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ICSE 2010 : SCIENCE Paper 3 (Biology)

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SCIENCE (PAPER-3)

Biology

(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.

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)

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 :

(i) Synapsis.

(ii) Neuro motor junction.

(iii) Synapse.

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

(i) Transpiration.

(ii) Bleeding.

(iii) Guttation.

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

(i) Placenta.

(ii) Zygote.

(iii) Morula.

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

(i) Cones.

(ii) Rods.

(iii) Organ of corti.

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

(i) Tuberculosis.

(ii) Poliomyelitis.

(iii) Malaria. [5]

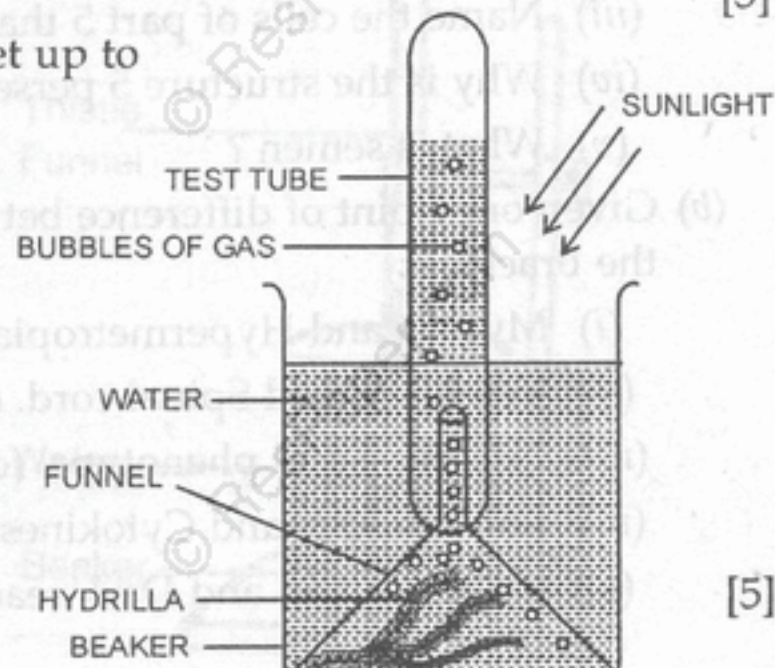
(f) The given figure represents an experiment set up to study a physiological process in plants :

(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

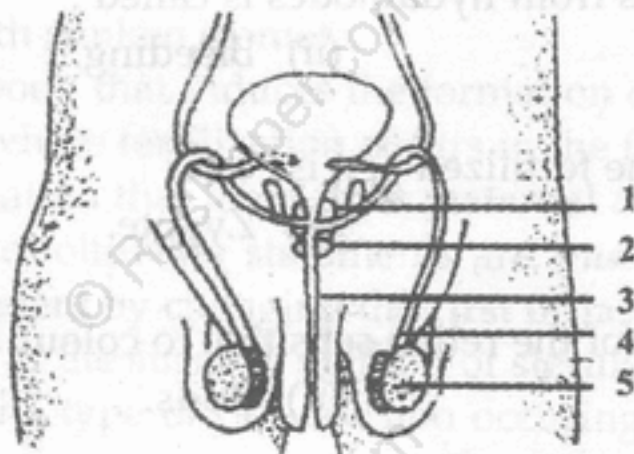
[5]

SECTION - II (40 MARKS)

(Attempt any FOUR Questions)

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) Given 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)

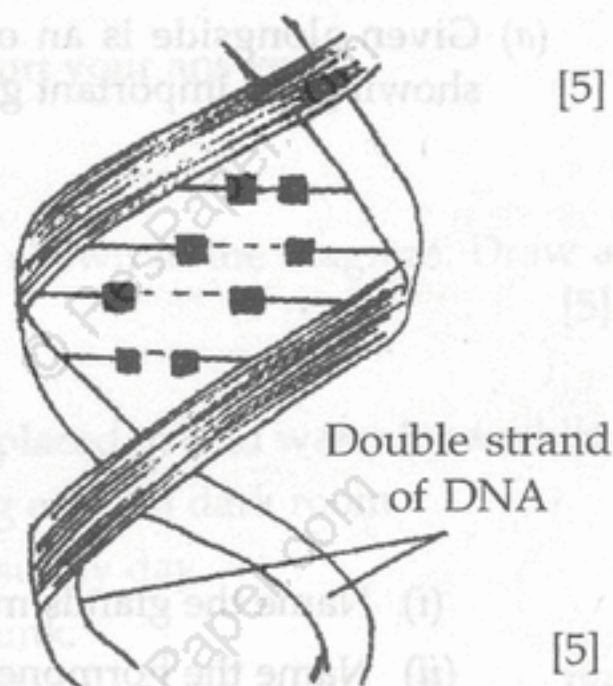
[5]

Question 3.

