

**BIOLOGY****SCIENCE Paper – 3****(One hour and a half)**

*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 [ ].*

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**SECTION I (40 Marks)**

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

**Question 1**

- (a) Name the following:
- (i) The type of cell division which occurs in the cells of the reproductive organs.
  - (ii) A plant with sunken stomata.
  - (iii) A foreign body that induces the formation of antibodies in the body.
  - (iv) The place where fertilization occurs in the female reproductive system.
  - (v) An organization that looks after maternal and child welfare centres. [5]
- (b) State whether the following statements are *true* or *false*. If *false*, **rewrite** the correct form of the statement by changing the **first or last word** only.
- (i) Tubectomy is the surgical method of sterilisation in males.
  - (ii) Mitosis is the type of cell division occurring in the cells of injured parts of the body.
  - (iii) Photolysis is the process of splitting of water molecules in the presence of grana and temperature.
  - (iv) Dilation of the pupil is brought about by the sympathetic nervous system.
  - (v) Chromosomes other than the pair of sex chromosome are called alleles. [5]

- (c) Given below are five sets of five terms each. In each case, **rewrite the terms in logical sequence** as directed at the end of each statement.

One has been done for you as an example.

Example: Anaphase, Telophase, Prophase, Metaphase, Interphase.

(sequential order of Karyokinesis)

Answer: Interphase, Prophase, Metaphase, Anaphase, Telophase.

- (i) Vagina, Ovary, Uterus, Oviduct, Cervix. (pathway of egg after ovulation)
  - (ii) Motor Neuron, Receptor, Sensory Neuron, Effector, Association Neuron. (pathway of a nerve impulse)
  - (iii) Pupil, Yellow Spot, Cornea, Lens, Aqueous humour. (path of entry of light into the eye from an object)
  - (iv) Stoma, Mesophyll cells, Xylem, Substomatal space, Intercellular space. (loss of water due to transpiration)
  - (v) Cortical cells, root hair, soil, water, endodermis, xylem. (entry of water into the plant from the soil) [5]
- (d) There are five sets consisting of five terms given below. In each set there is a word which is an odd one. For each of these sets write down the category of the group having identified the odd one out, as shown in the example:
- Example- (0) cell wall, vacuole, centrosome, plastids, mitochondria.

Answer:

S.No.	Category	Odd One
0	Organelles of Plant Cell	Centrosome

- (i) Blinking, Knitting without looking, Smiling, Blushing, Crying.
- (ii) Myopia, Cataract, Hypermetropia, Squint, Cretinism.
- (iii) Cowper's gland, Urethral gland, Lachrymal gland, Seminal vesicles, Prostrate gland.
- (iv) Vasopressin, Growth hormone, TSH, ACTH, FSH.
- (v) Cresol, DDT, Lime, Mercurochrome, Bordeaux mixture. [5]



(e) Choose the correct answer to the following statements out of the three choices given after each statement.

(i) A point of contact between two neurons is termed:

1. Synapsis
2. Neuro motor junction
3. Synapse.

(ii) Loss of water as droplets from hydathodes is called:

1. Transpiration.
2. Bleeding.
3. Guttation.

(iii) The technical term for the fertilized egg is:

1. Placenta.
2. Zygote.
3. Morula.

(iv) The photo receptor cells of the retina sensitive to colour are:

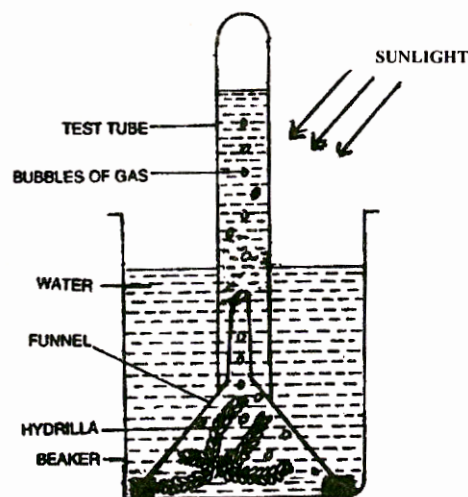
1. Cones.
2. Rods.
3. Organ of Corti.

