BIOLOGY

SCIENCE Paper – 3

(One hour and a half)

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 at the head of this Paper is the time allowed for writing the answers.

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*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 brackets [ ].

SECTION I (40 Marks)

*Attempt **all** questions from this Section*

Question 1

(a) Name the following:

(i) The mineral element essential for the clotting of blood.

(ii) The cells of the testes that produce male hormones.

(iii) The nutritive layer of the eye which also prevents reflection of light.

(iv) The structural and functional unit of the kidney.

(v) That part of the chloroplast where the light reaction of photosynthesis takes place. [5]

(b) State the main function of the following:

(i) Yellow spot

(ii) Coronary artery

(iii) Medulla oblongata

(iv) Thrombocytes

(v) Vitreous humour. [5]

(c) Copy and complete the following by filling in the blanks 1 to 5 with appropriate words/terms/phrases:

To test the leaf for starch, the leaf is boiled in water to -------- (1). It is next boiled in methylated spirit to ------- (2). The leaf is placed in warm water to soften it. It is then placed in a dish and ------- (3) solution is added.

The region, which contains starch, turns ------- (4) and the region, which does not contain starch, turns ------- (5) [5]

(d) Give the exact location of:

(i) Hydathodes

(ii) Organ of corti

(iii) Mitral valve

(iv) Pituitary gland

(v) Amnion. [5]

(e) State whether the following statements are *True* or *False*. If *False* **rewrite** the correct form of the statement by changing the **first or last word** only:

(i) Lysosomes is a part of the cell in which chromosomes are present.

(ii) Urethra carries urine from kidney to the urinary bladder.

(iii) Centromere is the organelle of the cell that initiates cell division.

(iv) Gestation is the process of fixing of the zygote to the uterine wall.

(v) Pencillin obtained from Pencillium notatum is an antibody. [5]

(f) Rewrite and complete the following sentences by inserting the correct word in the space indicated:

(i) ------ vaccine is given to build up immunity against polio.

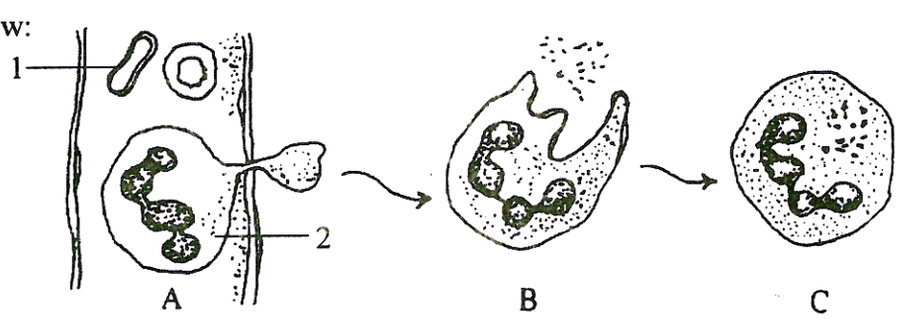
(ii) Phenotype is the observable characteristic which is ------ controlled.

(iii) Wooden doors swell up in rainy season due to -------.

(iv) The blood vessel that begins and ends in capillaries is the -------.

(v) -------- is the phenomenon of contraction of the cytoplasm from the cell wall. [5]

(g) Study the following diagram carefully and then answer the questions that follow:



(i) Name the cell labelled 1.

(ii) Identify the phenomenon occurring in A.

(iii) Mention two structural differences between 1 and 2.

(iv) Name the process occurring in B and C and state the importance of this process in the human body. [5]

(h) Match the items in Column I with that which is most appropriate in Column II.

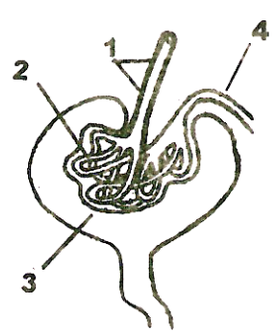
Column I	Column II
(1) Pacemaker	(a) Associated with static body balance
(2) Stroma	(b) Chordae tendinae
(3) Afferent nerve	(c) Site of light reaction
(4) Prolactin	(d) Motor neuron
(5) Saccules	(e) S A node
	(f) Stimulates production of milk by the mammary gland
	(g) Site of dark reaction
	(h) Transmits impulses from receptor organ to spinal cord.
	(i) Secreted by anterior lobe of Pituitary gland
	(j) Transfers impulses from spinal cord to muscles. [5]

SECTION II (40 Marks)

*Attempt any **four** questions from this Section*

Question 2

(a) Study the diagram given below and then answer the questions that follow:



(i) Name the region in the kidney where the above structure is present?

