

BIOLOGY
(SCIENCE PAPER – 3)

Maximum Marks: 80

Time allowed: Two hours

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

*You will **not** be allowed to write during 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.

Section A is compulsory. Attempt any four questions from Section B.

The intended marks for questions or parts of questions are given in brackets [].

SECTION A (40 Marks)

(Attempt all questions from this Section.)

Question 1

Select the correct answers to the questions from the given options.

[15]

(Do not copy the questions, write the correct answer only).

- (i) The sex chromosome in a human ovum is:
- (a) X chromosome
 - (b) Y chromosome
 - (c) Both X and Y chromosomes
 - (d) Either X or Y chromosome

This paper consists of 11 printed pages and 1 blank page.

- (ii) Which one of the following is a biodegradable waste?
- (a) Metal cans
 - (b) E-waste
 - (c) Plastic
 - (d) Flowers
- (iii) The heart sound 'Dup' is produced when:
- (a) Semilunar valves open
 - (b) Atrio ventricular valves close
 - (c) Semilunar valves close
 - (d) Atrio ventricular valves open
- (iv) Deplasmolysis occurs when a plasmolysed cell is placed in:
- (a) Concentrated salt solution
 - (b) Tap water
 - (c) Concentrated sugar solution
 - (d) Hypertonic salt solution
- (v) Alpha cells of Pancreas secrete:
- (a) Glycogen
 - (b) Glucose
 - (c) Glucagon
 - (d) Insulin
- (vi) Haploid number of chromosomes are found in:
- (a) Nephrons
 - (b) Neurons
 - (c) Skin cells
 - (d) Sperms

- (vii) The life span of an RBC is:
- (a) 120 days
 - (b) 220 days
 - (c) 20 days
 - (d) 2 weeks
- (viii) The statistical study of human population is called:
- (a) Mortality
 - (b) Demography
 - (c) Natality
 - (d) Equality
- (ix) The pale yellow colour of normal human urine is due to the pigment:
- (a) Melanin
 - (b) Anthocyanin
 - (c) Urochrome
 - (d) Haemoglobin
- (x) Stimulation of the nerves of the sympathetic nervous system:
- (a) Accelerates heartbeat
 - (b) Constricts pupil of eyes
 - (c) Increases peristalsis
 - (d) Retards heartbeat
- (xi) The site of light reaction in the cells of a green leaf is:
- (a) Nucleus
 - (b) Grana of chloroplast
 - (c) Cytoplasm
 - (d) Stroma of chloroplast

(xii) The paper used to demonstrate unequal transpiration in a dicot leaf is:

- (a) Filter paper
- (b) Litmus paper
- (c) Starch paper
- (d) Cobalt chloride paper

(xiii) Vitreous humour is present between:

- (a) Cornea and Iris
- (b) Lens and Retina
- (c) Iris and Lens
- (d) Cornea and Lens

(xiv) Oxygenated blood to liver is supplied by:

- (a) Hepatic artery
- (b) Hepatic vein
- (c) Inferior venacava
- (d) Hepatic portal vein

(xv) During the synthesis phase of the cell cycle, more of:

- (a) RNA is synthesised
- (b) RNA and proteins are synthesised
- (c) DNA is synthesised
- (d) Glucose is synthesized

Question 2

- (i) Name the following: [5]
- (a) The organelle that forms the aster during cell division.
 - (b) A genetic disorder in which the blood does not clot.
 - (c) The permanent stoppage of menstruation in human females around the age of 45 years.
 - (d) The openings on the barks of trees through which transpiration occurs.
 - (e) A gaseous plant hormone which promotes ripening of fruits.
- (ii) Arrange and rewrite the terms in each group in correct order to be in a logical sequence *beginning* with the term that is underlined: [5]
- (a) Snake, Rabbit, Cabbage, Hawk.
 - (b) Xylem, Soil water, Cortical cells, Root hair.
 - (c) Receptor, Response, Effector, Spinal Cord
 - (d) Fovea, Lens, Cornea, Conjunctiva.
 - (e) Testis, Urethra, Sperm duct, Epididymis.
- (iii) Match the items given in **Column I** with most appropriate ones in **Column II** and rewrite the correct matching pairs: [5]

Column I	Column II
(a) Hyposecretion of Thyroxine in adults	1. Diabetes insipidus
(b) Hyposecretion of Insulin	2. Myxedema
(c) Hypersecretion of Growth hormone in childhood	3. Dwarfism
(d) Hyposecretion of ADH	4. Gigantism
(e) Hypersecretion of Thyroxine	5. Diabetes mellitus
	6. Exophthalmic goitre
	7. Cretinism

