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ISC Specimen 2013 Biology Paper 1 (Theory) Botany and Zoology

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BIOLOGY**PAPER - 1****(THEORY)****(Botany and Zoology)***(Three hours)**(Candidates are allowed additional 15 minutes for **only** reading the paper.**They must NOT start writing during this time.)*

*Answer **all** questions in Part I and **five** questions in Part II, choosing **three** questions from Section A and **two** questions from Section B.*

All working including rough work, should be done on the same sheet as, and adjacent to, the rest of the answer.

The intended marks for questions or parts of questions are given in brackets [].

PART I (20 Marks)*Answer **all** questions.***Question 1**

- (a) Give *one* significant difference between each of the following: [5]
- (i) *Plasmolysis and Deplasmolysis.*
 - (ii) *Tendon and Ligament.*
 - (iii) *Threatened and endangered species.*
 - (iv) *Vasectomy and Tubectomy.*
 - (v) *Absorption spectrum and Action spectrum.*
- (b) Explain what would happen if: [5]
- (i) A green plant is exposed to green light only.
 - (ii) The cerebellum is injured.
 - (iii) Short day plants are exposed to red light followed by exposure to far-red light.
 - (iv) There is over-secretion of growth hormone after adolescence.
 - (v) A flower bud is emasculated and auxin is applied on the stigma.

- (c) Each of the following questions / statements have four suggested answers. [3]
Rewrite the correct answer in each case:
- (i) Which one of the following does not depend on a large surface area for its efficient functioning?
- (A) A root hair
 - (B) An alveolus of the lungs
 - (C) A villus of the small intestine
 - (D) A ventricle of the human heart.
- (ii) In a non-woody herbaceous plant, support is provided by:
- (A) Turgor pressure on cell walls
 - (B) Atmospheric pressure on cells
 - (C) Suction pressure of the cells
 - (D) Root pressure.
- (iii) The storage of sugar as glycogen in the liver is increased in the presence of:
- (A) Thyroxin
 - (B) Rennin
 - (C) Insulin
 - (D) Adrenalin
- (iv) The specific function of light energy in the process of photosynthesis is to:
- (A) Reduce carbon dioxide
 - (B) Synthesise glucose
 - (C) Activate chlorophyll
 - (D) Split water
- (v) Which one of the following helps the eye to adjust the focal length of the lens?
- (A) Cornea
 - (B) Aqueous humour
 - (C) Ciliary body
 - (D) Conjunctiva
- (vi) Introduction of dead or weak microbes into the body is known as:
- (A) Immunisation
 - (B) Vaccine
 - (C) Sterilization
 - (D) Vaccination

- (d) Mention the most significant function of the following: [3]
- (i) Ear ossicles
 - (ii) Hyaluronidase
 - (iii) Thylakoid membranes
 - (iv) Pericycle
 - (v) Piameter
 - (vi) Lymphocytes
- (e) State the best known contribution of: [2]
- (i) Chardack
 - (ii) Darwin
 - (iii) T.R. Malthus
 - (iv) William Roentgen
- (f) Expand the following : [2]
- (i) PEM
 - (ii) BCG
 - (iii) AIDS
 - (iv) TSH

PART II (50 Marks)

SECTION A

*Answer any **three** questions.*

Question 2

- (a) Draw a neat and fully labelled diagram of the V.S of a dicot leaf. [4]
- (b) Discuss the role of K^+ ions in the opening and closing of stomata. [3]
- (c) What are *aggregate fruits*? Give *two* examples. [3]

Question 3

- (a) How do nastic movements differ from tropic movements? Describe *any three* types of nastic movements in plants. [4]
- (b) Give an account of the Tunica Corpus Theory. [3]
- (c) Enlist the general functions of mineral elements in the life of a plant. What is meant by essentiality of an element? [3]

Question 4

- (a) Describe the process of digestion and absorption of fats. [4]
- (b) How is oxygen transported in the blood and released in the tissues? [3]
- (c) Draw a labelled diagram of the cochlea of the ear. [3]

Question 5

- (a) Describe the flow of blood through the heart during different phases of the cardiac cycle. [4]
- (b) Explain one cause and symptom of each of the following: [3]
- (i) Constipation
 - (ii) Uremia
 - (iii) Gout.
- (c) State the differences between *bone* and *cartilage*. [3]

Question 6

- (a) Explain the *counter current* system in a nephron. [4]
- (b) Describe the structure and functions of the xylem. [3]
- (c) Write *three* differences between cyclic and noncyclic photophosphorylation. [3]

SECTION B

Answer any two questions.

Question 7

- (a) Give an account of Lederberg's replica-plating experiment to show the genetic basis of adaptation. [4]
- (b) Explain *three* objections against Lamarck's theory of inheritance. [3]
- (c) Define: [3]
- (i) Biotic potential
 - (ii) Gene pool
 - (iii) Heterosis.