(ii) Name the parts labelled 1, 2, 3 and 4.

(iii) Name the stages involved in the formation of urine.

(iv) What is the technical term given to the process occurring in 2 and 3? Briefly describe the process. [5]

(b) Give reasons for the following:

(i) Photosynthesis is considered as a process supporting all life on earth.

(ii) A matured mammalian erythrocyte lacks nucleus and mitochondria.

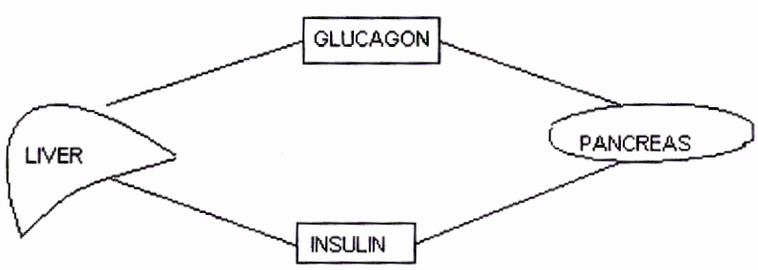
(iii) Potato cubes when placed in water become firm and increase in size.

(iv) Urine is slightly thicker in summer than in winter.

(v) People living in hilly regions usually suffer from simple goitre. [5]

Question 3

(a) Study the diagram given below and then answer the questions that follow:



(i) Name the cells of the pancreas that produce (1) glucagon (2) insulin.

(ii) State the main function of (1) glucagon (2) insulin.

(iii) Why is the pancreas referred to as an exo-endocrine gland?

(iv) Why is insulin not given orally but is injected into the body?

(v) What is the technical term for the cells of the pancreas that produce endocrine hormones?

(vi) Where in the body is the pancreas located? [5]

(b) With reference to the functioning of the eye, answer the questions that follow:

(i) What is meant by *power of accommodation* of the eye?

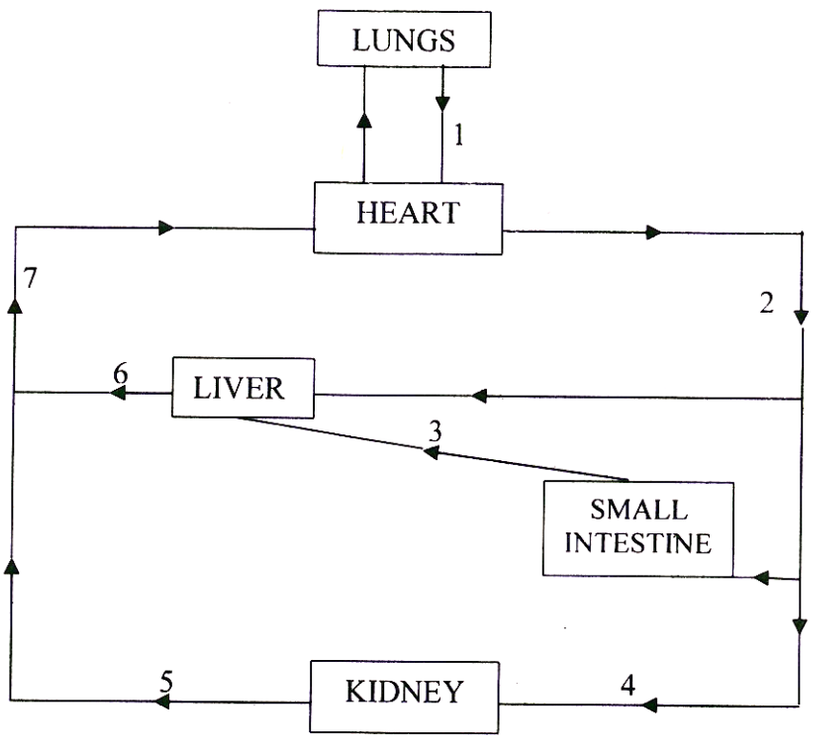
(ii) What is the shape of the lens during (1) near vision (2) distant vision?

(iii) Name the two structures in the eye responsible for bringing about the change in the shape of the lens.

(iv) Name the cells of the retina and their respective pigments which get activated (1) in the dark (2) in light. [5]

Question 4

(a) The diagram below represents circulation in the human body. Answer the questions that follow:



(i) Name the blood vessels labelled 1, 3, 6, and 7.

(ii) Name the blood vessel that supplies the walls of the heart with oxygen.

(iii) Draw a neat labelled diagram of the blood vessel numbered '2' as seen in a cross section.

