

SCIENCE

Paper 3 (Biology)

(Two hours)

Answers to this Paper must be written on the paper provided separately.

You will not be allowed to write during the first 15 minutes.

This time is to be spent in reading the Question paper.

The time given is the time allowed for writing the answers.

Attempt all questions from section I and any four questions from section II.

The Intended marks for questions or parts of questions are given in the bracket [].

Section - I (40 marks)

All questions are compulsory.

Question 1

A. Name the hormone that [5]

1. Controls the secretion of thyroid hormones
2. Stimulates development of mammary gland to produce milk
3. Lowers the blood sugar level
4. Regulates the sodium – potassium ratio of blood
5. Helps body to fight stress and unfavourable conditions

B. Give the exact location of [5]

1. S A Node
2. Pancreas
3. Endodermis
4. Mitral Valve
5. Ejaculatory duct

C. Given below are six sets with four terms each. In each set a term is an odd one and cannot be grouped in the same category to which the other three belong. Identify the odd one in each set and name the category to which the remaining three belong. The first one has been done as an example: [5]

Example: Fructose, Sucrose, Glucose, Calcium

Odd term: Calcium

Category: Sugars

1. Inferior Vena Cava, Pulmonary Artery, Pulmonary Vein, Renal Vein
2. Lenticular transpiration, Guttation, Photosynthesis, Transpiration
3. Ammonia, urea, uric acid, creatinine
4. Presbyopia, Astigmatism, Colour blindness, Hypermetropia.
5. Thyroid gland, Pituitary gland, Sweat gland, Adrenal gland.

D. Match the items in A with that which is most appropriate in column B.

Rewrite the matching pair.

[5]

Column A	Column B
1. Chromosomes arrange in a horizontal plane at the equator.	a. Endocrine gland
2. Facial tissues look puffy	b. Ureotelism
3. Secretions are transported by blood	c. Anaphase
4. Clotting of blood	d. Calcium
5. Type of excretion with chief excretory product uric acid	e. Uricotelism
	f. Cretinism
	g. Iron
	h. Exocrine gland
	i. Metaphase
	j. Myxoedema

E. Choose from the four answers given below

[5]

1. Insulin is secreted by

- a. α (Alpha) – Cells b. β (Beta) – Cells c. γ (Gamma) – Cells d. δ (Delta) – Cells

2. Number of live birth per 1000 people of population per year

- a. Growth rate b. Demography c. Birth rate d. Natality

3. A concentrated sugar solution compared to distilled water

- a. Hypotonic b. Isotonic c. Hypertonic d. None

4. Chromosomes which does not decide the sex of humans

- a. Allosomes b. Phagosomes c. Autosomes d. All of them

5. The nitrogen base not found in the structure of DNA

- a. Adenine b. Guanine c. Uracil d. Cytosine

F. Given below is an example of certain structures and their special functional activities.

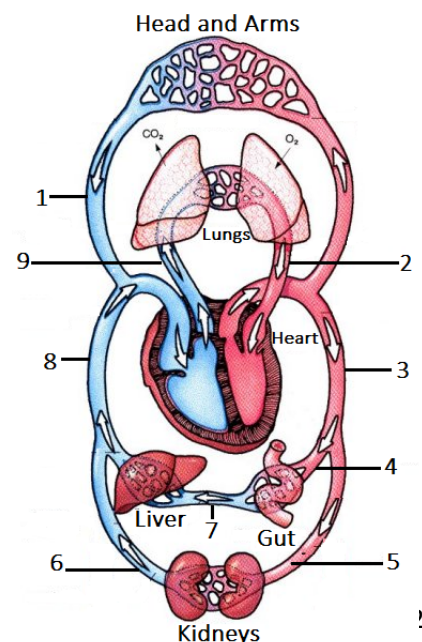
For example: Eye and Vision. On similar pattern complete the following.