(iv) Choose the **odd** one out from the following terms and name the **category to which the others belong**: [5]

- (a) Used bandages, Pesticides, Face masks, Syringes.
- (b) Dust, Smoke, Carbon monoxide, Effluents
- (c) Uterus, Urethra, Urinary bladder, Ureter
- (d) Menstrual phase, Telophase, Follicular phase, Luteal phase
- (e) Malleus, Incus, Cochlea, Stapes

(v) State the exact location of the following structures: [5]

- (a) Thyroid gland
- (b) Dura mater
- (c) Amniotic fluid
- (d) Papillary muscles
- (e) Islets of Langerhans

SECTION B (40 Marks)

(Attempt any four questions from this Section.)

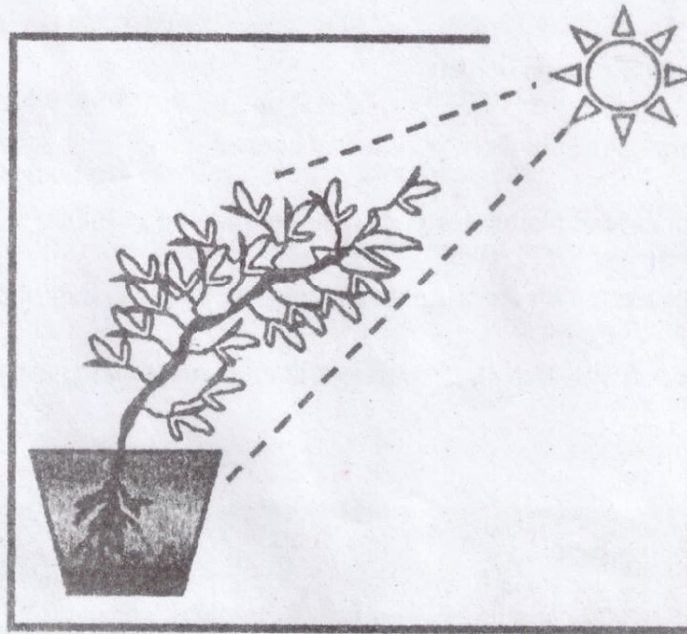
Question 3

- (i) Write the overall chemical equation for photosynthesis. [1]
- (ii) Mention *any two* functions of blood. [2]
- (iii) Differentiate between Karyokinesis and Cytokinesis. [2]
- (iv) *Excessive use of fertilizers in agricultural fields reduces the yield of crops.* [2]

Justify the statement.

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

[3]



- (a) Name the phenomenon depicted by the shoot in the above diagram.
- (b) Which plant hormone plays an important role in the above movement?
- (c) Complete and rewrite the given statement by filling in the correct terms:

Shoots show positive _____ whereas, roots show positive _____.

