

**Mock Board Exam**  
**ICSE SEMESTER 2 EXAMINATION**

**BIOLOGY**

**SECTION A- 10 MARKS**

**Question 1**

(i) Which chamber of the heart has the thickest wall?

- (a) Right ventricle
- (b) Left ventricle
- (c) Right auricle
- (d) Left auricle

Answer: (b) Left ventricle

(ii) Which of the following parts of the adrenal gland secretes mineralocorticoids?

- (a) Zona glomerulosa
- (b) Zona Reticularis
- (c) Zona Fasciculata
- (d) Adrenal medulla

Answer: (a) Zona glomerulosa

(iii) In total, how many pairs of spinal nerves are present?

- (a) 21
- (b) 12
- (c) 8
- (d) 31

Answer: (d) 31

(iv) The right kidney is placed lower than the left kidney due to the presence of:

- (a) Lungs
- (b) Heart
- (c) Liver
- (d) Stomach

Answer: (c) Liver

(v) What is another name for ADH hormone?

- (a) Oxytocin

- (b) Vasopressin
- (c) Prolactin
- (d) Growth Hormone

Answer: (b) Vasopressin

(vi) The tube that carries urine from the kidneys to the urinary bladder is:

- (a) Urethra
- (b) Ureter
- (c) Renal tubule
- (d) Nephron

Answer: (b) Ureter

(vii) Thromboplastin required for blood clotting at the site of injury is released by:

- (a) Thrombocytes
- (b) Monocytes
- (c) Basophils
- (d) Neutrophils

Answer: (a) Thrombocytes

(viii) Deficiency of iodine in an adult diet causes a disease called:

- (a) Infertility
- (b) Gigantism
- (c) Goitre
- (d) Diabetes insipidus

Answer: (c) Goitre

(ix) The somatic nervous system is responsible for the movement of:

- (a) Voluntary muscles
- (b) Involuntary muscles
- (c) Cardiac muscles
- (d) Smooth muscles

Answer: (a) Voluntary muscles

(x) An instrument that measures blood pressure is known as:

- (a) Anemometer
- (b) Stethoscope
- (c) Thermometer
- (d) Sphygmomanometer

Answer: (d) Sphygmomanometer

## SECTION B

### Question 2

- (i) State two important functions performed in our body by lymph. [2]

Answer:

Functions of lymph include:

- Nutritive: Supplies nutrition and oxygen to those parts where blood cannot reach.
- Drainage: It drains away excess tissue fluid and metabolites and returns proteins to the blood from tissue spaces.
- Absorption: Fats from the intestine are absorbed through lymphatics.

- (ii) Why are the spinal cord and the brain referred to as the central nervous system? [2]

Answer:

- The brain and the spinal cord lie in the skull and the vertebral column respectively. They have an important role to play because all bodily activities are controlled by them.
- A stimulus from any part of the body is always carried to the brain or spinal cord for the correct response. A response to a stimulus is also generated in the central nervous system. Therefore, the brain and the spinal cord are called the central nervous system.

- (iii) What will happen if: [3]

- (a) The adrenal gland is removed.
- (b) Blood sugar level falls.
- (c) Thyroid gland does not function properly.

Answer:

- (a) If the adrenal gland is removed.

- The body will not be able to regulate carbohydrate, protein, fat, and mineral metabolism.
- The kidney will fail to retain sodium.
- The secondary sexual characters will be poorly developed in males.
- The body will not be able to face emergency situations (stress and strain).

(b) If blood sugar level falls, it will result in sweating, tremor, increased heartbeat, hunger, and weakness. In extreme cases, it may result in insulin shock (coma).

(c) If the thyroid gland does not function properly, it will produce disorders such as cretinism, myxoedema, simple goitre, or exophthalmic goitre.

- (iv) Explain the functioning of nephrons. [3]

Answer:

Functioning of a nephron:

- The blood enters the kidney through the renal artery, which branches into many capillaries associated with the glomerulus.
- The water and solutes are transferred to the nephron at Bowman's capsule.
- In the proximal tubule, some substances such as amino acids, glucose, and salts are selectively reabsorbed and unwanted molecules are added to the urine.
- The filtrate then moves down into the loop of Henle, where more water is absorbed
- From here, the filtrate moves upwards into the distal tubule and finally to the collecting duct. The collecting duct collects urine from many nephrons.
- The urine formed in each kidney enters a long tube called a ureter. From the ureter, it gets transported to the urinary bladder and then into the urethra.

### Question 3

(i) Why is blood circulation in the human heart called double circulation? [2]

Answer:

The blood circulation in the human heart is called double circulation because the blood passes through the heart twice in one complete cycle of the body – once through the right half in the form of deoxygenated blood to the lungs (pulmonary circulation) and next through the left half in the form of oxygenated blood to all body parts (systemic circulation).