[5]

1. Glomerulus and _____
2. Centrioles and _____
3. Pericycle and _____
4. Meninges and _____
5. Organ of Corti and _____

G. The diagram given alongside represents blood circulation in human beings. Study the same and answer the following questions. [5]

1. Label the parts 1, 2, 5, and 7.
2. Differentiate between part 3 and 8 (structural difference)
3. Name the blood vessel that will contain most amount of amino acids some hours after having a protein rich meal.
4. Complete the sequence and mention the type of circulation.
Heart to _____ to _____ to kidney to _____ to _____ to heart. (blood vessels)



H. Given below are five groups of terms. In each group arrange and rewrite the terms in the correct order so as to be in a logical sequence. [5]

For Example: Mouth, oesophagus, colon, duodenum, stomach

Answer – Mouth → Oesophagus → stomach → duodenum → colon

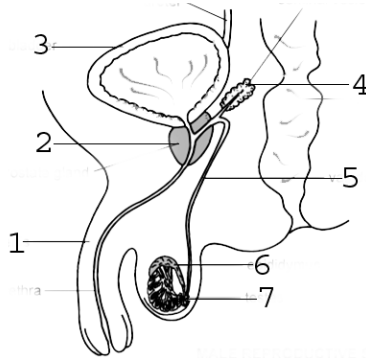
1. Renal artery, Peritubular network, Glomerulus, Efferent Arteriole, Afferent arteriole
2. Pia mater, Arachnoid mater, Dura mater, cranium
3. Seminiferous tubule, Urethra, Ejaculatory duct, Vas Deferens
4. ACTH RH, Pituitary gland, Glucocorticoids, Adrenal cortex, ACTH
5. Yellow spot, Vitreous Humour, Lens, Aqueous humour, Cornea

Part II

(Attempt any four questions)

Question 2

A. The diagram given below is of human male reproductive system. Study the same and answer the questions. [5]



1. Label the parts 7, 6, 5 and 4.
2. State one main function of part 2 and 5.
3. Draw and label the structure of the human male gamete.

B. Answer the following-

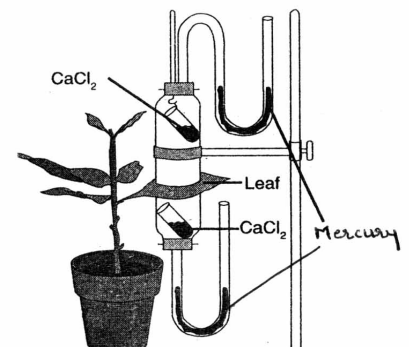
[5]

1. Explain the terms : Vasectomy and Tubectomy
2. Locate corpus callosum and give its significance.
3. Define osmosis. Give its significance.

Question 3

A. The apparatus shown here is Garreau’s potometer designed to demonstrate a particular phenomenon in plants. Before keeping the leaf in between the cups, anhydrous calcium chloride contained in two small vials were weighed and placed in both the cups.

The ends of the cups were closed with corks through which two mercury manometers were connected. After a few hours, CaCl₂ vials were taken out and weighed again. [5]



- (i) What is the aim of the experiment?
- (ii) What is the purpose of keeping calcium chloride vials inside the cup?

- (iii) After a few hours, CaCl_2 vials were taken out and weighed again. Will you expect any difference in weight? If so, give reasons.
- (iv) What was the purpose of using a manometer?
- (v) Name two other potometers?

B. Differentiate between the following:

[5]

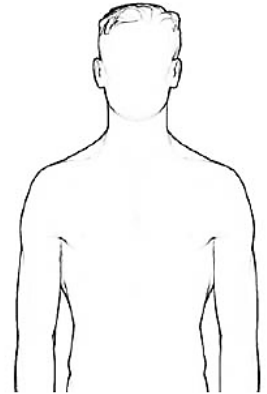
- i. Acrocentric and telocentric chromosome (position of centromere)
- ii. Light reaction and dark reaction (product formed)
- iii. Vitreous humour and aqueous humour (location)
- iv. Tubular reabsorption and tubular secretion (substances)
- v. Cobalt chloride paper and Goat's bladder (role)

Question 4

A. Given below is the outline of human body.

[5]

