

Structural Organisation in Animals

EXAM DRILL

ANSWERS

1. (c) : The bony partition between tympanic cavity (cavity of middle ear) and auditory capsule (internal ear) is perforated by a small window-like oval aperture, the fenestra ovalis, which remains closed by a membrane and a cartilaginous nodule, the stapedial plate.
 2. (a) : The common Indian bull frog *Rana tigrina* lives in or near permanent freshwater lakes, ponds and streams. It lives in the water most of the time. It lives near water mainly for two reasons : (i) To keep skin moist to carry on cutaneous respiration and (ii) To immediately jump or slip into water to escape from enemies.
 3. (b) : In frog, the hindlimbs end in five digits and they are larger and muscular than forelimbs that end in four digits.
- OR
- (d)
 4. (d) : Mucus helps frog in forming moist skin as skin is its respiratory organ.
 5. (a)
 6. (c) : The duodenum releases secretin hormone which reaches pancreas through blood circulation and stimulates the pancreas to release pancreatic juice.
 7. In frog, the hindlimbs end in five digits and they are larger and muscular than forelimbs that end in four digits.
 8. Final digestion takes place in intestine where pancreatic juice breakdown proteins and carbohydrates and bile breakdown fats. The undigested food moves to rectum and exits through the cloaca.
 9. Bile is stored in the gall bladder of frog after it has been secreted by liver.
 10. (c) : During hibernation (winter sleep) and aestivation (summer sleep) cutaneous respiration is the only method of respiration in frog. Mouth of frog is tightly closed during pulmonary respiration.
- OR
11. (i) (d) : Food is captured by the bilobed tongue.
(ii) (d) : In male frogs, two ureters act as urinogenital duct which open into the cloaca.
(iii) (a)
(iv) (c) : Tadpole undergoes metamorphosis to form an adult.
(v) Digested food is absorbed by the numerous finger-like folds in the inner wall of intestine.
 12. Bidder's canal is present inside kidney of a male frog. It receives sperms from testes *via* a number of vasa efferentia and passes it to the urinogenital duct.
 13. The digestive system of frog consists of alimentary canal and digestive gland. Frogs are carnivorous. This means that their diet consists of food which is purely of animal origin. Carnivores have shorter digestive tracts as meat is easier to digest than plant material.
- In addition to buccopharyngeal respiration, frog also respire through lungs that is called pulmonary respiration. So, if a hole is punched in the floor of its buccal cavity, then the frog will not die.
14. Frog is a cold-blooded(poikilothermal) animal, which cannot maintain constant body temperature. Frog cannot withstand extreme cold weather and it burries itself deep in the mud. It is called winter sleep or hibernation. During this period, it lives in dormant state of very slow vital body activities and very little energy is required which is obtained from fat bodies and from stored glycogen of liver. The oxygen need is met by respiration through skin. With the coming of spring, the hibernating frogs come out and start their normal life.
 15. Sexual dimorphism, is the phenomenon by which one sex can be morphologically distinguished from the other, *e.g.*, frog. In case of frog, male and female can be differentiated from each other due to the following reasons:
 - (i) Male frog possesses vocal sacs, which are mostly developed during breeding season.
 - (ii) During mating season, male frog develops amplexusory pads on first finger of each hand.

16. Adult frog respire by three different types of respiration:
Cutaneous respiration : It occurs through the highly vascularised skin of frog in water or land.

Buccopharyngeal respiration : It occurs on land or during partial immersion in water *via* mucous epithelial lining of buccopharyngeal cavity.

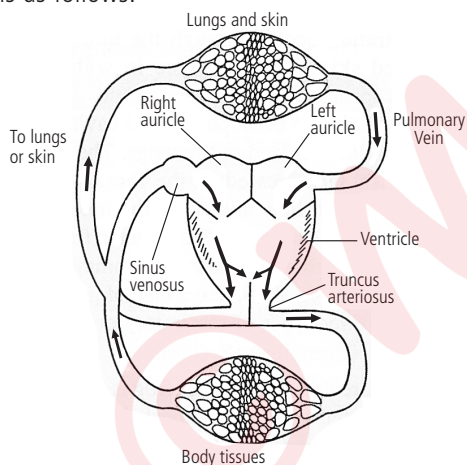
Pulmonary respiration : It is less frequent and takes place through lungs in adult frog when the frog is outside the water.

