
BIOLOGY

SCIENCE Paper – 3

(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 at the head of this Paper 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 brackets [].

SECTION I (40 Marks)

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

Question 1

- (a) Name the following: [5]
- (i) The layer of the eyeball that provides nourishment to the eye.
 - (ii) One gaseous compound which depletes the ozone layer.
 - (iii) The structure which connects the placenta and the foetus.
 - (iv) A pair of corresponding chromosomes of the same shape and size and derived one from each parent.
 - (v) The compound formed when haemoglobin combines with carbon dioxide in blood.

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

(b) Correct and *rewrite the statements* by changing the biological term that is underlined for each statement: [5]

- (i) The theory of Inheritance of Acquired Characters was proposed by Watson and Crick.
- (ii) The protective sac which develops around the developing embryo is called the Pericardium.
- (iii) Maintaining balance of the body and coordinating muscular activities is carried out by the cerebrum.
- (iv) The kidney is composed of number of neurons.
- (v) The part of the eye which can be donated from a clinically dead person is the Retina.

(c) Give suitable *biological reasons* for the following statements: [5]

- (i) The birth rate in India is very high.
- (ii) Carbon monoxide is dangerous when inhaled.
- (iii) Root hairs become flaccid and droop when excess fertilizers are added to the moist soil around them.
- (iv) Acid rain is harmful to the environment.
- (v) All life on Earth is supported by Photosynthesis.

(d) Match the items given in Column A with the most appropriate ones in Column B and **REWRITE** the correct matching pairs: [5]

Column A		Column B
(i) Cranial nerves	–	Testosterone
(ii) Leydig cells	–	Natural reflex
(iii) Acetylcholine	–	12 pairs
(iv) Spinal nerves	–	Prolactin
(v) Sneezing	–	Neurotransmitter
	–	18 pairs
	–	31 pairs
	–	Conditioned reflex

(e) Choose the correct answer from the four options given below: [5]

(i) While recording the pulse rate, where exactly does a doctor press on our wrist?

- A. Nerve
- B. Vein
- C. Artery
- D. Capillary

(ii) In a human male, a sperm will contain:

- A. Both X and Y chromosomes
- B. Only Y chromosome
- C. Only X chromosome
- D. Either X or Y chromosome

(iii) A muscular wall is absent in:

- A. Capillary
- B. Venule
- C. Arteriole
- D. Vein

(iv) On which day of the menstrual cycle does ovulation take place?

- A. 5th day
- B. 28th day
- C. 14th day
- D. 1st day

(v) Which one of the following does not affect the rate of transpiration?

- A. Light
- B. Humidity
- C. Wind
- D. Age of the plant

- (f) Identify the **ODD** term in each set and name the **CATEGORY** to which the remaining three belong: [5]

Example: glucose, starch, cellulose, calcium

Odd term: calcium

Category: others are different types of carbohydrates.

- (i) Addison's disease, Cushing's Syndrome, Acromegaly, Leukemia.
- (ii) Insulin, Adrenaline, Pepsin, Thyroxine.
- (iii) Axon, Dendron, Photon, Cyton.
- (iv) Chicken pox, Colour blindness, Haemophilia, Albinism.
- (v) Polythene bag, Crop residue, Animal waste, Decaying vegetable.
- (g) Expand the following biological abbreviations: [5]
- (i) ABA
- (ii) IAA
- (iii) ATP
- (iv) DNA
- (v) TSH
- (h) Study the picture given below and answer the following questions: [5]



- (i) Identify the type of pollution.
- (ii) Name one pollutant that causes the above pollution.
- (iii) Mention the impact of this pollution on human health.

(iv) State one measure to control this pollution.

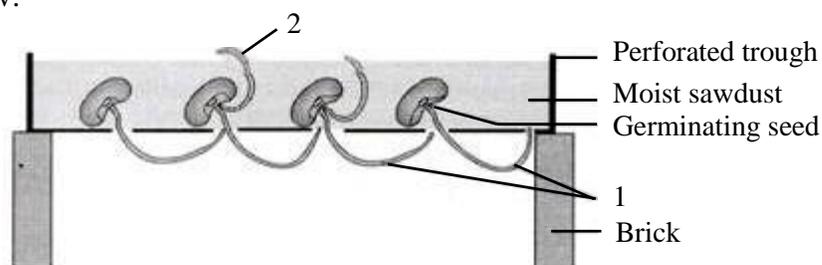
(v) What is a 'Pollutant'? Explain the term.

