

ISC Class 12 Biology Practical Syllabus 2020-21

PAPER II

PRACTICAL WORK – 15 Marks

1) **Taxonomy:** Study floral characteristics through dissection of flowers, drawing floral formula and diagrams of following families:

- (i) Malvaceae: type – China rose / Hollyhock or any other locally available flower of the family.
- (ii) Solanaceae: type – *Petunia* / *Datura* / Brinjal Flower / *Solanum nigrum* any other locally available flower of the family

Floral characteristics should be explained by dissection of flowers. Students should be taught how to cut vertical section of the flower and draw accurately labelled diagrams. The technique of drawing floral diagrams with the mother axis in the right position is necessary. Floral formula should be correctly written. Identification of the correct family giving reasons, technique of cutting T.S. and L.S of ovary should be explained and accordingly correct labelled-diagram should be drawn.

Students should know the examples of plants (belonging to each family) which are of economic importance. The examples of common names of plants must be supported with correct scientific names as well.

NOTE: In the examination, candidates will be tested on any one of the above families.

2) **Simple biochemical and physiological experiments**

To isolate DNA from available plant material.

Isolation of DNA from spinach leaves, green pea seeds, pulp of banana and papaya.

Take half a ripe and peeled banana into a beaker and add 50 ml of extraction fluid (1.5gm table salt +10 ml liquid detergent +90 ml distilled water). Place the beaker in a water bath set at 60 °C for 15 minutes. Stir gently with a glass rod. Filter 5ml of cooled content into a clean test tube and add 5ml of cold 90% ethanol. DNA molecules separate out and appear as white fibres.

3) **Slide preparation**

T.S. of ovary of any locally available flower, to show marginal / axile placentation.

The technique of staining and mounting neatly should be explained. Students should also know how to make labelled outline diagrams. They should also be taught to identify the mount under low/ high power of microscope. Two identifying features of the above need to be mentioned.

4) **Spotting: (three minutes to be given for each spot which includes identification, drawing a labelled diagram and writing at least two identifying characteristics).**

NOTE: Spotting must be done on a separate answer sheet during examination, which should be handed over to the Examiner immediately after spotting.

(i) Identify and comment on the following:

- (a) T.S. of ovary of mammal (Permanent slide).
- (b) T.S. of testis of mammal (Permanent slide).
- (c) T.S. of blastula / blastocyst of a mammal (chart/ slide).
- (d) Whole mount of *Plasmodium* sporozoite (slide /chart).
- (e) Whole mount of *Entamoeba histolytica* trophozoite (slide/chart).
- (f) Preserved specimen/ chart/ model of *Ascaris*.

(ii) Comment upon ecological adaptations of plants and animals.

Models/ virtual images/ charts of one plant and one animal found in xeric and aquatic habitats. Examples: Hydrilla, cactus, fish and camel.

(iii) Flowers adapted to pollination by different agencies – insect and wind.

Students should be able to identify the type of pollination of the given flower, draw the diagram of the flower and give two reasons for the type of pollination. Example: Hibiscus and grass.

Students should be taught how to identify, draw, label and give significantly visible characteristics as observed, of each spot, in a given time of three minutes. 'T.S.', 'model', 'whole mount', 'chart', 'image' of the specimen should be mentioned as a part of identification.

PROJECT WORK AND PRACTICAL FILE – 15 Marks

Project Work – 10 Marks

The project work is to be assessed by a Visiting Examiner appointed locally and approved by the Council.

The candidate is to creatively execute **one** project/assignment on an aspect of biology. Preference is to be given to investigatory projects. Teachers may assign or students may choose any **one** project of their choice. Students can choose any other project besides the ones indicated in the list. Following is **only a suggestive** list of topics:

- (i) Genetic disorders
- (ii) Gene therapy
- (iii) Human Genome Project
- (iv) DNA fingerprinting
- (v) Bio-piracy
- (vi) Cancer.
- (vii) AIDS/Hepatitis.
- (viii) Drug addiction and community.
- (ix) Role of micro-organisms in industry.
- (x) Human population.
- (xi) Mendelian Inheritance
- (xii) Environmental resistance.
- (xiii) Traditional and modern methods: Study of a few traditional methods of pest deterrence vis-a-vis modern methods of pest control - viability of traditional methods in today's scenario and limitations and dangers of modern methods.
- (xiv) Role of agrochemicals in increasing food production.

Suggested Evaluation Criteria for Project Work:

Format of the Project:

- Content
- Introduction
- Presentation (graphs, tables, charts, newspaper cuttings, handmade diagrams, photographs, statistical analysis if relevant)
- Conclusion/ Summary
- Bibliography

Projects should be handwritten by the candidate. Written pages should not exceed 15-20 pages.

Practical File – 5 Marks

The Visiting Examiner is required to assess students on the basis of the Biology Practical file maintained by them during the academic year.

Each practical done during the year, needs to be recorded by the student in the Practical file and the same must be checked, signed and dated by the teacher.

SCIENTISTS AND THEIR CONTRIBUTIONS:

1. Hugo de Vries: Mutation
2. Alec Jeffreys: DNA finger printing
3. Temin and Baltimore: Reverse transcription.
4. Jacob, Monod and Lwoff: proposed Lac operon.
5. Watson and Crick: Structure of DNA
6. Nirenberg and Khorana: Genetic code
7. Gregor Mendel: Father of genetics
8. Sutton and Boveri: Chromosomal theory of inheritance
9. Hugo de Vries: Correns and Tschermack: Rediscovered Mendelism
10. T. H. Morgan: Linkage
11. Henking: Discovered X-chromosome
12. F. Meischer: Isolated nucleic acid from pus cells, called Nuclein
13. Chargaff: Rule of equivalence in DNA structure
14. Hershey and Chase: DNA is the genetic material
15. Meselson and Stahl: Semi-conservative replication of DNA
16. G. Gamow: Triplet nature of codons
17. S. Ochoa: discovered polynucleotide phosphorylase
18. H Boyer: discovered Restriction Enzyme
19. S Cohen: method to transfer plasmid DNA in host cells
20. E. Wilson: coined the term Biodiversity
21. P. Ehrlich: Rivet Popper Hypothesis
22. Sanger: DNA/Protein sequencing