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 cell body of a nerve cell.

(ii) The waxy layer on the epidermis of the leaf meant to reduce transpiration.

(iii) A non-biodegradable pesticide.

(iv) The physical expression of genes in an individual.

(v) Knot-like mass of blood capillaries inside the bowman's capsule. [5]

(b) State the exact location of the following:

(i) Chloroplast.

(ii) Incus.

(iii) Corpus callosum.

(iv) Guard cells.

(v) Pulmonary semilunar valve. [5]

(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:

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Example : Fructose, Sucrose, Glucose, Calcium.

Odd term : Calcium

Category : Carbohydrates.

(i) Carbonic acid, Acetic acid, benzoic acid, boric acid.

(ii) Saliva, bile, sweat, tears.

(iii) Cretinism, Myxedema, Simple goitre, Acromegaly.

(iv) Sneezing, coughing, blinking, typing.

(v) Semicircular canals, Cochlea, tympanum, utriculus. [5]

(d) Match the items in Column A with that which is most appropriate in Column B. Rewrite the matching pair.

Column A	Column B
(1) Testis	(a) Kidney
(2) Poliomyelitis	(b) Water vapour
(3) Transpiration	(c) Prostate gland
(4) Clotting of blood	(d) Iron
(5) Uriniferous tubule	(e) Uterus
	(f) Gonad
	(g) Salk's vaccine
	(h) Water droplet
	(i) Calcium
	(j) TAB vaccine

[5]

(e) Choose the correct answer from the four options given below:

(i) The cell component visible only during cell division:

A. Mitochondria

B. Chloroplast

C. Chromosome

D. Chromatin.

(ii) Pulse wave is mainly caused by the:

A. Systole of atria

B. Diastole of atria.

C. Systole of the left ventricle.

D. Systole of the right ventricle.

(iii) The recessive gene is one that expresses itself in:

A. Heterozygous condition

B. Homozygous condition

C. F_2 generation

D. Y-linked inheritance.

(iv) A gland which secretes both hormone and enzyme is the:

A. Pituitary

B. Pancreas

C. Thyroid

D. Adrenal

(v) The ventral root ganglion of the spinal cord contains cell bodies of the:

A. Motor neuron

B. Sensory neuron

C. Intermediate neuron

D. Association neuron. [5]

(f) Given below is an example of certain structures and their special functional activities.

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

(i) Neutrophils: .....

(ii) Ureter: .....

(iii) Neurotransmitters: .....

(iv) Iris of the eye: .....

(v) Placenta: ..... [5]

(g) The figure given below represents an experiment to demonstrate a particular aspect of photosynthesis. The alphabet 'A' represents a certain condition inside the flask.

(i) What is the aim of the experiment?

(ii) Identify the special condition inside the flask.

(iii) Name an alternative chemical that can be used instead of KOH.

(iv) In what manner do the leaves 1 and 2 differ at the end of the starch test? [5]

(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.

For example:

Question: Implantation, Parturition, Ovulation, Gestation, Fertilization.

Answer : Ovulation, Fertilization, Implantation, Gestation, Parturition.

(i) Spongy cells, Upper epidermis, Stoma, Palisade tissue, Substomatal space.

(ii) Spinal cord, Motor neuron, Receptor, Effector, Sensory neuron.

(iii) Endodermis, Cortex, Soil water, Xylem, Root hair.

(iv) Metaphase, Telophase, Prophase, Anaphase, Cytokinesis.

(v) Intestine, Liver, Intestinal artery, Hepatic Vein, Hepatic Portal Vein. [5]

SECTION II (40 Marks)

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

Question 2

(a) Given below is a diagram of the lateral section of a testis of a man. Study the same and answer the questions that follow:

(i) Label the parts numbered 1 to 4 of the diagram.

(ii) State the functions of the parts labelled 1 and 3.

(iii) What is the significance of the testes being located in the scrotal sac outside the abdomen?

(iv) What is the role played by the inguinal canal?

(v) What is semen? [5]

(b) Give the biological / technical terms for the following:

(i) Chemicals found in the blood which act against antigens.