Question 8

- (a) Write the causative agent and the most important symptom of each of the following diseases: [4]
- (i) Dengue
 - (ii) Tuberculosis
 - (iii) Ascariasis
 - (iv) Chicken pox.
- (b) Explain the role of bacteria in improving soil fertility. [3]
- (c) What is Biomedical Engineering? Give *two* examples. [3]

Question 9

- (a) Briefly mention the measures you would suggest to control population explosion in India. [4]
- (b) Explain the origin of wheat in the form of a flow chart. [3]
- (c) What is amniocentesis? Explain its role in modern medical treatment. [3]

Question 10

- (a) Write *two* similarities and *two* differences between the *Cro-Magnon* man and the *Homo sapiens*. [4]
- (b) Explain *each* briefly: [3]
- (i) Captive breeding
 - (ii) National Park
 - (iii) In-situ conservation.
- (c) What is plant introduction? Give *two* examples. [3]

BIOLOGY**PAPER - 2****(PRACTICAL)****(Three hours)***(Candidates are allowed additional 15 minutes for only reading the paper.**They must NOT start writing during this time.)*

*Answer all questions.**All working including rough work should be done on the same sheet as the rest of the answer.**The intended marks for questions or parts of questions are given in brackets []**Note: Q4 (Spotting) is to be attempted on a separate continuation sheet. The continuation sheet is to be handed over to the Supervising Examiner after the last observation. This continuation sheet should be attached to the main answer booklet of the candidate after the examination.*

Question 1**[5]**

- (a) Examine carefully the flower specimens D41 and D42 provided. Describe the floral characteristics of each in semi-technical terms.
- (b) With a sharp razor blade, cut a longitudinal section of each specimen D41 and D42. Arrange a cut surface of each on a wet filter paper and show to the Visiting Examiner.
- (c) Observe the cut surfaces carefully with a hand lens and record your observations as follows:

Androecium		D41	D42
(i)	Relation of stamens to each other	--	--
(ii)	Nature of fixation of anthers	--	--
Gynoecium			
(i)	Nature of stigma	--	--
(ii)	Type of placentation	--	--

- (d) Make a neat labelled diagram of the cut surface of specimen D41.
- (e) Take a fresh specimen of D42. With the help of a forcep, remove the whorls one by one, till you reach the gynoecium. Now with a sharp razor blade, cut a transverse section of the ovary. Make a neat and labelled diagram of the transverse section.
- (f) Name the families to which specimens D41 and D42 belong.
- (g) Write *two* characteristics of each family.
- (h) Write the floral formulae of specimen D41 and D42.
- (i) Draw the floral diagram of specimen D42.
- (j) Mention *one* economically important plant belonging to each family mentioned in (f) above. (Write the botanical name only.)

Question 2

[5]

- (a) Cut the potato provided transversely into two equal halves and name them as A and B. Peel off the skin as a ring, one cm deep, from the broad cut end of each half, which will act as a base.
- (b) Scoop out a cavity from the rounded end of each potato-half with the help of a knife. The cavity should be 2 – 3 cms deep.
- (c) Boil the potato-half B in water for 10 minutes.
- (d) Pour distilled water into two petri dishes. Add two or three drops of red ink or eosin or safranin to the water in each dish. Now stand potato-half A in one dish and B in the other.
- (e) Fill the cavity in A and B to half its depth, with 15% sugar solution and mark the level with an alpin.
- (f) Leave the potato halves A and B as such for about an hour. **Show the experimental set up to the Visiting Examiner.**
- (g) Record your observation of potato halves A and B after one hour.
- (h) Give an explanation for your observation in each case.
- (i) Why was water stained with red dye?
- (j) Name the physiological process that has been studied by this experiment.
- (k) Define the process.
- (l) Why was potato B boiled?

Question 3**[5]**

Make a temporary stained mount of a nerve cell from specimen D43. Proceed as follows:

- (a) With the help of forceps and scalpel, remove some substance from the centre of specimen D43. Tease it with the help of a needle. Stain it with methylene blue for two minutes. Blot out excess stain. Transfer the tissue to another slide. Tease with a needle. Put a drop of glycerine and cover it with a coverslip. Remove excess of glycerine with the help of a filter paper.

Show your slide to the Visiting Examiner under low power microscope.

- (b) Draw a neat labelled diagram of the mount.
(c) Mention the number of cell/cells visible in the slide.
(d) Mention *two* identifying features of the cell/cells.

Question 4**[5]**

Identify the given specimens A to E. Give *two* reasons to support your answer in each case. Draw a neat labelled diagram of each specimen. You are not allowed to spend more than three minutes for each spot.

Note: *Hand over your continuation sheets to the Supervising Examiner after you finish answering this question.*

Question 5

Show the following to the Visiting Examiner for assessment:

- (a) Project **[7]**
(b) Biology Practical File. **[3]**

BIOLOGY**PAPER – 2****(PRACTICAL)****List of Items for Spotting****Spotting:**

1. T.S. of blastula.
2. An inflorescence of Sweet Pea flower.
3. T.S. of monocot leaf.
4. An experimental set up with light source for oxygen liberation during photosynthesis (beaker, hydrilla, test tube)
5. Model of Human Brain.