

BIOLOGY
SCIENCE Paper – 3
(Two hours)

Note: You will be not allowed to write in 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.

Section A is compulsory.

Attempt any four questions from Section B.

The intended marks for questions or parts of questions are given in the brackets().

SECTION A

QUESTION 1

Select the correct answers to the questions from the given options: (15)

i) Following questions consist of two statements – Assertion (A) and Reason (R).

Answer these questions selecting the appropriate option given below:

Assertion (A): The purpose of making urine is to filter out undigested food from intestine.

Reason (R): Kidneys filter the waste and produce urine.

- a) Both A and R are true and R is the correct explanation of A.
 - b) Both A and R are true but R is not the correct explanation of A.
 - c) A is true but R is false.
 - d) A is false but R is true.
- ii) A big tree falls in a forest, but its roots are still in contact with the soil. The branches of this fallen tree grow straight up (vertically). This happens in response to:
- a) Water and light
 - b) Gravity and water
 - c) Water and minerals
 - d) Light and gravity
- iii) If a normal cell of human body contains 46 chromosomes, then the number of chromosomes in a sex cell of a human being is most likely to be:
- a) 60 b) 22 c) 23 d) 40
- iv) The prime source of CFCs:
- a) Refrigeration equipments b) Vehicular emissions
 - c) Domestic sewage d) Industrial effluents
- v) Which of the following in real sense is not an excretory system?
- a) Giving out CO₂
 - b) Removal of urea
 - c) Passing out faecal matter
 - d) Sweating
- vi) A cross between a tall plant (TT) and a dwarf plant (tt) resulted in progeny that were all tall plants as:
- a) Tallness is the dominant trait
 - b) Dwarfness is the dominant trait
 - c) Tallness is the recessive trait
 - d) Height of plant is not governed by gene t.

This paper consists of 6 printed pages.



- vii) Which one of the following occurs against concentration gradient?
- Transpiration
 - Diffusion
 - Active transport
 - Osmosis
- viii) Which of the following is not a stage of karyokinesis?
- Prophase
 - Metaphase
 - Synthesis phase
 - Telophase
- ix) The centrally placed atom in the structure of a chlorophyll molecule is:
- Iron
 - Magnesium
 - Manganese
 - Methyl group
- x) KOH in physiological experiments is used to absorb:
- Oxygen
 - Water
 - Carbon dioxide
 - Alcohol
- xi) Sunken stomata are found in the leaves of:
- Trifolium
 - Lemna
 - Nerium
 - Lilium
- xii) Surgical method of sterilization in a male involves cutting and tying of:
- Ureter
 - Penis
 - Urethra
 - Spermduct
- xiii) A neurotransmitter released by the axon ends of a nerve cell:
- Acetylene
 - Acetylcholine
 - Acetic acid
 - Chlorine
- xiv) What is the scientific name of the garden pea used by Gregor Mendel for his experiment?
- Pisum vulgare*
 - Pisum sativum*
 - Pisum fabaceae*
 - Pisum biflorum*
- xv) Industrial melanism was highlighted by:
- Touch-me-not
 - Butterfly
 - Polar bear
 - Peppered moth

QUESTION 2

A. Name the following: (5)

- i) The cross in which only one pair of characters is considered.
- ii) The exudation of sap from the injured parts of the plant.
- iii) A process of separating small molecules from the larger ones of blood by using a kidney machine.
- iv) Sudden change in genes or in the number of chromosomes.
- v) The emptied follicle in the ovary that secretes hormone.

B. Given below in the box are a set of 18 biological terms. Of these 12 can be paired into 6 matching pairs. Of the six pairs, one has been done for you as an example. Write out the remaining 5 matching pairs and number it from 1 to 5: (5)

Guttation, Midbrain, ~~Birth Rate~~, ~~Umbilical cord~~, Plant cell, ~~Mutation~~, ~~Natality~~, Centrosomes, Plastids, ~~Hydathodes~~, ~~Cluster of blood vessels~~, ~~Sickle cell anemia~~, ~~Adenine~~, Cobalt-60, Thyroid gland, White blood cells, Cytosine, ~~Purine~~

Example: Umbilical cord – Cluster of blood vessels

C. Give biological reasons for the following statements: (5)

- i) Cutting of trees should be discouraged.
- ii) In some xerophytes leaves are modified into spines.
- iii) There is frequent urination in winter than summer.
- iv) Gametes must be produced by meiosis for sexual reproduction.
- v) Use of pressure horn is prohibited in certain places.

D. Arrange and rewrite the terms in each group in the correct order so as to be in a logical sequence for the following: (5)

- i) Add Iodine solution, Destarched plant, Wash leaf in boiling water, Place in sunlight, Boil leaf in methylated spirit.
- ii) Renal artery, Renal vein, Glomerulus, Afferent arteriole, Efferent arteriole.
- iii) G₁ phase, Karyokinesis, S phase, Cytokinesis, G₂ phase.
- iv) Photons, Photolysis, Glucose formation, Activates chlorophyll, NADPH.
- v) Substomatal space, Upper epidermis, Spongy cells, Stoma, Palisade cells.