17. (a) Stomach of frog comprises of two parts, the anterior larger part called the cardiac stomach is present near the heart. The opening of the oesophagus into the cardiac stomach is guarded by a cardiac sphincter, which prevents the backward flow of food and a posterior narrow tapering part, called pyloric stomach which is separated from the duodenum by pyloric sphincter and controls the entry of food into duodenum.

(b) Rectum represents the large intestine which stores faecal matter and water is absorbed by its wall.

OR

(a) The diagrammatic view of heart and blood flow in frog is as follows:



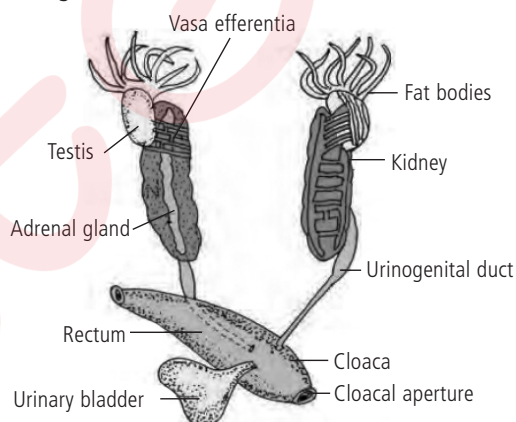
(b) Tadpole is the larva of frog. It resembles as a fish in form and mode of life. It respire through gills, swim with tail and is fully aquatic. The tadpole grows and metamorphoses into a small frog.

18. (a) Each eye is provided with upper and lower eyelids which are actually simple folds of skin. The upper eyelid is thick and very slightly movable. The lower eyelid is vestigial and immovable. The nictitating membrane is movable, semi-transparent and can be drawn over the eye when the animal is inside water where it prevents aquatic infection and also enables the frog to see underwater. This membrane is retracted when the frog is on land. A Harderian gland is present below the lower eyelid whose secretion lubricates the eyeball and nictitating membrane.

Frogs have monocular vision, since the eyes of frog are situated one on each side of the head, each eye focuses its own object and both the eyes cannot focus on one object, this type of vision is known as monocular vision. Monocular vision in frog is due to the absence of neck.

(b) Male reproductive organs consist of a pair of yellowish ovoid testes, which are found adhered to the upper part of kidneys by a double fold of peritoneum called mesorchium. Vasa efferentia are 10-12 in number that arise from testes. They enter the kidneys on their side and open into Bidder's canal. Finally it communicates with the urinogenital duct that comes out of the kidneys and opens into the cloaca. The cloaca is a small, median chamber that is used to pass faecal matter, urine and sperms to the exterior.

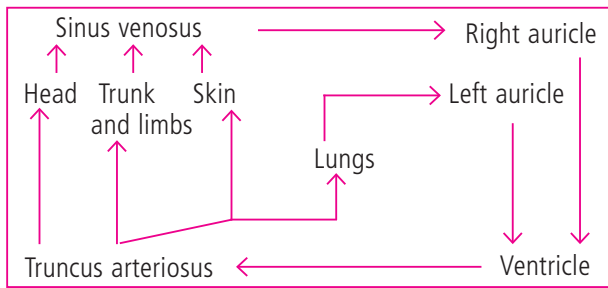
The well labelled diagram of male reproductive system of frog is as follows:



OR

(a) The heart is a muscular pumping organ pushing the blood into the closed circulatory system. The heart is enclosed within a sac formed of two membranes, an outer pericardium and an inner epicardium which closely invests the heart. Between these two membranes a serous or pericardial fluid is found which protects the heart from outer shocks, prevents friction and also keeps the heart moist. The heart of frog is three chambered, *viz.*, two auricles and a single ventricle. The two thin walled auricles are separated from each other by the interauricular septum. The two auricles, however, are clearly separated from the ventricle by a transverse coronary sulcus or auriculo-ventricular groove. The ventricle is the most conspicuous and prominent part of the heart. It is conical in shape with thick muscular walls. Besides auricles and ventricle, the heart has two more chambers—truncus arteriosus and sinus venosus.

(b) Graphical representation of blood circulation in frog is as follows:



(c) The renal portal system collects the blood from the hind parts of the body from which the urea and uric acid present in the blood are first got filtered in the kidneys before the blood goes into post-caval and then to the heart. Thus, the blood going to the heart contains comparatively less impurities after passing through the renal portal system.