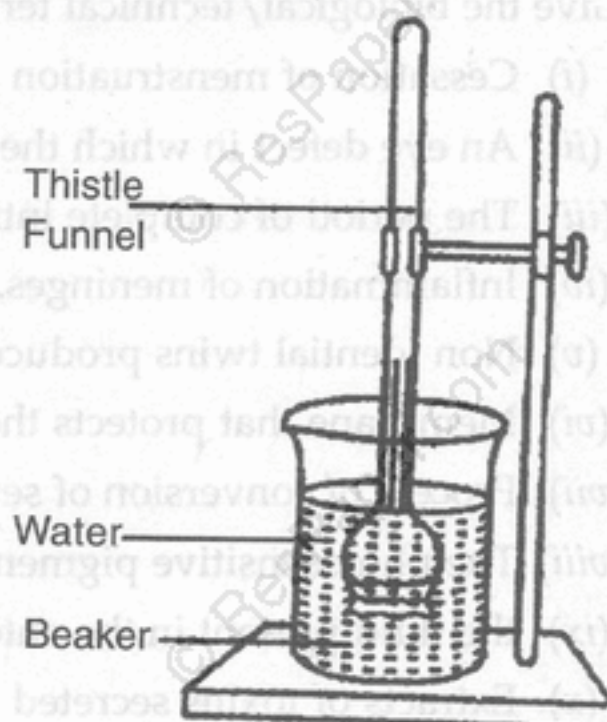
- (a) (i) State Mendel's Law of Dominance.
 (ii) A pure tall plant (TT) is crossed with a pure dwarf plant (tt).
 Draw Punnett squares to show (1) F₁ generation (2) F₂ generation.
 (iii) Give the Phenotype of the F₂ generation.
 (iv) Give the Phenotypic and Genotypic ratio of the F₁ and F₂ generation.
 (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 alongside 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 alongside 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.

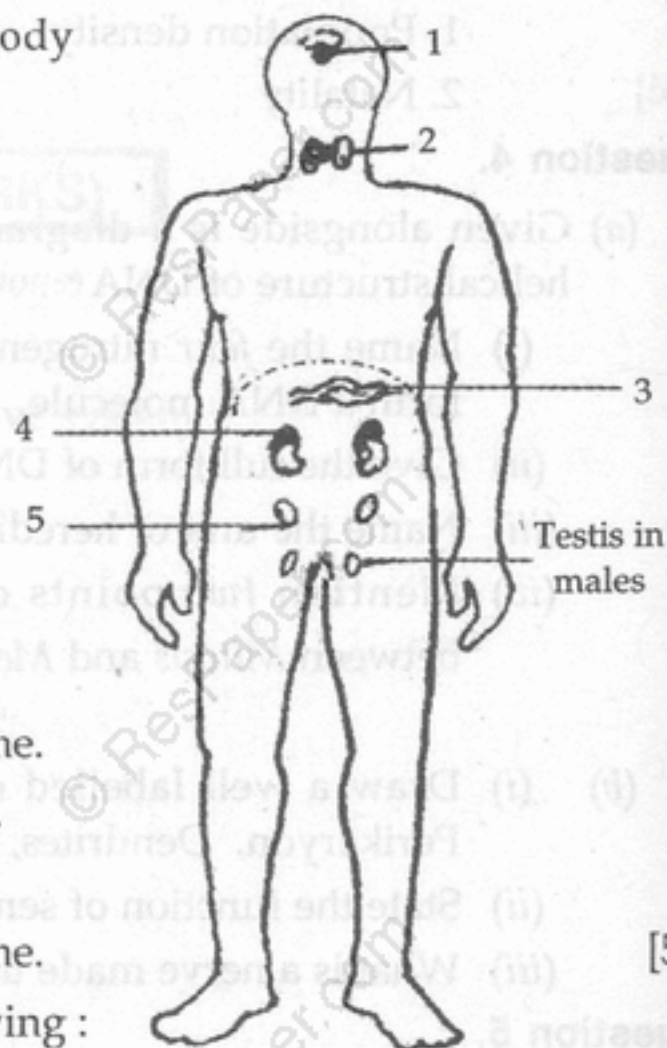
- (iii) What change would you observe in the thistle funnel containing sugar solution after about 10 minutes ?
- (iv) Is sugar solution hypertonic or hypotonic ?
- (v) Explain why much salt is added to pickles. [5]

(b) Explain the following terms :

- (i) Reflex action
- (ii) Vaccination
- (iii) Turgidity
- (iv) Bleeding in plants.
- (v) Cataract. [5]

Question 6.

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



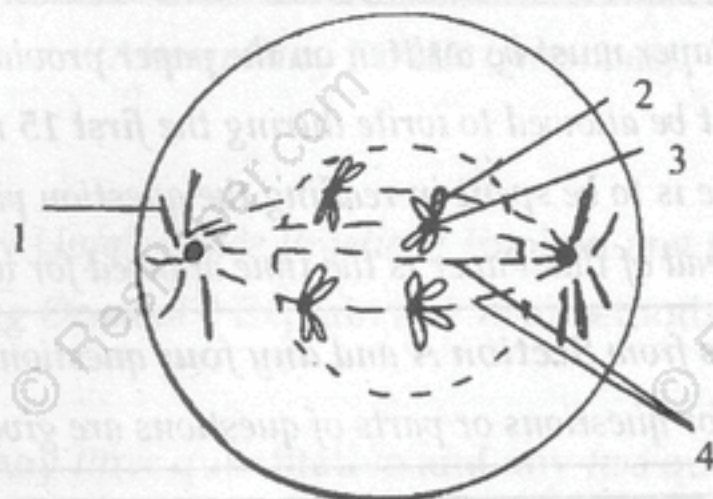
- (i) Name the glands marked 1 to 5.
- (ii) Name the hormone secreted by 2.
Give *one* important function of this hormone.
- (iii) Name the endocrine cells present in part 3.
- (iv) Name the hormone secreted by part 4.
Give *one* important function of this hormone. [5]

(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]