

**BIOLOGY**  
**(SCIENCE PAPER – 3)**

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*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.*

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

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

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**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

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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
<del>(a)</del> Hyposecretion of Thyroxine in adults	<del>1.</del> Diabetes insipidus
<del>(b)</del> Hyposecretion of Insulin	2. Myxedema
<del>(c)</del> Hypersecretion of Growth hormone in childhood	<del>3.</del> Dwarfism
<del>(d)</del> Hyposecretion of ADH	<del>4.</del> Gigantism
<del>(e)</del> Hypersecretion of Thyroxine	<del>5.</del> Diabetes mellitus
	6. Exophthalmic goitre
	<del>7.</del> 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.)*

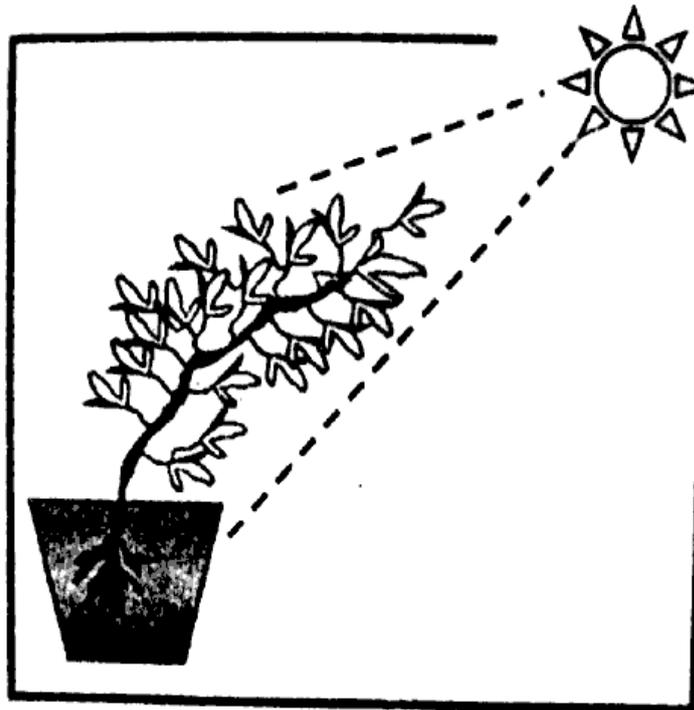
#### Question 3

- (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 \_\_\_\_\_.

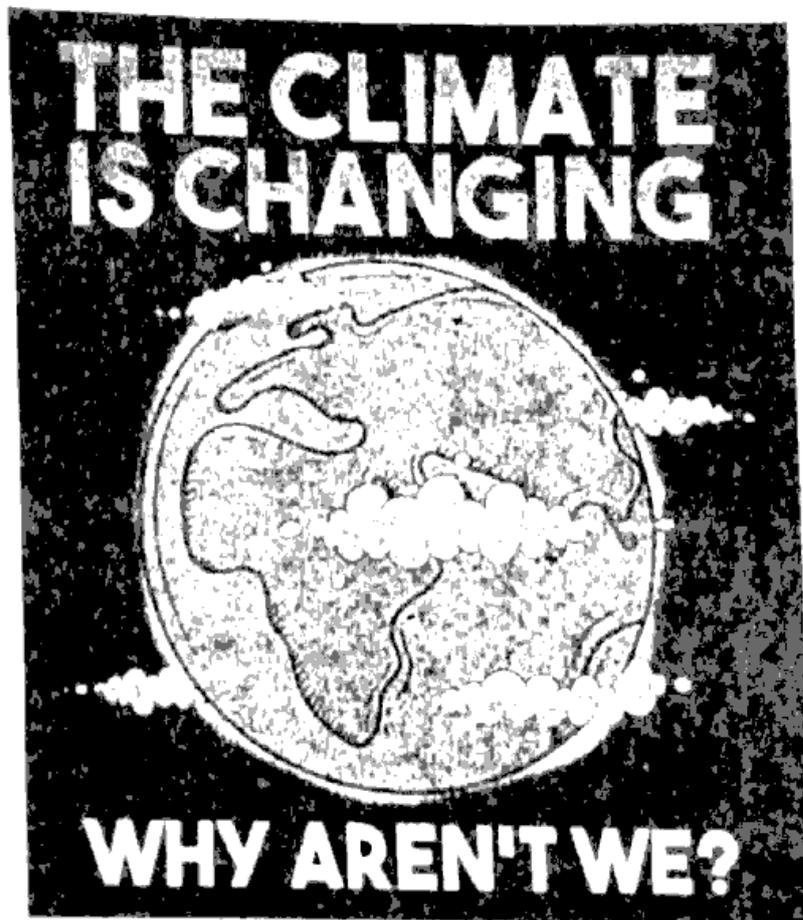
#### Question 4

- (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:



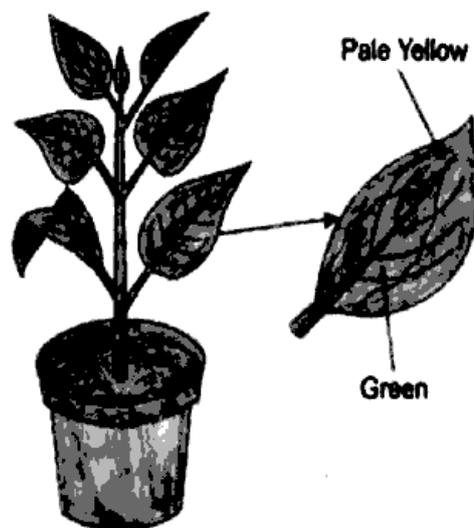
- (a) Name the climatic phenomenon for the increase in Earth's temperature.
- (b) Mention *one* reason for this warming.
- (c) What measure can be taken to prevent this climate change?

### 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. <https://www.icseonline.com> [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 F<sub>2</sub> generation.

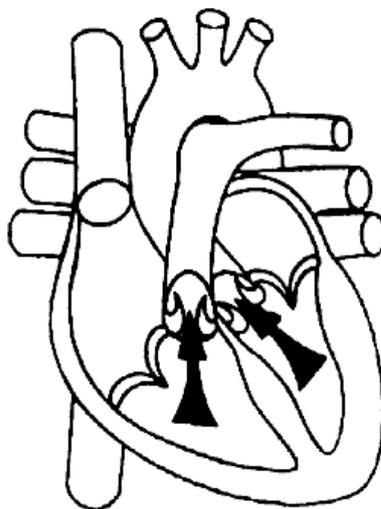
- (iii) Leaves of certain plants roll up on a hot sunny day. [2]
- Explain by giving suitable reasons.

- (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.