(ii) How do endocrine glands differ from other glands? [2]

Answer:

Endocrine glands are ductless glands, which pour their secretion directly into the bloodstream while the other glands are exocrine glands that have ducts. Through ducts, they pour their secretions (not hormones) into the bloodstream.

(iii) Explain reflex arc and reflex action briefly. [3]

Answer:

- Reflex Arc

A reflex arc is a pathway followed by nerves that carry sensory information from the receptor to the spinal cord, and then carry the response to the effector organ(s) during a reflex action.

- Reflex Action

Reflex action is an involuntary functioning or movement of any organ or body part in response to a particular stimulus.

The function or action occurs immediately, without the involvement of the consciousness.

(iv) Explain the process of urine formation that takes place in the renal corpuscle. [3]

Answer:

- Glomerular filtration occurs in the glomerulus where blood is filtered. This process occurs across the three layers- epithelium of Bowman's capsule, endothelium of glomerular blood vessels, and a membrane between these two layers.
- Blood is filtered in such a way that all the constituents of the plasma reach the Bowman's capsule, except proteins. Therefore, this process is known as ultrafiltration.

#### Question 4

(i) What is Peripheral Nervous System? [2]

Answer:

- Peripheral Nervous System (PNS) is the lateral part of the nervous system that develops from the central nervous system which connects different parts of the body with the CNS. We carry out both voluntary and involuntary actions with the help of peripheral nerves.
- PNS includes two types of nerve fibres: Afferent nerve fibres, afferent nerve fibres.

(ii) How much urine is excreted by a normal man per day? [2]

What is the amount of urea and uric acid in it?

Answer:

- A normal man under normal conditions may excrete about 1200 to 1500 ml of urine daily.
- It contains about 60 g of urea and uric acid.

(iii) Sino-atrial nodes are called the pacemaker of our heart. Why?

[3]

Answer:

- The Sino-atrial (SA) node is a specialized bundle of neurons located in the upper part of the right atrium of the heart.
- The cardiac impulse originating from the SA node triggers a sequence of electrical events in the heart, thereby controlling the sequence of muscle contraction that pumps blood out of the heart.
- Since the SA node initiates and maintains the rhythmicity of the heart, it is known as the natural pacemaker of the human body.

(iv) State three characteristics of hormones. [3]

Answer:

- Hormones are secreted by endocrine glands.
- They are specific in action and are secreted in minute quantities.
- They are chemically proteins, biogenic amines or steroids.

#### Question 5

(i) Describe the nervous system and its functions. [2]

Answer:

- The nervous system is a complex network of nerves and cells that carry messages to and from the brain and spinal cord to various parts of the body.
- The nervous system includes both the Central Nervous System and Peripheral Nervous System. The Central Nervous System is made up of the brain and spinal cord and the Peripheral Nervous system is made up of the Somatic Nervous System and the Autonomic Nervous System.

(ii) Why is excretion necessary? Name the common excretory substances in our body. [2]

Answer:

- Excretion helps in removing toxic wastes from our body and it also plays an important role in osmoregulation i.e., the maintenance of homeostasis of the body.
- Carbon dioxide, water, nitrogenous compounds such as urea, uric acid, and excess salts are some common excretory products.

(iii) What prevents the backflow of blood inside the heart during contraction? [3]

Answer:

- Valves ensure that blood does not flow back when the atria or ventricles contract. Since ventricles have to pump blood into various organs with high pressure, they have thicker walls than atria.
- The separation of the right side and left side of the heart by the ventricular septum.
- This helps to keep oxygenated and deoxygenated blood from mixing so as to supply a high amount of oxygen to the body as the oxygen demand in multicellular organisms is enormous.

(iv) How does the pituitary gland help in the secretion of hormones by other glands?

[3]

Answer:

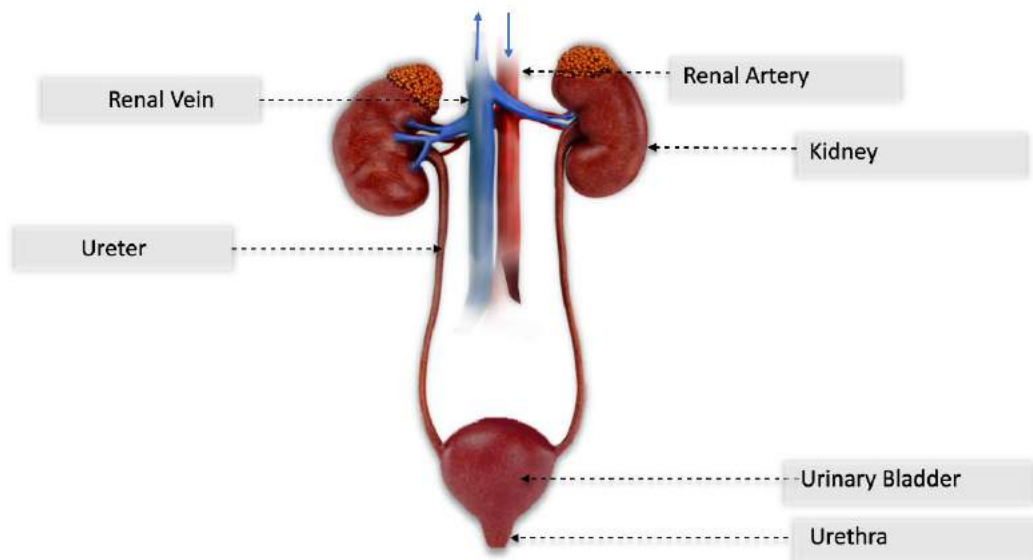
- Pituitary gland secretes growth hormone, thyroid-stimulating hormone, Adrenocorticotrophic hormone, luteinizing hormone, follicle-stimulating hormone, prolactin, and ADH.
- So, the pituitary gland is called the master gland because it secretes tropic hormones which control the hormone secretions from the rest of the endocrine glands.
- Hormones secreted from the pituitary gland help control the following body processes:
  1. Growth (GH)
  2. Blood pressure
  3. Some aspects of pregnancy and childbirth including stimulation of uterine contractions during childbirth (Parturition)
  4. Breast milk production
  5. Sex organ functions in both males and females
  6. Thyroid gland function
  7. The conversion of food into energy (metabolism)
  8. Water and osmolarity regulation in the body
  9. Water balance via the control of reabsorption of water by the kidneys
  10. Temperature regulation
  11. Pain relief

### Question 6

(i) Name the various organs of the human excretory system. Draw a neat labelled diagram of the human excretory system. [2]

Answer:

- The excretory system of human beings consists of the following main organs: two kidneys, two ureters, bladder, and urethra.



(ii) What are the parts of the human brain and what are their functions? [2]

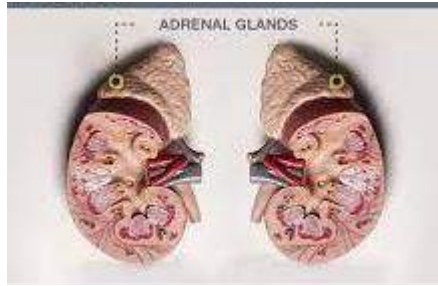
Answer:

- Forebrain consists of a cerebrum that coordinates all voluntary actions such as thoughts, sensations, learning, sight, smell, etc.
- Midbrain controls the reflex movements of the head, neck, and eye which includes changes in pupil size.
- Hindbrain consists of- Pons, Cerebellum, and Medulla.
  - Pons take part in respiration. The cerebellum helps in maintaining postures and balance of the body. The medulla controls all involuntary actions such as heartbeat, blood pressure, etc. It also controls swallowing, sneezing, vomiting, coughing, etc.

(iii) Explain the Structure, functions & location of the Adrenal gland. [3]

Answer:

- Adrenal glands are endocrine glands that are responsible for producing important hormones required for metabolic functions and stress response.
- The human body has two adrenal glands, the right gland is pyramidal in shape and the left gland is semilunar in shape.
- The left adrenal gland is also comparatively larger than the right.



#### Adrenal Gland Function

- One of the most well-known responses – the Fight or Flight response is triggered by the release of stress hormones from the adrenal glands.
- The adrenal glands produce a variety of hormones. These hormones are very crucial for the normal functioning of the body. For instance, the glands secrete cortisol, which has anti-inflammatory properties and aids the immune system.
- The adrenal gland also helps to regulate metabolism and blood pressure through various other hormones.

(iv) Give a detailed account of blood cells.

[3]

Answer:

- Blood contains corpuscles which are red blood cells (erythrocytes), white blood cells (leucocytes), and platelets. In this fluid connective tissue, the blood cells move in a fluid matrix called plasma.
- The plasma contains inorganic salts and organic substances. It is a main circulating fluid that helps in the transport of substances.

1. Red blood corpuscles (Erythrocytes): The red blood corpuscles are oval-shaped, circular, biconcave disc-like, and lack a nucleus when mature (mammalian RBC). They contain a respiratory pigment called haemoglobin which is involved in the transport of oxygen to tissues.

2. White blood corpuscles (Leucocytes): They are larger in size, contain distinct nuclei, and are colourless. They are capable of amoeboid movement and play an important role in the body's defence mechanism.

WBCs are of two types: Granulocytes and Agranulocytes

3. Blood platelets: They are minute, anucleate, fragile fragments of giant bone marrow called megakaryocytes. They play an important role in blood clotting mechanisms.