E. Complete the following table by filling the blanks with the most suitable words. (5)

Gland/Specific part of gland	Hormone secreted	Effect on the body
1	2	Regulates basal metabolism
3	Insulin	4
5	6	Increases heart beat
7	8	Causes contractions of uterine muscle during child birth
9	10	Regulates Na ⁺ and K ⁺ ions metabolism

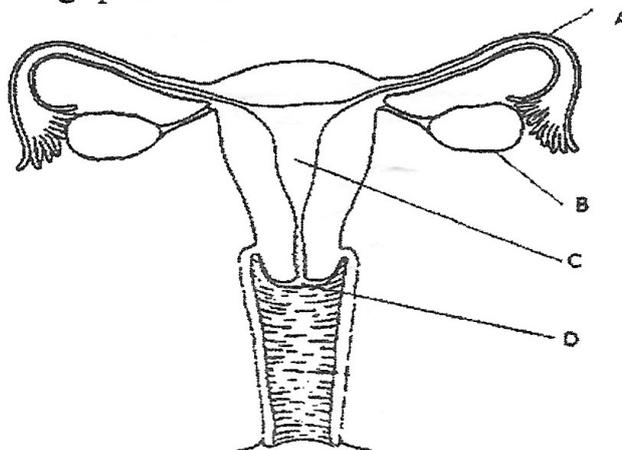


SECTION B

[Attempt any four questions. Mention the question numbers as given alongside.]

QUESTION 3

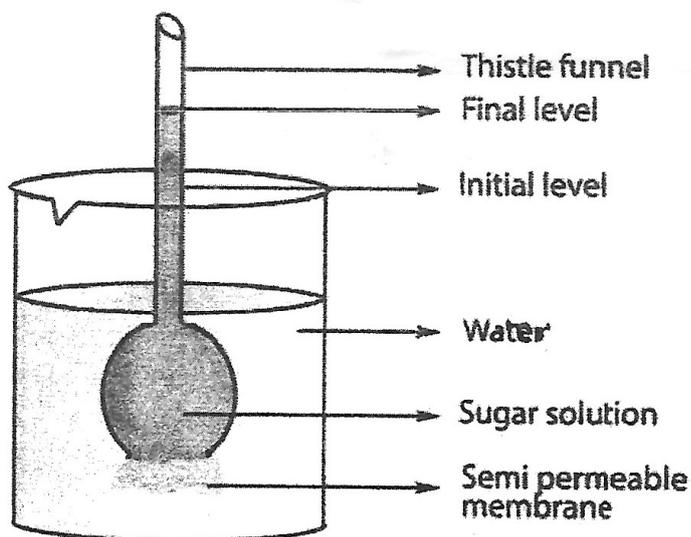
- A. Define polymerisation. (1)
- B. Differentiate between menarche and menopause (2)
- C. Draw a neat labelled diagram of human sperm cell. Show structures acrosome, nucleus, mitochondria and tail. (2)
- D. What are the common sources of oil spills? How do they affect sea life? (2)
- E. Given below is the structure of human female reproductive system. Observe and answer the following questions (3)



- i) Label the parts marked A, C and D
- ii) State the function of B.
- iii) Name the part that is cut and the ends are tied up during surgical method of contraception.

QUESTION 4

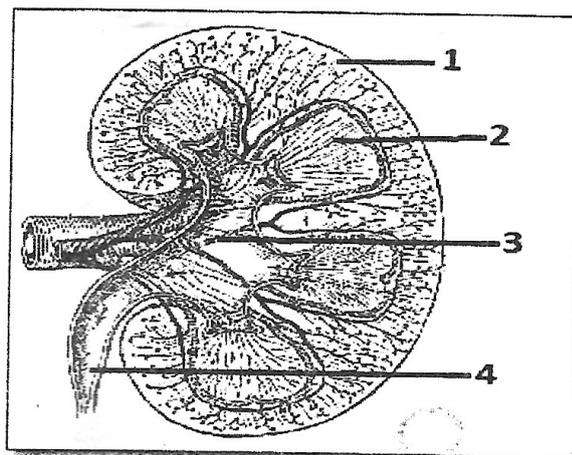
- A. Explain the term photolysis. (1)
- B. Write a short note on "Root pressure". Give any example of root pressure. (2)
- C. Differentiate between mitosis and meiosis. (2)
- D. Higher wind velocity increases rate of transpiration. Give logical reason for the given statement. (2)
- E. The diagram alongside represents an experimental set up to demonstrate a vital process. Study the same and then answer the questions that follow: (3)
(Note 'A' marks the initial level in the vertical tube.)



- i) Name the process. Define it.
- ii) Name two liquids (in terms of tonicity) that could be used in this experiment.
- iii) Why did the level of the liquid in the vertical tube rise?