(v) Salk's vaccine is used to build immunity against:

1. Tuberculosis.
2. Poliomyelitis.
3. Malaria.

[5]

(f) The figure below represents an experiment set up to study a physiological process in plants:





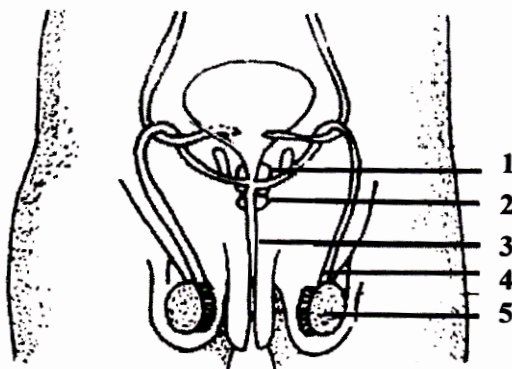
- (i) Name the physiological process being studied.
- (ii) Explain the process.
- (iii) What is the aim of the experiment?
- (iv) Give a well balanced equation to represent the process. [5]
- (g) Given below is an example of a certain structure and its special functional activity: Example - (0) Ribosomes and Protein synthesis. On a similar pattern complete the following:
- (i) Hypothalamus and -----.
- (ii) Suspensory ligaments and -----.
- (iii) Semi circular canals and -----.
- (iv) Mitochondria and -----.
- (v) Seminiferous tubules and ----- [5]
- (h) Explain the following terms:
- (i) Antibiotics
- (ii) Antiseptic
- (iii) Hormones
- (iv) Diffusion
- (v) Destarched plant [5]

**SECTION II (40 Marks)**

*Attempt any four questions from this Section*

**Question 2**

- (a) Given below is the outline of the male reproductive system:



- (i) Name the parts labelled 1 to 5.



- (ii) State the functions of the parts labelled 1 and 4.
  - (iii) Name the cells of part 5 that produce testosterone.
  - (iv) Why is the structure 5 present outside the body in the scrotal sacs?
  - (v) What is semen? [5]
- (b) Give *one* point of difference between the following on the basis of what is given in the brackets:
- (i) Myopia and Hypermetropia. (cause of the defect)
  - (ii) Cerebrum and Spinal cord. (arrangement of cytons and axons of neuron)
  - (iii) Genotype and Phenotype. (definition)
  - (iv) Karyokinesis and Cytokinesis. (explain the term)
  - (v) Light reaction and Dark reaction. (site of occurrence) [5]

**Question 3**

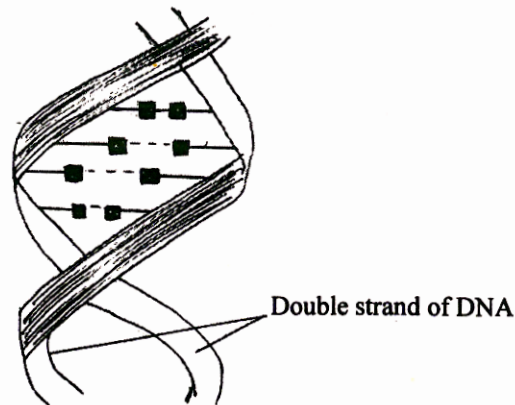
- (a)
- (i) State Mendel's Law of Dominance.
  - (ii) A pure tall plant (TT) is crossed with a pure dwarf plant (tt).  
Draw Punnett squares to show (1) F<sub>1</sub> generation (2) F<sub>2</sub> generation.
  - (iii) Give the Phenotype of the F<sub>2</sub> generation.
  - (iv) Give the Phenotypic and Genotypic ratio of the F<sub>1</sub> and F<sub>2</sub> generation.
  - (v) Name any *one* X-linked disease found in humans. [5]
- (b) Answer the following briefly:
- (i) *Three* functions of WHO.
  - (ii) *Three* advantages of a small family.
  - (iii) Explain the terms:
    - (1) Population density.
    - (2) Natality [5]





**Question 4**

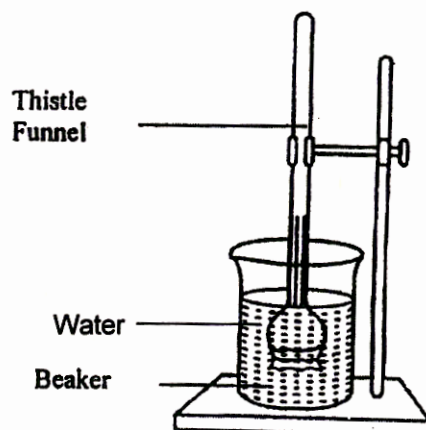
- (a) Given below is a diagram of a double helical structure of DNA:



- (i) Name the *four* nitrogenous bases that form a DNA molecule.
  - (ii) Give the full form of DNA.
  - (iii) Name the unit of heredity.
  - (iv) Mention *two* points of difference between *Mitosis* and *Meiosis*. [5]
- (b) (i) Draw a well labelled diagram of a Neuron showing the following parts: Perikaryon, Dendrites, Axon, Node of Ranvier and Myelin sheath.
- (ii) State the function of sensory neuron and a motor neuron.
  - (iii) What is a nerve made up of? [5]

**Question 5**

- (a) Given below is the diagram of an apparatus set up to study a very important physiological process:



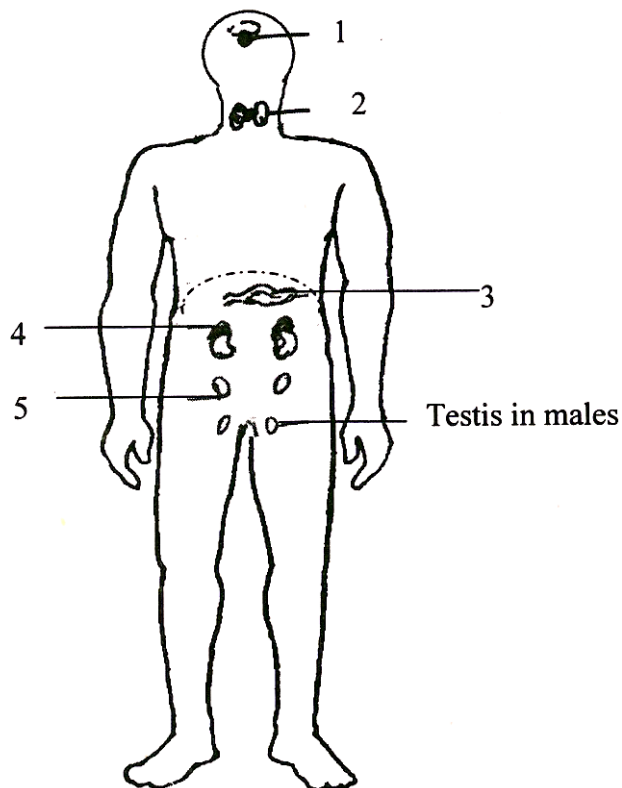
- (i) Name the process being studied.
- (ii) Explain the process.



- (iii) What change would you observe in the thistle funnel containing sugar solution after about 10 minutes?
  - (iv) Is sugar solution hypertonic or hypotonic?
  - (v) Name the part of the plant cell which is represented by the sugar solution.
  - (vi) Explain why much salt is added to pickles. [5]
- (b) Explain the following terms:
- (i) Reflex action
  - (ii) Vaccination
  - (iii) Turgidity
  - (iv) Bleeding in plants.
  - (v) Cataract. [5]

**Question 6**

- (a) Given below is an outline of the human body showing the important glands.



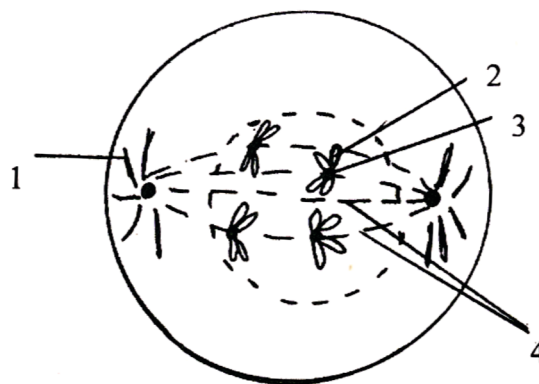
- (i) Name the glands marked 1 to 5.
- (ii) Name the hormone secreted by 2.  
Give one important function of this hormone.



- (iii) Name the endocrine cells present in part 3.
- (iv) Name the hormone secreted by part 4.  
Give *one* important function of this hormone. [5]
- (b) Give the biological /technical term for the following:
- (i) Cessation of menstruation in females.
  - (ii) An eye defect in which the cornea becomes uneven.
  - (iii) The period of complete intrauterine development of the embryo.
  - (iv) Inflammation of meninges.
  - (v) Non identical twins produced by the fertilization of two eggs.
  - (vi) Membrane that protects the foetus and secretes a protective fluid.
  - (vii) Process of conversion of several molecules of glucose to one molecule of starch.
  - (viii) The photosensitive pigment present in the cone cells of the retina.
  - (ix) The fluid present in the anterior part in front of the eye lens.
  - (x) Extracts of toxins secreted by bacteria. [5]

**Question 7**

- (a) Given below is a diagram representing a stage during mitotic cell division in an animal cell:



- (i) Identify the above stage. Give a reason to support your answer.
- (ii) Name the parts labelled 1, 2, 3 and 4.
- (iii) What is the function of part 3?



- (iv) Name the stage that comes just after the stage shown in the diagram. Draw a well labelled diagram of this stage. [5]
- (b) Account for the following:
- (i) Wilted lettuce leaves become crisp/firm when placed in cold water for a while.
  - (ii) One feels blinded for a short time while coming out of a dark room.
  - (iii) The leaves of certain plants roll up on a bright sunny day.
  - (iv) An alcoholic person walks unsteadily when drunk.
  - (v) Sleeping under a tree at night is not advisable. [5]