BIOLOGY

PAPER – 1

(THEORY)

(Botany and Zoology)

(Three hours)

Maximum Marks: 70

*(Candidates are allowed additional 15 minutes for **only** reading the paper.*

They must NOT start writing during this time.)

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*Answer **all** questions in Part I and **six** questions in Part II, choosing **two** questions from each of the three sections A, B and C.*

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 a brief answer for each of the following: **[4]**

(i) What are *vestigial organs*?

(ii) Define root *pressure*.

(iii) What is *incomplete dominance*?

(iv) What is *genetic conservation*?

(b) Each of the following question(s)/ statement(s) has four suggested answers. Choose the correct option in each case. **[4]**

1. Monadelphous stamens are those which:

(i) united into more than two bundles

(ii) united into two bundles

(iii) unite into one bundle

(iv) remain free

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2. Determination of skin colour is an example of:

   (i) co-dominance

   (ii) polygenic inheritance

   (iii) incomplete dominance

   (iv) Pleiotropy

3. 'Bt' cotton is resistant to:

   (i) insects

   (ii) draught

   (iii) salt

   (iv) Herbicides

4. Haemophilia is a:

   (i) Y linked disorder

   (ii) Autosomal sex disorder

   (iii) X linked disorder

   (iv) Deficiency disorder

(c) Give a scientific term for each of the following: **[4]**

(i) Maximum number of individuals that an environment can support.

(ii) Exhibition of superiority of the hybrid over both of its parents.

(iii) The functional unit of gene.

(iv) The development of an embryo without the occurrence of fertilization.

(d) Expand the following abbreviations: **[4]**

(i) SCP

(ii) ZIFT

(iii) IPM

(iv) PGA

(e) Name the scientists who are associated with the following: **[4]**

(i) Reverse transcription

(ii) DNA fingerprinting

(iii) Mutation

(iv) Mass Flow Hypothesis

PART II (50 Marks)

SECTION A

*Answer any **two** questions.*

Question 2

(a) Give *three* differences between living and non-living organisms in levels of organization. **[3]**

(b) State the Theory of Recapitulation. **[1]**

(c) Give the difference between frame-shift mutation and substitution mutation. **[1]**

Question 3

(a) State *three* similarities between *Australopithecus* and *Apes*. **[3]**

(b) Define genetic drift. **[1]**

(c) What is *abiogenesis*? **[1]**

Question 4

(a) Give an account of the different types of natural selection. **[3]**

(b) Define Neo-Darwinism. **[1]**

(c) What are coacervates? **[1]**

SECTION B

*Answer any **two** questions*

Question 5

(a) Give *four* anatomical differences between a dicot root and monocot root. **[4]**

(b) State the importance of water to plants. **[4]**

(c) Differentiate between: **[2]**

(i) Absorption spectrum and action spectrum

(ii) Racemose and cymose inflorescence

Question 6

(a) Give an account of the follicular phase of the menstrual cycle. **[4]**

(b) Explain the process of spermatogenesis. **[4]**

(c) Define: **[2]**

(i) Implantation

(ii) Capacitation

Question 7

(a) Give the functions of placenta in human females. **[4]**

(b) Explain the development of micro sporangium in plants. **[4]**

(c) Define: **[2]**

(i) Triple fusion

(ii) Porogamy

SECTION C

*Answer any **two** questions.*

Question 8

(a) Give *four* differences between *linkage* and *crossing over*. **[4]**

(b) Explain the Meselson and Stahl's experiment for semiconservative replication of DNA. **[4]**

(c) State *two* goals of the Human Genome Project. **[2]**

Question 9

(a) What is biodiversity? Mention the implications of the loss of biodiversity. **[4]**

(b) Give *any four* causes of cancer. **[4]**

(c) Mention the causative agent and the preventive measures for each of the following: **[2]**

(i) Dengue

(ii) Amoebiasis

Question 10

(a) Briefly discuss the reasons for addiction to alcohol. **[4]**

(b) Explain sex determination in honey bees. **[4]**

(c) What is *bio fortification*? What role does it play in improving food production? **[2]**