6248480

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.

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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: [5]

(i) The exchange of chromatid parts between the maternal and the paternal chromatids of a pair of homologous chromosomes during meiosis.

(ii) The number of individuals inhabiting per unit area.

(iii) The immunity acquired by providing readymade antibodies from outside for treating certain infectious diseases.

(iv) The pollutants that cannot be broken down to simple and harmless products.

(v) The part of the brain that carries impulses from one hemisphere of the cerebellum to the other.

(b) Choose the correct answer from each of the four options given below: [5]

(i) A plant cell may burst when:

A. Turgor pressure equalises wall pressure.

B. Turgor pressure exceeds wall pressure.

C. Wall pressure exceeds turgor pressure.

D. None of the above

(ii) The individual flattened stacks of membranous structures inside the chloroplasts are known as:

A. Grana

B. Stroma

C. Thylakoids

D. Cristae

(iii) The nephrons discharge their urine at the:

A. Urinary bladder

B. Urethra

C. Renal pelvis

D. Renal pyramid

(iv) Gigantism and Acromegaly are due to:

A. Hyposecretion of Thyroxine.

B. Hyposecretion of Growth hormone

C. Hypersecretion of Thyroxine

D. Hypersecretion of Growth hormone

(v) The mineral ion needed for the formation of blood clot is:

A. Potassium

B. Sodium

C. Calcium

D. Iron

(c) In each set of terms given below, there is an odd one and cannot be grouped in the same category to which the other three belong. Identify the odd term in each set and name the category to which the remaining three belong. [5]

Example: *Ovary, Fallopian tube, Ureter, Uterus.*
Odd term: Ureter
Category: Parts of female reproductive system.

(i) Sewage, Newspaper, Styrofoam, Hay.

(ii) Thymine, Cytosine, Adenine, Pepsin.

(iii) Malleus, Iris, Stapes, Incus.

(iv) Cortisone, Somatotropin, Adrenocorticotropic hormone, Vasopressin.

(v) Typhoid, Haemophilia, Albinism, Colour blindness.

(d) Complete the following paragraph by filling in the blanks (i) to (v) with appropriate words: [5]

The amount of urine output is under the regulation of a hormone called (i) _____ secreted by the (ii) _____ lobe of the pituitary gland. If this hormone secretion is reduced, there is an increased production of urine. This disorder is called (iii) _____. Sometimes excess glucose is passed with urine due to hyposecretion of another hormone called (iv) _____ leading to the cause of a disease called (v)_____.

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

(i) Centromere

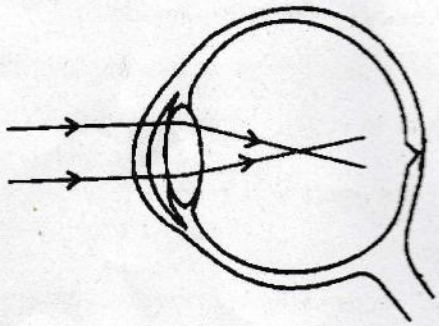
(ii) Chordae tendinae

(iii) Thyroid gland

(iv) Ciliary body

(v) Proximal convoluted tubule.

(f) Given below is a diagram depicting a defect of the human eye, study the same and then answer the questions that follow: [5]



(i) Name the defect shown in the diagram.

(ii) What are the two possible reasons that cause this defect?

(iii) Name the type of lens used to correct this defect.

(iv) With the help of a diagram show how the defect shown above is rectified using a suitable lens.

(g) Given in the box below are a set of 14 biological terms. Of these, 12 can be paired into 6 matching pairs. Out of the six pairs, one has been done for you as an example. [5]

Example: endosmosis – Turgid cell.

Identify the remaining *five* matching pairs :

Cushing's syndrome, Turgid cell, Iris, Free of rod and cone cells, Colour of eyes, Hypoglycemia, Active transport, Acrosome, Addison's disease, Blind spot, Hyperglycemia, Spermatozoa, Endosmosis, Clotting of blood.

(h) State the main function of the following: [5]

(i) Lymphocytes of blood

(ii) Leydig cells

(iii) Guard cells

(iv) Eustachian tube

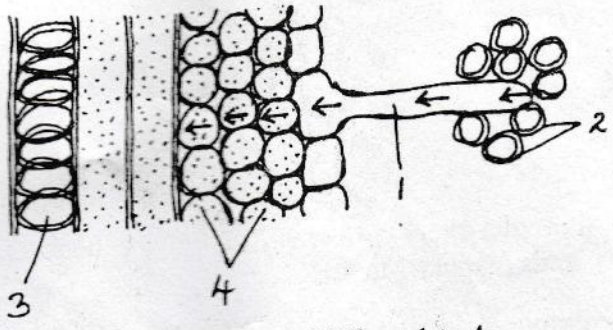
(v) Corpus luteum

SECTION II (40 Marks)

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

Question 2

(a) The figure given below is a diagrammatic representation of a part of the cross section of the root in the root hair zone. Study the same and then answer the questions that follow: [5]



(i) Name the parts indicated by the guidelines 1 to 4.

