissner's membrane

(d) Presence of a membranous pharynx

(C) Which is the largest organ in the digestive system of frogs?

(a) Liver (b) Lungs

(c) Mouth (d) Large intestine

(D) **In frogs, two more patches of teeth seen on one either side of the median line of the roof of the buccal cavity called as ..... .**

(a) molar **(b) premolar**

(c) vomerine **(d) cannine**

(E) **Frog's eyes are generally covered by ..... membrane.**

(a) camouflage **(b) copulatory**

(c) nictitating **(d) tympanum**

Ans. (A) *(b) The digestive system of a frog is similar to digestive system of humans in certain structures.*

Explanation: The digestive system of frogs is very similar to that of humans. Both have a mouth, buccal cavity, pharynx, oesophagus, stomach, small intestine and large intestine.

Related Theory

- *The tongue of a frog is bilobed, and around one-third the length of its body, which enables them to catch its prey. The long, sticky tongue wraps the entire insect and then pulls it down the throat so they cannot chew the food.*
- *Since frogs are carnivorous organisms, the length of their alimentary canal is reduced.*
- *The final digestion of food takes place in the small intestine. After this, the nutrients are absorbed by villi and microvilli (small microscopic projections in the small intestine). The undigested food moves onto the rectum and is finally removed outside through the cloaca.*

(B) *(b) Presence of a copulatory pad*

Explanation: Male frogs can be distinguished by the presence of sound producing vocal sacs and also a copulatory pad on the first digit of the forelimbs which are absent in female frogs.

(C) *(a) Liver*

Explanation: The largest organ in the digestive system of frogs is liver. Unlike the human liver, which is composed of four lobes, the liver of a frog has three lobes, *i.e.* the right lobe, the left anterior lobe, and the left posterior lobe. It produces bile that breaks down the food that a frog eats and this bile is stored by the gall bladder.

(D) *(c) vomerine*

Explanation: In frogs, teeth are premaxillary, maxillary which is arranged in a row and a pair of a patch of vomerine teeth seen on one either side of the median line of the roof of the buccal cavity. The vomers also comprise two groups of vomerine teeth. These teeth are not utilised to chew but check the escape of captured prey.

(E) *(c) nictitating*

Explanation: Frog's eyes are generally covered by a nictitating membrane which protects them when they are in the water. It also helps in keeping the eyes moist when the frog is on land.

19. *Frogs can live both on land and in freshwater and belong to the Class Amphibia of Phylum Chordata. The most common species of frog found in India is Rana tigrina.*

Frogs are poikilotherms and show the ability to camouflage and mimicry. Frogs are not seen during peak summer and winter.

The skin of a frog is smooth and slippery due to the presence of mucus and is always maintained in a moist condition. The colour of dorsal side of body is generally olive green with dark irregular spots. On the ventral side, the skin is uniformly pale yellow. Body of a frog is divisible into head and trunk. A neck and tail are absent. Above the mouth, a pair of nostrils is present. Eyes are bulged and covered by a membrane that protects them while in water. On either side of eyes, a membranous tympanum (ear) receives sound signals. The forelimbs and hind limbs help in swimming, walking, leaping and burrowing. The hind limbs end in five digits and they are larger and more muscular than forelimbs which end in four digits. Feet have webbed digits that help in swimming. Frogs exhibit sexual dimorphism.

(A) The digestive system of frogs is made of various parts. Arrange and provide their names in an orderly sequence from the beginning to the terminal portion.

(B) Frogs are poikilotherms. What is the meaning of this term?

(C) What is the meaning of camouflage and mimicry?

Ans. (A) The digestive system of frogs begins from the mouth and ends at the cloaca. Thus, the correct orderly sequence is:

Mouth → Buccal cavity → Oesophagus → Stomach → Intestine → Rectum → Cloaca → Cloacal aperture

(B) Frogs are poikilotherms; it means body temperature in these animals varies with the variation in temperature of the environment. Such animals are also called as cold-blooded animals.

(C) The ability of the animals to change their colour to hide from the enemies is referred as camouflage and this protective colouration is called as mimicry.

VERY SHORT ANSWER Type Questions (VSA)

[1 mark]

20. Name some common Indian species of frogs.

Ans. (1) *Rana tigrina:* Largest species of India.
(2) *Rana cyanophlyctis:* Found in Rajasthan, UP and MP.
(3) *Rana malabarica:* Common in Maharashtra.

21. Which type of blood circulatory system is present in frogs?

Ans. Closed type of blood circulatory system is present in frogs.

Related Theory

The circulatory system of a frog is well-developed. It also has a lymphatic system. The blood vascular system includes the heart, blood and blood vessels. The lymphatic system consists of lymph, lymph channels and lymph nodes.

22. A mature female frog can lay how many ova at a time?

Ans. 2,500 to 3,000 ova at a time.

SHORT ANSWER Type-I Questions (SA-I)

[2 marks]

23. Trisha performed an experiment with the head region of a frog but she doesn't know much about this. What do you know about the head region of a frog?

Ans. The head region of frogs is triangular in shape with a blunt snout. It bears several parts, such as:
(1) Mouth
(2) External nares
(3) Eyes
(4) Brow spots
(5) Eardrums on the upper side
(6) Throat on the lower side.