SECTION II (40 Marks)

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

Question 2

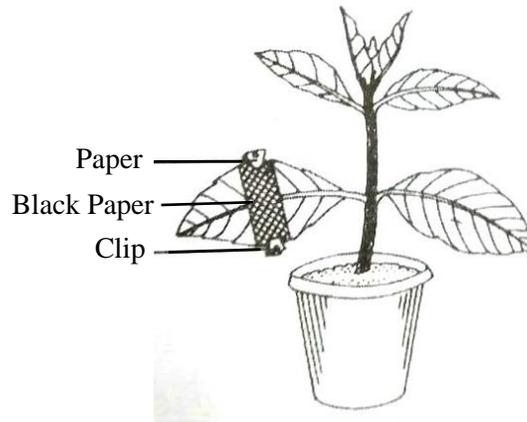
- (a) Given below is an experimental setup to demonstrate a particular tropic movement in germinating seeds. Study the diagram and answer the questions that follow: [5]



- (i) Label the parts 1 and 2.
- (ii) Name the tropic movement shown by part 1.
- (iii) Part 1 is affected by two stimuli. Name them.
Which one of the two is stronger?
- (iv) What is Thigmotropism? Give one example.
- (v) What is meant by 'Positive' and 'Negative' tropic movements in plants?
- (b) Mention the exact location of the following: [5]
- (i) Testis
- (ii) Incus
- (iii) Thylakoids
- (iv) Amniotic fluid
- (v) Corpus callosum

Question 3

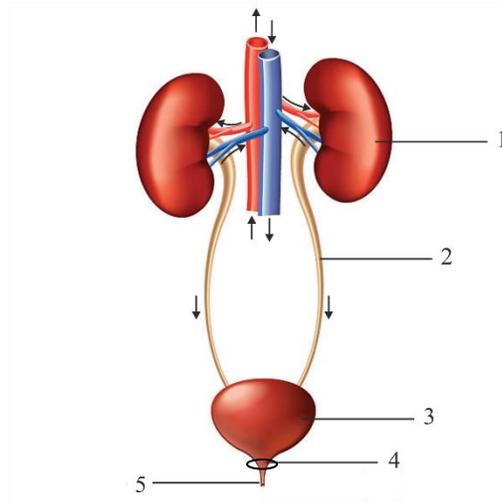
- (a) The diagram given below represents an experiment to prove the importance of a factor in photosynthesis. Answer the questions that follow: [5]



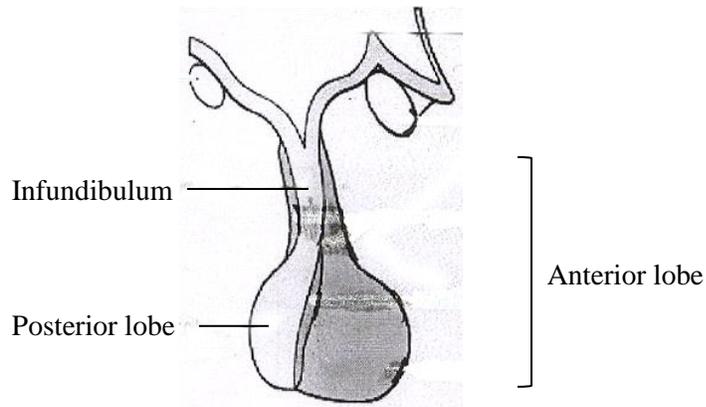
- (i) Name the factor studied in this experiment.
 - (ii) What will you observe in the experimental leaf after the starch test?
 - (iii) Explain the process of Photosynthesis.
 - (iv) Give a balanced chemical equation to represent the process of photosynthesis.
 - (v) Draw a neat, labelled diagram of an experimental setup to show that oxygen is released during photosynthesis.
- (b) State the main functions of the following: [5]
- (i) Medulla Oblongata
 - (ii) Cytokinins
 - (iii) Tears
 - (iv) Coronary Artery
 - (v) Seminal Vesicles

Question 4

- (a) The diagram given below represents an organ system in the human body. [5]
Study the same and answer the questions that follow:



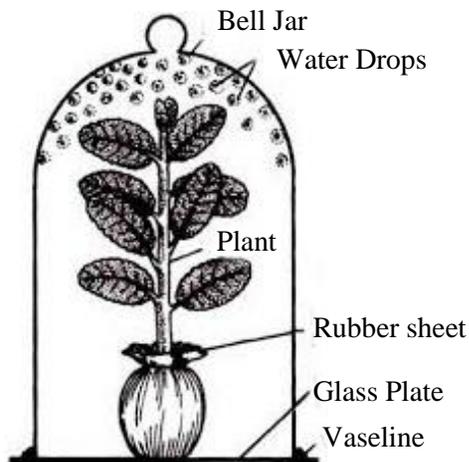
- (i) Identify the system.
- (ii) Label the parts marked 2 and 4. Mention the function of part 5.
- (iii) Name the structural and functional units of the part marked 1.
- (iv) What is the fluid that accumulates in part 3?
Which is the main nitrogenous waste present in it?
- (v) Draw a neat, labelled diagram showing the longitudinal section of part 1.
- (b) The diagram given below represents an endocrine gland in the human body. [5]
Study the diagram and answer the following questions:



- (i) Identify the endocrine gland. Where is it located?
- (ii) Why is the above gland referred to as the ‘Master gland’?
- (iii) Name the hormone which in deficiency causes Diabetes Insipidus.
How does this disorder differ from Diabetes Mellitus?
- (iv) Explain the term ‘Hormone’.
What is the role of Tropic hormones in the human body?
- (v) Which lobe of the above gland secretes:
 1. Oxytocin
 2. ACTH
 3. Growth hormone