(ii) Which is the process that enables the passage of water from the soil into the root hair?

(iii) Name the pressure that is responsible for the movement of water in the direction indicated by the arrows. Define it.

(iv) Due to an excess of this pressure sometimes drops of water are found along the leaf margins of some plants especially in the early mornings. What is the phenomenon called?

(v) Draw a well labelled diagram of the root hair cell as it would appear if an excess of fertiliser is added to the soil close to it.

(b) Differentiate between the following pairs on the basis of what is mentioned within brackets: [5]

(i) Human skin cell and Human ovum (number of chromosomes)

(ii) Sperm duct and fallopian tube (function)

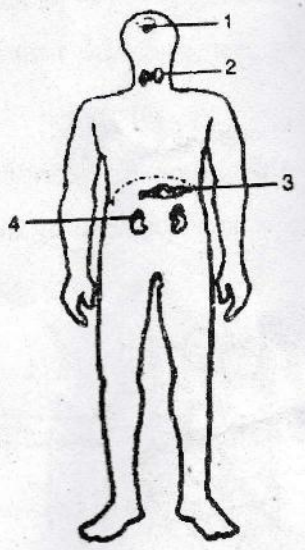
(iii) Red Cross and WHO (one activity)

(iv) Rod cells and cone cells (pigment)

(v) LUBB and DUP (names of the valves whose closure produce the sound)

Question 3

(a) Given below is the outline of the human body showing the important glands: [5]



(i) Name the glands marked 1 to 4.

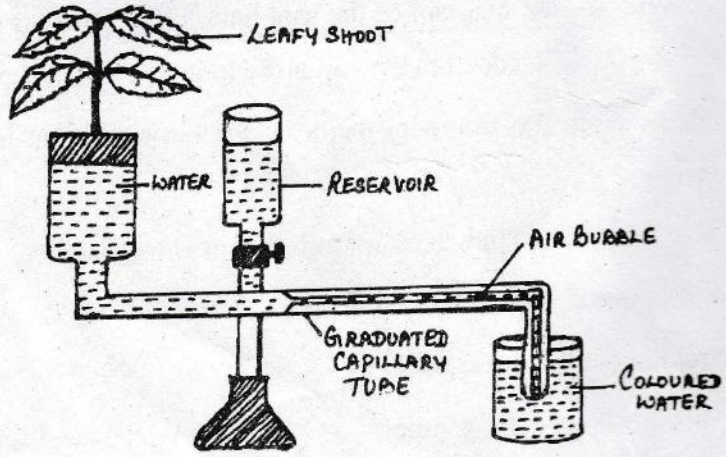
(ii) Name the hormone secreted by part 2. Give one important function of this hormone.

(iii) Name the endocrine part of the part numbered 3.

(iv) Why is the part labelled 1 called the master gland? Which part of the forebrain controls the gland labelled 1?

(v) Name the gland that secretes the 'emergency hormone'.

(b) The diagram of an apparatus given below demonstrates a particular process in plants. Study the same and answer the questions that follow: [5]



(i) Name the apparatus.

(ii) Which phenomenon is demonstrated by this apparatus?

(iii) Explain the phenomenon mentioned in (ii) above.

(iv) State two limitations of using this apparatus.

(v) What is the importance of the air bubble in the experiment?

(vi) Name the structures in a plant through which the above process takes place.

Question 4

(a) (i) Draw a well labelled diagram of the membranous labyrinth found in the inner ear. [5]

(ii) Based on the diagram drawn above in (i) give a suitable term for each of the following descriptions:

1. The sensory cells that helps in hearing.
2. The part that is responsible for static balance of the body.
3. The membrane covered opening that connects the middle ear to the inner ear.
4. The fluid present in the middle chamber of cochlea.
5. The structure that maintains dynamic equilibrium of the body.

(b) Give the Biological / technical term for the following: [5]

(i) Complete stoppage of menstrual cycle in females.

(ii) Pigment providing colour to urine.

(iii) The vein which drains the blood from the intestine to the liver.

(iv) The canal through which the testes descend into the scrotum just before the birth of a male baby.

(v) The process causing an undesirable change in the environment.

(vi) The removal of nitrogenous wastes from the body.

(vii) The repeating components of each DNA strand lengthwise.