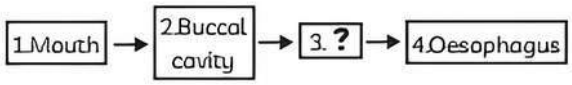
24. You must have heard the word 'amplexus' in biology class. What is its meaning?

Ans. Amplexus is the mating position of amphibians in which the male climbs onto the female's back, grasping her either behind the arms or around the waist. In frogs and toads, this position helps in fertilisation. It is considered as a physical position in which cloacae of both the frogs align at such a position through which sperms and eggs meet easily.

25. Frogs show sexual dimorphism. Justify the statement.

Ans. Frogs show sexual dimorphism. This means that apart from differences in reproductive organs of the two sexes, the appearance or phenotypic characteristics differ with sex within the same animal species.

26. Identify '3' in the pathway of food ingested by a frog.



Ans. Structure 3 is the pharynx. In the digestive system of a frog, the pharynx lies after the buccal cavity and before the oesophagus. The structures larynx, gizzard and crop are not a part of the digestive system of the frog.

SHORT ANSWER Type-II Questions (SA-II)

[3 marks]

27. (A) How many chambers are present in the heart of a frog?
(B) Mention all the endocrine glands found in frogs.
(C) Explain the role of thin and moist skin of amphibians.

Ans. (A) The heart of a frog is a muscular structure located in the upper body cavity. It has three chambers, two atria, and one ventricle, and is surrounded by a pericardium membrane.

(B) Pituitary, thyroid, parathyroid, thymus, pineal body, pancreatic islets, adrenals, and gonads are the most notable endocrine glands found in frogs.

(C) Amphibians such as frogs has extremely thin and moist skin. It is water permeable, which means water can pass through their skin.

Their skin also produces mucus with the help of mucus glands which serves to keep the skin moist and helps in gas exchange, i.e. cutaneous respiration. A layer of mucus on the skin helps keep moisture trapped next to it, and this moisture transfers oxygen into the frog's body. In this way, the different role of skin is extremely important for frogs' well-being.

28. Describe the economic importance of frogs.

Ans. The economic importances of frogs are:

(1) Baby frogs are used as fish baits, (any substance which is used to attract or catch fish).

(2) They feed on insects and help in reducing insect pest population. In this way, they are considered beneficial to man.

(3) Frogs are consumed as food as they have high nutritive value.

(4) Frogs are nature's pharmacy. A painkiller, Epibatidine is 200 times more potent than morphine and is made by some poison dart frogs.

(5) They are used for research in medical science and pharmacology.

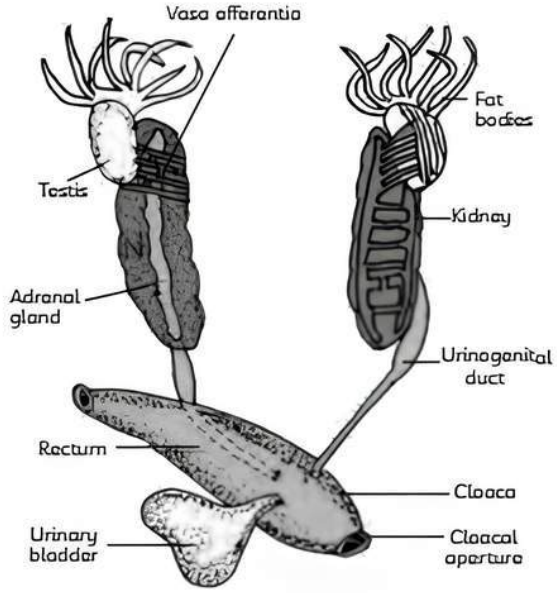
(6) They help to maintain ecological balance by forming an important part of food chain.

LONG ANSWER Type Questions (LA)

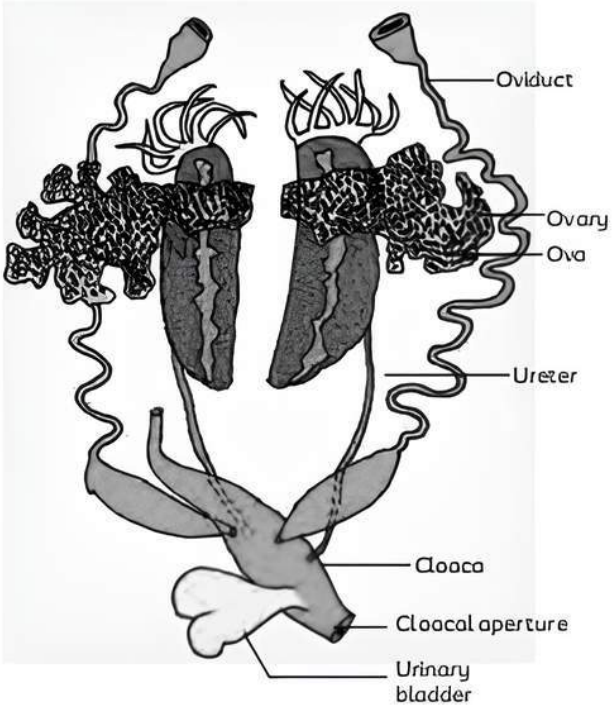
[**4** & **5** marks]

29. Frogs have well-organised male and female reproductive systems. Draw and label both.

Ans.



Male reproductive system



Female reproductive system