Question 5

- (a) Given below is an apparatus which was setup to investigate a physiological process in plants. The setup was placed in bright sunlight. Answer the questions that follow: [5]

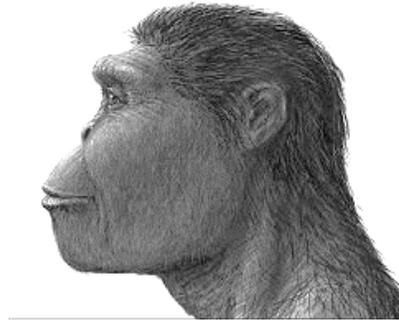


- (i) Name the process being studied. Define the process.
- (ii) Why was the pot enclosed in a rubber sheet?
- (iii) Mention two external factors which can accelerate the above process.
- (iv) List two adaptations in plants to reduce the above process.
- (v) Draw a neat, labelled diagram of a stomatal apparatus.

- (b) Given below are two stages in the evolution of man. [5]
Study them and answer the questions that follow:



A



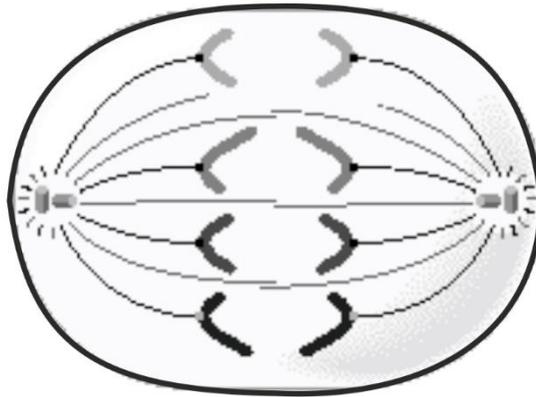
B

- (i) Identify Australopithecus and Neanderthal man from the above pictures.
- (ii) Mention two characteristic features each for the two stages.
- (iii) Who proposed the theory of 'Natural Selection'?
- (iv) Name the organism used as an example to explain 'Industrial Melanism'.
- (v) Give two examples of Vestigial organs in humans.

Question 6

- (a) In Mendel's experiments, tall pea plants (T) are dominant over dwarf pea plants (t). [5]
- (i) What is the phenotype and genotype of the F₁ generation if a homozygous tall plant is crossed with a homozygous dwarf plant?
 - (ii) Draw a Punnett square board to show the gametes and offspring when both the parents are heterozygous for tallness.
 - (iii) What is the phenotypic ratio and genotypic ratio of the above cross in (ii)?
 - (iv) State Mendel's Law of Dominance.
 - (v) What is a Dihybrid Cross?

- (b) Given below is a diagram representing a stage during the mitotic cell division. [5]
Study the diagram and answer the following questions:



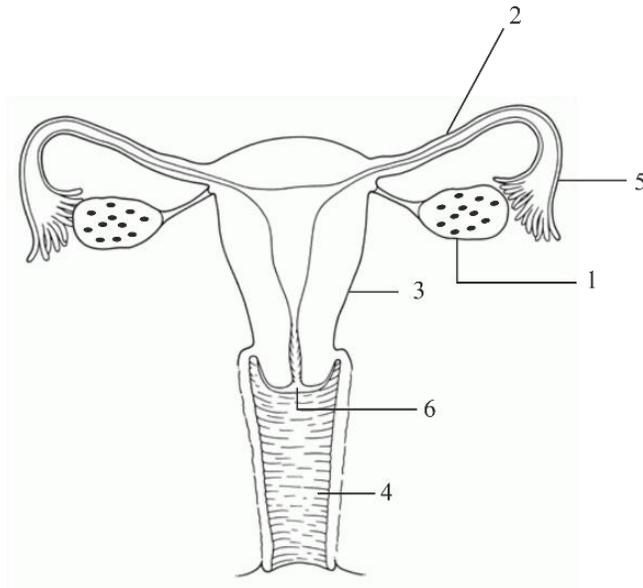
- (i) Identify the stage by giving a suitable reason.
- (ii) Is it a plant or an animal cell? Give a reason to support your answer.
- (iii) Draw a neat, labelled diagram of the stage which follows the one shown in the diagram.
- (iv) How many chromosomes will each daughter cell have after the completion of the above division?
- (v) Name the four nitrogenous bases.

Question 7

- (a) Answer the following questions briefly: [5]
- (i) How are the cytons and axons placed in the brain and the spinal cord?
 - (ii) Which part of the human ear gives 'Dynamic balance' and 'Static balance' to the body?
 - (iii) Explain how the human eye adapts itself to bright light and dim light.
 - (iv) What is Parthenocarpy? Give one example.
 - (v) Mention any two objectives of 'Swachh Bharat Abhiyan'.

- (b) The diagram given below represents a system in the human body. Study the diagram and answer the following questions:

[5]



- (i) Identify the system.
- (ii) Label the parts marked 5 and 6.
- (iii) Name the two hormones secreted by 1.
- (iv) Mention the number and the name of the part involved in fertilization and implantation from the above diagram.
- (v) Mention the surgical methods of contraception in:
 1. Human males.
 2. Human females.