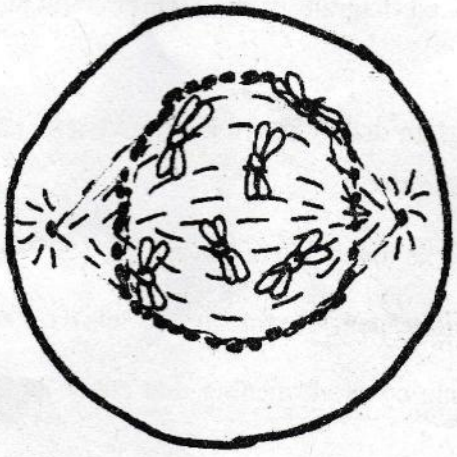
(viii) An alteration in the genetic material that can be inherited.

(ix) The process of uptake of mineral ions against the concentration gradient using energy from the cell.

(x) Blood vessels carrying blood to the left atrium.

Question 5

(a) The given diagram shows a stage during mitotic division in an animal cell: [5]



(i) Identify the stage. Give a reason to support your answer.

(ii) Draw a neat labelled diagram of the cell as it would appear in the next stage. Name the stage.

(iii) In what two ways is mitotic division in an animal cell different from the mitotic division in a plant cell?

(iv) Name the type of cell division that occurs during:

A. Growth of a shoot

B. Formation of pollen grains.

(b) Give scientific reasons for the following statements: [5]

(i) Colour blindness is more common in men than in women.

(ii) Injury to medulla oblongata leads to death.

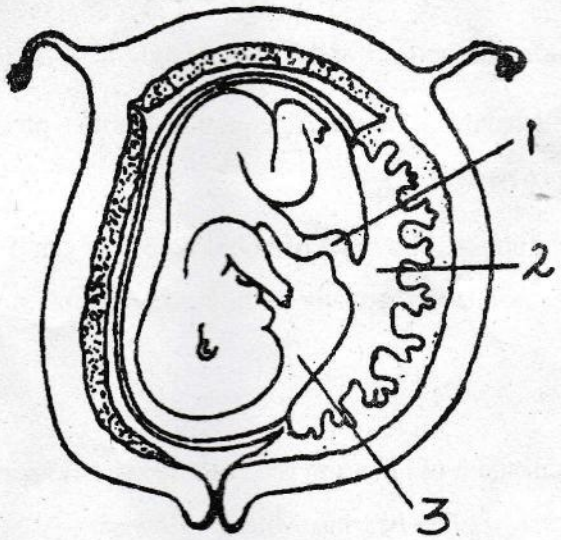
(iii) When an ovum gets fertilized, menstrual cycle stops temporarily in a woman.

(iv) Mature erythrocytes in humans lack nucleus and mitochondria.

(v) Blood flows in arteries in spurts and is under pressure.

Question 6

(a) The diagram given below is that of a developing human foetus. Study the diagram and then answer the questions that follow: [5]



(i) Label the parts numbered 1 to 3 in the diagram.

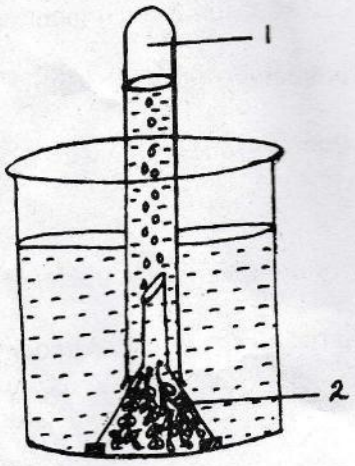
(ii) Mention any two functions of the part labelled 2 in the diagram.

(iii) Explain the significance of the part numbered 3 in the diagram.

(iv) Define the term 'Gestation'. What is the normal gestational period of the developing human embryo?

(v) Mention the sex chromosomes in a male and female embryo.

(b) The following diagram demonstrates a physiological process taking place in green plants. The whole set up was placed in bright sunlight for several hours. Study the diagram and answer the questions that follow: [5]



(i) What aspect of the physiological process is being examined?

(ii) Explain the physiological process mentioned in (i) above.

(iii) Label the parts numbered 1 and 2 in the diagram.

(iv) Write a well-balanced chemical equation for the physiological process explained in (ii) above.

(v) What would happen to the rate of bubbling of the gas if a pinch of sodium bicarbonate is added to the water in the beaker? Explain your answer.

Question 7

(a) A homozygous tall plant (T) bearing red coloured (R) flowers is crossed with a homozygous dwarf (t) plant bearing white (r) flowers :- [5]

(i) Give the genotype and phenotype of the plants of F_1 generation.

(ii) Mention the possible combinations of the gametes that can be obtained from the F_1 hybrid plant.

(iii) State the Mendel's law of Independent Assortment.

(iv) Mention the phenotypes of the offsprings obtained in F_2 generation.

(v) What is the phenotypic ratio obtained in F_2 generation?

(b) Briefly explain the following terms : [5]

(i) Reflex action

(ii) Power of accommodation

(iii) Photophosphorylation

(iv) Hormone

(v) Synapse