(iv) Mention one structural difference between blood vessels numbered 4 and 5. [5]

(b) With reference to the human ear, answer the questions that follow:

(i) Give the technical term for the structure found in the inner ear.

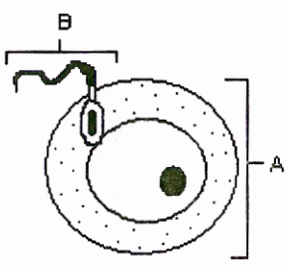
(ii) Name the three small bones present in the middle ear. What is the biological term for them collectively?

(iii) Name the part of the ear associated with (1) static balance (2) hearing (3) dynamic balance.

(iv) Name the nerve, which transmits messages from the ear to the brain. [5]

Question 5

(a) The diagram below represents two reproductive cells A and B. Study the same and then answer the questions that follow:



(i) Identify the reproductive cells A and B.

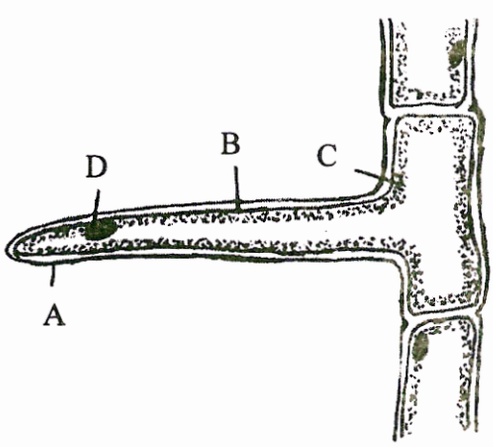
(ii) Name the specific part of the reproductive system where the above cells are produced.

(iii) Where in the female reproductive system do these cells unite?

(iv) Name the main hormones secreted by the (1) ovary (2) testes.

(v) Name an accessory gland found in the male reproductive system and state the function of its secretion. [5]

(b) The diagram below represents a layer of epidermal cells showing a fully-grown root hair. Study the diagram and answer the questions that follow:



(i) Name the parts labelled A, B, C and D.

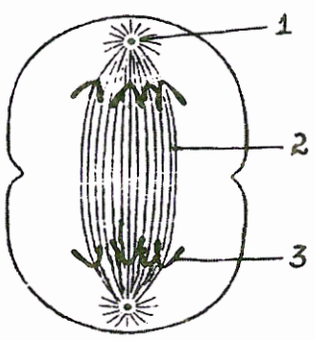
(ii) The root hair cell is in a turgid state. Name and explain the process that caused this state.

(iii) Mention one distinct difference between the parts labelled A and B.

(iv) Draw a diagram of the above root hair cell as it would appear when a concentrated solution of fertilizers is added near it. [5]

Question 6

(a) The diagram below represents a stage during cell division. Study the same and then answer the questions that follow:



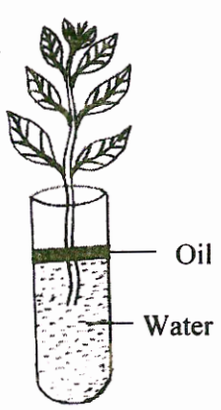
(i) Name the parts labelled 1, 2 and 3

(ii) Identify the above stage and give a reason to support your answer.

(iii) Mention where in the body this type of cell division occurs.

(iv) Name the stage prior to this stage and draw a diagram to represent the same. [5]

(b) Study the diagram given below and answer the questions that follow:



(i) Name the process being studied in the above experiment.

(ii) Explain the process mentioned in (i) above.

(iii) Why is oil placed over water?

(iv) What do we observe with regard to the level of water when this set up is placed in (1) bright sunlight (2) humid conditions (3) windy day?

(v) Mention any three adaptations found in plants to overcome the process mentioned in (ii) above. [5]

Question 7

(a) (i) During a street fight between two individuals, mention the effects on the following organs by the autonomous nervous system, in the table given below: (one has been done for you as an example)

ORGAN	SYMPATHETIC SYSTEM	PARASYMPATHETIC SYSTEM
e.g. Lungs	Dilates bronchi and bronchioles	Constricts bronchi and bronchioles
(1) Heart		
(2) Pupil of the eye		
(3) Salivary gland		

(ii) List *four* major activities of the Red Cross. [5]

(b) Write down the difference between the following pairs as indicated within the brackets:

(i) Antiseptic and disinfectant (an example for each)

(ii) Erythrocytes and leucocytes (function)

(iii) Guttation and bleeding in plants (cause)

(iv) NADP and AIDS (expand the abbreviation)

(v) Monohybrid and Dihybrid cross (phenotypic ratio) [5]