QUESTION 5

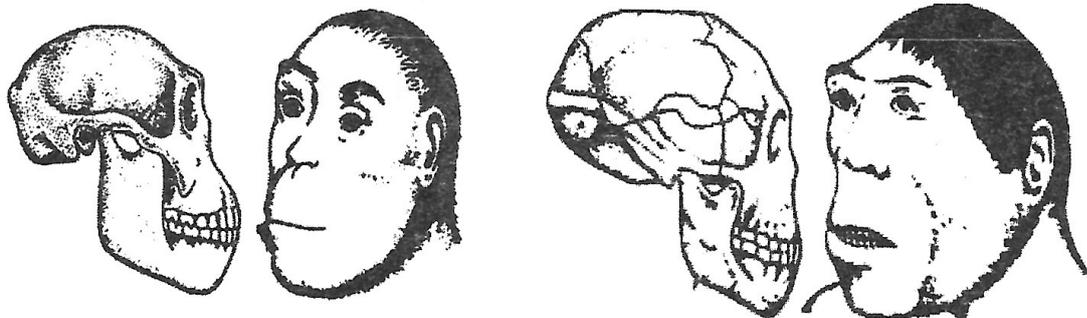
- A. Expand the abbreviation MTP. (1)
- B. Explain the role of abscisic acid. (2)
- C. Explain ultrafiltration. (2)
- D. Differentiate between hepatic vein and hepatic portal vein. (2)
- E. The diagram given below shows a section of a human kidney. Study the diagram carefully and answer the questions that follow: (3)



- i) Label the parts numbered 1 and 3 only.
- ii) Why does part '2' have a striped while part 1 as dotted appearance?
- iii) What is the fluid that passes down part '4'? Name the main nitrogenous waste present in it.

QUESTION 6

- A. Define the term evolution. (1)
- B. Explain the terms speciation and vestigial organ. (2)
- C. Explain Theory of Natural Selection. (2)
- D. Elaborate any two reasons for population explosion in India. (2)
- E. Given alongside are two figures (A and B) representing the two stages of evolution of human being. Answer the related questions: (3)



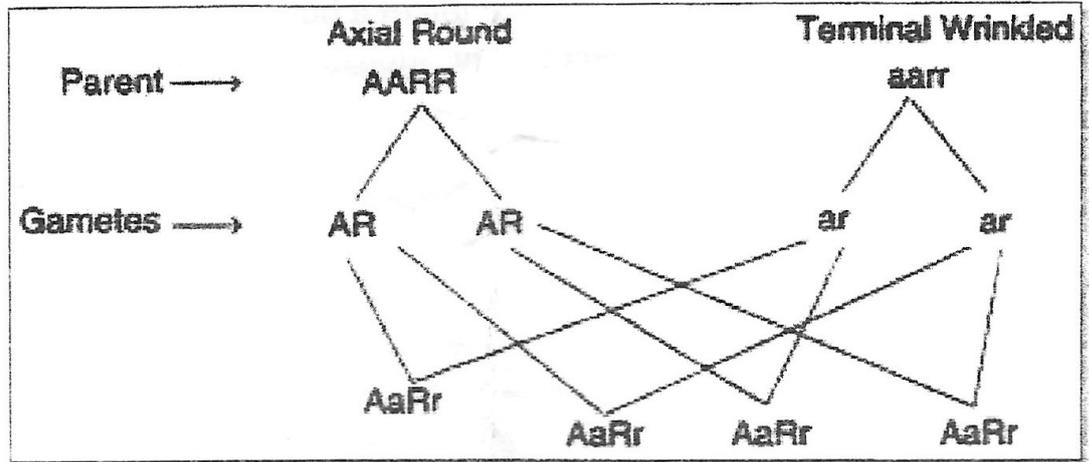
A

B

- i) Name the two stages A and B of human ancestors.
- ii) Differentiate between the two stages. (Based on cranial capacity and Height)
- iii) Write all the stages of human evolution in their correct sequence.

QUESTION 7

- A. Define gene. (1)
- B. State two possible reasons for myopia. (2)
- C. Differentiate between centromere and centrosome. (Based on their function) (2)
- D. Differentiate between the terms Fenestra ovalis and Fovea centralis. (2)
- E. Given below is a schematic diagram showing Mendel's Experiment on sweet pea plant having axial flowers with round seeds (AARR) and terminal flowers with wrinkled seeds (aarr). Study the same and answer the questions that follow: (3)



- i) Give the phenotype of F₂ generation produced upon by the self-fertilization of F₁ progeny.
- ii) Give the phenotypic ratio of F₂ generation.
- iii) Name and explain the law induced by Mendel on the basis of the above observation.

QUESTION 8

- A. Define Parthenocarpy. (1)
- B. Explain reflex action. Give any appropriate example of reflex action. (2)
- C. Explain the reason for Acromegaly and Gigantism. (2)
- D. Differentiate between Greenhouse effect and Global warming. (2)
- E. Explain Industrial Melanism. (3)

*****ALL THE BEST*****