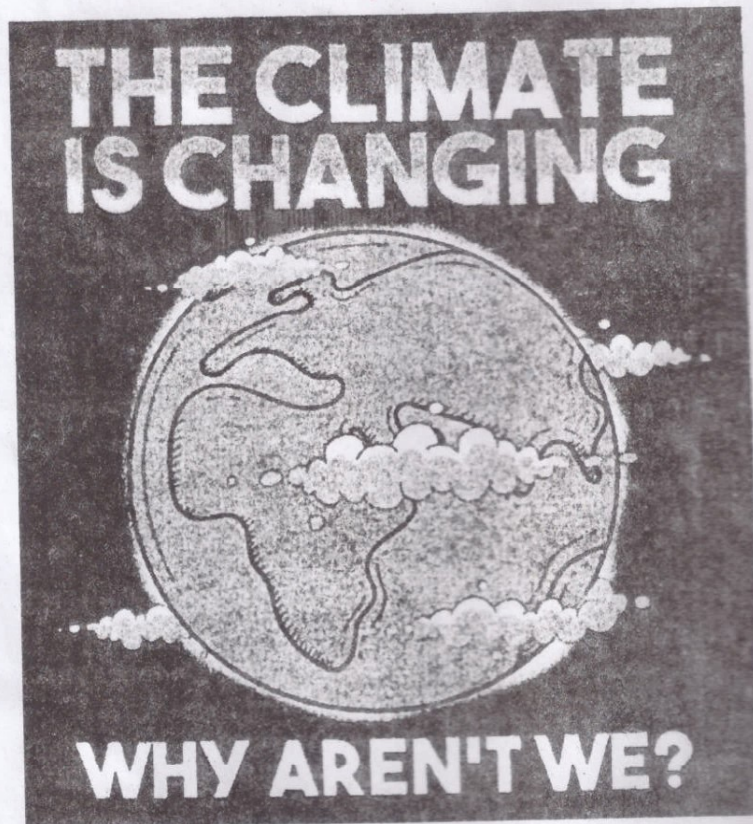
Question 4

- (i) Expand the abbreviation – DNA. [1]
- (ii) What is Active transport? [2]
- (iii) Mention the *two* pairs of nitrogenous bases which pair with each other with hydrogen bonds. [2]
- (iv) State Mendel's 'Law of Segregation'. [2]
- (v) Draw a neat, labelled diagram of a human sperm. [3]

Question 5

- (i) Explain the term 'Population density'. [1]
- (ii) Name the *two* surgical methods of population control. [2]
- (iii) Mention *two* factors responsible for population explosion in India. [2]
- (iv) Name *any two* resources which come under pressure due to rising population. [2]
- (v) The diagram given below depicts the climate change on planet Earth. [3]

Answer the following questions:



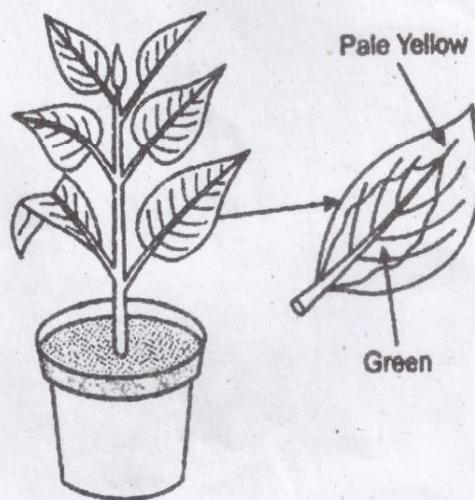
- (a) Name the climatic phenomenon for the increase in Earth's temperature.
- (b) Mention *one* reason for this warming.
- (c) What measure can be taken to prevent this climate change?

Question 6

- (i) Define the term Transpiration. [1]
- (ii) State *any two* adaptations in plants to reduce transpiration. [2]
- (iii) Mention *any two* functions of the human foetal placenta. [2]
- (iv) What is the significance of the human testes being located in scrotal sacs outside the abdomen? [2]
- (v) Draw a neat, labelled diagram of a Malpighian Capsule. [3]

Question 7

- (i) What is a Reflex action? [1]
- (ii) Renal cortex has a dotted appearance and Renal medulla has a striped appearance. Explain. [2]
- (iii) What are the *two* functions of cerebellum. [2]
- (iv) Distinguish between Semicircular canals and Utriculus based on their function. [2]
- (v) A potted plant with variegated leaves was kept in dark for 24 hours and then placed in bright sunlight. Answer the following questions. [3]



- (a) Which aspect of photosynthesis is being tested in the above diagram?
- (b) Why was the plant kept in dark for 24 hours?
- (c) After the starch test what will be the colour of the yellow and green parts of the leaf? Give reasons to support your answer.

Question 8

(i) Define the term Mutation. [1]

(ii) A pure breeding red flower variety of pea plant (RR) is crossed with a pure breeding white flower variety of pea plant (rr). [2]

Draw a Punnett square to find out the Phenotypic and Genotypic ratios of the progeny belonging to the F₂ generation.

(iii) Leaves of certain plants roll up on a hot sunny day. [2]

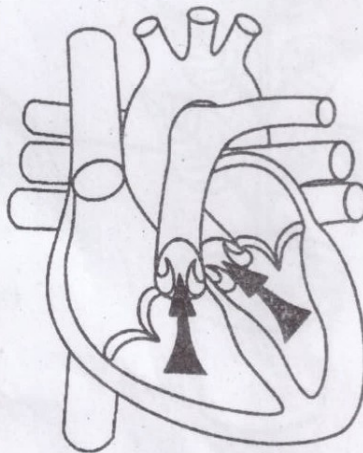
Explain by giving suitable reasons.

(iv) What is a semi permeable membrane? [2]

Name the semi permeable membrane present in a plant cell.

(v) The diagram below depicts the human heart in one of its phases. [3]

Answer the questions that follow:



- (a) Which part of the heart is in the contraction phase?
- (b) Give a suitable reason to justify your answer in (a).
- (c) Distinguish between Systole and Diastole.