

BIOLOGY

Paper – 1

(THEORY)

(Botany and Zoology)

Three hours and a quarter

(The first 15 minutes of the examination are for reading the paper only.

Candidates must NOT start writing during this time).

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

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

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

PART I (40 marks)

Answer all questions.

Question 1.

(a) *Read the following questions carefully. For each question there are four alternatives A, B, C and D. Choose the correct alternative and write it in your answer sheet.* [5]

(i) Water enters the plant root through root hairs by the process of

- A endosmosis.
- B imbibition.
- C discretion.
- D osmosis.

(ii) Minerals found in the red pigment of vertebrate blood is

- A iron.
- B copper.
- C calcium.
- D magnesium.

- (iii) Most plants are green in colour because
 - A the atmosphere filters out all the colours of the visible light spectrum except green.
 - B green lights are the most effective wavelength region of the visible spectrum in sun light for photosynthesis.
 - C chlorophyll is least effective in absorbing green light.
 - D green light allows maximum photosynthesis.

- (iv) The change of gene frequency from one generation to the next is known as
 - A genetic constitution.
 - B inheritable genes.
 - C genetic drift.
 - D gene pool.

- (v) Which one of the following diseases is correctly matched with its pathogen?
 - A Tetanus - salmonella
 - B Cholera - vibrio comma
 - C Plague - corynebacterium
 - D Tuberculosis - mycobacterium leprae

(b) *Fill-in-the-blanks and write the correct answer only in your answer sheet. Do not copy the whole sentence.*

[5]

- (i) The closing and opening of stomata is controlled by.....and the number of stomata per square mm of leave surface is called
- (ii) Blood pressure is determined as.....and pressure.
- (iii)corpuscles have respiratory pigment called.....
- (iv) New species evolve by sudden and distinct.....heritable changes called.....
- (v) The changes in thegenes in a chromosome occurs inmutation.

(c) **Match each item under Column A with that which is most appropriate in Column B. You must rewrite the correct matching pairs.**

Column A	Column B
(i) Corpus callosum	a. progesterone
(ii) Corpus luteum	b. connects two cerebral hemispheres
(iii) Phytochrome	c. electron carrier complex
(iv) Cytochrome	d. archaeopteryx
(v) Endosperm	e. pericarp
(vi) Connecting link	f. food
(vii) Missing link	g. priipatus
(viii) Macro nutrient	h. photoreceptor molecules
(ix) Micro nutrient	i. boron
(x) Ovary wall	j. nitrogen
	k. potassium
	l. estrogen

(d) **Give reasons for the following.**

[10]

- (i) Heart wood ceases the function of conducting tissue and gives support to the stem.
- (ii) Plant growth is slow during lag phase and increases rapidly in exponential phase.
- (iii) Land animals excrete uric acid as nitrogenous waste.
- (iv) Most old people suffer from osteoarthritis.
- (v) Energy will be consumed even when a person sleeps.

(e) **Write one important function of each of the following.**

[5]

- (i) Zinc in plants
- (ii) Nucellus
- (iii) Collip's hormone
- (iv) Goblet cells
- (v) Multi nucleation

(f) **Give the important contributions of the following scientists.**

- (i) Kurosawa
- (ii) Schoene and Hoffmann
- (iii) Ivan Pavlov
- (iv) Burnet

(g) **Give the scientific name for the following.**

[2]

- (i) The response of plants to the relative length of day and night to which a flowering plant is exposed.
- (ii) The gaseous hormone which is associated with abscission of leaves, flowers and acceleration of fruit ripening.
- (iii) The functional contact between one neuron and another for the purpose of transferring information.
- (iv) The part of the retina having only cones.

(h) **Define the following terms.**

[2]

- (i) Capacitation
- (ii) Rouleaux formation

(i) **Elaborate the following.**

[2]

- (i) H.C.G
- (ii) EGF
- (iii) IBA
- (iv) CCC

(j) **Give one important difference between the following pairs based on what's given in the bracket.**

[2]

- (i) Photoperiodism and vernalisation (chemical to stimulate flowering)
- (ii) Callus culture and suspension culture (medium used)

PART II**SECTION A (30 marks)**

Answer any three questions.