1. Redraw the same, place the following glands in the diagram and label the same.
Thyroid, Pancreas, Adrenal and Pituitary
2. Name the hormones of the Posterior lobe of Pituitary.
3. Expand: ACTH and PRL



B. Explain in brief the role of-

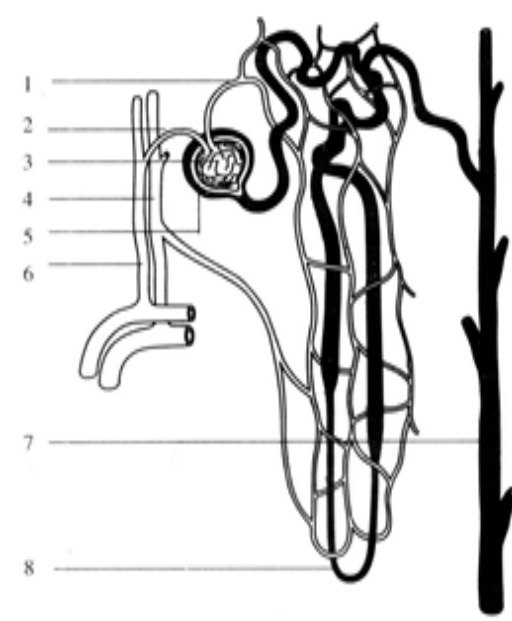
[5]

- (i) Antigens
- (ii) Palisade tissue
- (iii) Sunken stomata
- (iv) Root hair cell
- (v) Hydathodes

Question 5

A. Study the diagram given below and answer the questions that follow.

[5]



1. Name the parts 2, 4, 6 and 8.
2. Differentiate between part 1 and 2. (structure and composition)
3. Name the part(s) of the structure that

- reabsorbs most water
- contains maximum concentration of urea

B. Give biological reasons for the following.

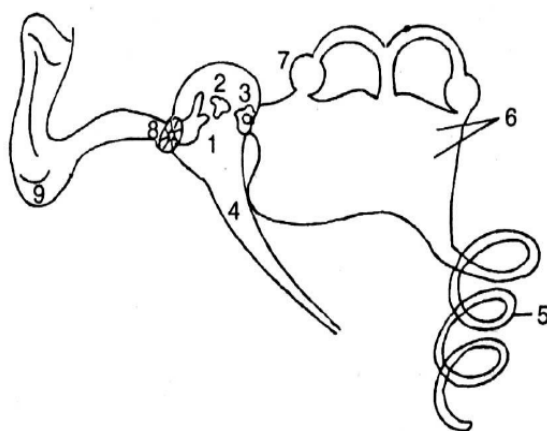
[5]

- Insulin is injected into the body of a highly diabetic patient and not given orally.
- It is difficult to see in bright sunlight immediately after coming out of a dark cinema hall during
- noon show.
- Blood passes through the heart twice in one circulation.
- Oxygen liberated during photosynthesis comes from water.
- Gametes have haploid number of chromosome.

Question 6

A. The diagram given below represents the structure of mammalian ear. Study the same and then answer the questions that follow.

[5]



- Label the parts 4, 5 and 8.
- Name the parts 1, 2 and 3. Mention a common term for them.
- What is dynamic equilibrium? Mention the part responsible for this part.

B. Answer the following-

05

- Draw a well labeled diagram of internal structure of heart.
- Define :Demography

Question 7

A. Answer the following-

05

- A man with type A blood has a wife with type B. They have a child with type O blood.
 - Give the genotypes of all the three.
 - What other blood groups can be expected in the future offspring of this couple?
- Show the genetic diagrams (punnett squares) for understanding the X - linked inheritance in case of
 - progeny of a colourblind man and a normal woman for colour vision
 - progeny of a haemophilic man and a carrier woman for haemophilia
- State the Law of Dominance.

B. Answer the following-

05

- Explain : “The sex of the child is determined by the father.”
- State two properties of a hormone.
- Draw a neat and labelled diagram of front view of female reproductive system.