(ii) A constituent that causes pollution.

(iii) The onset of menstruation in a young girl.

(iv) Structure which connects the placenta with the foetus.

(v) The fluid present between the layers of meninges.

(vi) Permanently open structures seen on the bark of an old woody stem.

(vii) The biological process which is the starting point of the food chain.

(viii) The change in an organism resulting due to stimulus.

(ix) An Antiseptic substance present in tears.

(x) A solution in which the relative concentration of water molecules and the solute on either side of the cell membrane is the same. [5]

Question 3

(a) Draw a diagram of the human eye as seen in a vertical section and label the parts which suits the following descriptions relating to the:

(i) photosensitive layer of the eye.

(ii) structure which is responsible for holding the eye lens in its position.

(iii) structure which maintains the shape of the eye ball and the area of no vision.

(iv) anterior chamber seen in front of the eye lens.

(v) outer most transparent layer seen in front of the eye ball. [5]

(b) Differentiate between the following pairs on the basis of what is mentioned within brackets:

(i) Photolysis and Photophosphorylation. (Definition).

(ii) Bicuspid valve and Tricuspid valve. (Function)

(iii) Vasectomy and Tubectomy. (Explain)

(iv) Cerebrum and Spinal cord. (Arrangement of nerve cells)

(v) Bowman's capsule and Malpighian capsule. (parts included) [5]

Question 4

(a) Given below is a schematic diagram showing Mendel's Experiment on sweet pea plants having axial flowers with round seeds (AARR) and Terminal flowers with wrinkled seeds (aarr). Study the same and answer the questions that follow:

(i) Give the phenotype of F_1 progeny.

(ii) Give the phenotypes of F_2 progeny produced upon by the self-pollination of F_1 progeny.

(iii) Give the phenotypic ratio of F_2 progeny.

(iv) Name and explain the law induced by Mendel on the basis of the above observation. [5]

(b) Complete the following table by filling in the blanks from 1 to 10 with appropriate terms:

S.No.	Gland	Secretion	Function / Effect on body
1.	Thyroid	1	2
2.	3	Vasopressin	4
3.	5	6	Promotes glucose utilization by the body cells.
4.	Lacrimal gland	7	8
5.	Adrenal medulla	9	10

[5]

Question 5

(a) The diagram given below represents the human heart in one phase of its functional activities. Study the same and answer the questions that follow:

(i) Name the phase.

(ii) Label the parts 1, 2, and 3

(iii) Which part of the heart is contracting in this phase? Give a reason to support your answer.

(iv) Draw well labelled diagrams of part 1 and 2 to show the structural differences between them. [5]

(b) Give biological reasons for the following:

(i) The wall of the ventricle is thicker than the auricles.

(ii) The renal cortex has a dotted appearance.

(iii) Wooden frames of doors get jammed during the monsoon season.

(iv) Throat infections can lead to ear infections.

(v) The hand automatically shows the direction to turn a cycle without thinking. [5]

Question 6

(a) The figure given below shows the epidermal cells of an onion bulb. This cell was then transferred to a drop of sugar solution.

(i) Draw a well labelled diagram of the epidermal cell as it would appear after immersion in a strong sugar solution.

(ii) What scientific term is used for the changes as shown in (i) above?

(iii) What should be done to restore the cell back to its original condition?

(iv) Give the scientific term for the recovery of the cell as a result of the step taken in (iii) above.

(v) Define the term osmosis. [5]

(b) Briefly explain the following terms:

(i) Genes.

(ii) Cytokinesis in plant cells.

(iii) Guttation.

(iv) Diabetes insipidus.

(v) Disinfectants. [5]

Question 7

(a) (i) Draw a well labelled diagram to show the anaphase stage of mitosis in a plant cell having four chromosomes.

(ii) State any *two* harmful effects of acid rain.

(iii) Expand the following biological abbreviations:

(1) NADP

(2) ACT [5]

(b) (i) List any *two* major activities of the Red Cross.

(ii) Write any *two* major reasons for the population explosion in the world.

(iii) Write the names of *four* nitrogenous bases in a DNA molecule. [5]