Question 2.

- (a) Explain the *four* different types of cells which make up the xylems tissue. [4]
- (b) Write notes on exocrine and endocrine parts of the pancreas. [3]
- (c) What do you understand by the term ammonotelic animal? Human beings are not ammonotelic animals while protozoans are. Why? [3]

Question 3.

- (a) What is imbibition? Give *two* important aspects of imbibition and *four* significant roles of imbibition in plants and in nature. [3]
- (b) Micro-nutrients were discovered only after the discovery of macro nutrients. Why? Mention *one* physiological role and *one* deficiency disease caused by phosphorus and copper. [3]
- (c) Define granulocytes. Represent the different types of granulocytes with the help of a simple labeled diagram and state *one* function each. [4]

Question 4.

- (a) With the help of a sketch, explain cyclic photophosphorylation. [4]
- (b) Give *two* functions each for the following hormones secreted by the pituitary gland. [2]
- (i) Oxytocin
- (ii) Adrenocorticotrophic hormone (ACTH)
- (c) Explain Summation briefly. [2]
- (d) How does the application of Cytokinin on lateral branches overcome apical dominance? [2]

Question 5.

- (a) Describe the structure of a mammalian heart. [3]
- (b) Describe briefly the development of endosperm in angiosperm in *three* ways. [3]
- (c) The formation of spermatids consists of three different phases. Explain the three phases briefly. [3]

Question 6.

- (a) Describe with a suitable example the following artificial methods of vegetative propagation. [3]
- (i) Stem cutting
- (ii) Layering
- (b) (i) Why do some plants flower in summer and some in winter? [1]
- (ii) Distinguish between short day plant and long day plant. Mention *four* points. [2]
- (c) (i) Draw a well labeled diagram of the V.S of the human eye. [3]
- (ii) Give *one* difference between the blind spot and the yellow spot. [1]

SECTION B (30 marks)

Answer any two questions.

Question 7.

- (a) Give *three* differences between homologous and analogous organs. [3]
- (b) Based on Lamark's and Darwin's theory, explain why giraffe have long necks. [4]
- (c) Explain the role of Biology in improved productivity and in the field of social forestry briefly. [2]
- (d) Write down the botanical names of the following. [2]
- (i) Maize
- (ii) Tomato
- (e) Biofertilizers are preferred over chemical fertilizers. Justify your answer with *two* reasons [2]

- (f) Define the following.
- (i) Integrated Pest Management
 - (ii) Bio pesticides

Question 8.

- (a) What put an end to the reduced atmosphere of the primitive earth? [2]
- (b) If abiotic origin of life is in the process on a planet other than the earth, what could be some of the expected conditions? [3]
- (c) Mutation is considered as raw materials for evolution. Support your answer giving *two* reasons. [2]
- (d) Describe the modes of infection and preventive measures of Diphtheria and Tetanus. [2]
- (e) Give *four* advantages of Micro propagation. [2]
- (f) Describe the role of natural selection in industrial melanism with a suitable example. [3]
- (g) What are Transition and Transversion? [1]

Question 9.

- (a) Give a detailed description of fossil formation. [4]
- (b) Define allopatric speciation. How did Darwin's Finches explain the allopatric speciation? [3]
- (c) Define the following terms from mutation. [3]
- (i) Forward Mutation
 - (ii) Gene Mutation
 - (iii) Frame shift mutation
- (d) Explain the term producer gas. Name the mixture of different gases present in producer gas. [2]
- (e) Explain artificial insemination in brief and give *two* important significance of artificial insemination. [3]

Question 10.

- (a) Write down *four* advantages of tissue culture method of preserving germplasm.
- (b) Give *two* uses of Riboflavin in human beings. [1]
- (c) What is the full name of the causative agent of AIDS and which part of the immune system does it affect? [2]
- (d) Compare spontaneous and induced mutation. [2]
- (e) Man and apes have a common ancestor. Support your answer giving *two* reasons. [2]
- (f) Mention *one* function each for the following cells. [2]
- (i) T- cells.
- (ii) B – cells
- (g) What is autograft? Give *one* suitable example. [2]
- (h) Explain the effect of alcohol on the nervous system. [2]