

## 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) Leguminosae: subfamily – Papilionaceae – type – Sweet pea/ Pea/ Bean/ *Sesbania/ Clitoria* (single flower) or any other locally available flower of the sub-family.
- (iii) 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**

(i) Study of soils from **two different sites**.

*Collect soil samples from two different areas and make a comparative study of their moisture content, water holding capacity and pH.*

**Guidelines for collection of soil samples:**

- *Moisture content – Soil samples are to be collected from a dry place and a wet place. Alternatively, samples of soil can be dried to different degrees in oven/by keeping in sun.*

- *Water holding capacity – Pour given amount of water in known weight of soil sample and record the volume of water retained by the soil sample.*

- *pH – Add water to the soil sample and test with pH paper.*

*Students should be taught to set up and demonstrate the experiments with correct diagram of the setup, record their observations methodically and give conclusions. This will give a clear idea of the physiological processes. Questions can be asked based on the above physiological processes studied.*

(ii) 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**

- (i) Germination of pollen grain in a nutrient medium.
- (ii) T.S. of ovary of any locally available flower, to show marginal / axile placentation.
- (iii) T.S. of a hydrophyte stem.
- (iv) T.S. of a xerophytic leaf (*Nerium*).

*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:
- T.S. of ovary of mammal (Permanent slide).
  - T.S. of testis of mammal (Permanent slide).
  - T.S. of blastula / blastocyst of a mammal (chart/ slide).
  - Whole mount of *Plasmodium* sporozoite (slide /chart).
  - Whole mount of *Entamoeba histolytica* trophozoite (slide/chart).
  - 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:

- Genetic disorders
- Gene therapy
- Human Genome Project
- DNA fingerprinting
- Bio-piracy
- Cancer.
- AIDS/Hepatitis.
- Drug addiction and community.
- Role of micro-organisms in industry.
- Human population.
- Mendelian Inheritance
- Environmental resistance.
- 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.
- 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. Oparin: Coacervates, Conditions on primitive earth were favourable for chemical evolution
2. Stanley Miller & Harold Urey: Recreated probable conditions on primitive earth
3. Ernst Haeckel: Proposed the recapitulation theory
4. Charles Darwin: Natural Selection
5. Hugo de Vries: Mutation
6. T. R. Malthus: Theory of Human Population Growth/ Essays on population
7. Alec Jeffreys: DNA finger printing
8. Temin and Baltimore: Reverse transcription.
9. Jacob, Monod and Lwoff: proposed Lac operon.
10. Watson and Crick: Structure of DNA
11. Nirenberg and Khorana: Genetic code
12. Gregor Mendel: Father of genetics
13. Sutton and Boveri: Chromosomal theory of inheritance
14. Hugo de Vries: Correns and Tschermack: Rediscovered Mendelism
15. T. H. Morgan: Linkage
16. P Maheshwari: Plant tissue culture
17. Henking: Discovered X-chromosome
18. F. Meischer: Isolated nucleic acid from pus cells, called Nuclein
19. Chargaff: Rule of equivalence in DNA structure
20. Hershey and Chase: DNA is the genetic material
21. Meselson and Stahl: Semi-conservative replication of DNA
22. G. Gamow: Triplet nature of codons
23. S. Ochoa: discovered polynucleotide phosphorylase
24. Wallace: divided the Earth into biogeographical regions
25. M S Swaminathan: Green revolution in India
26. H Boyer: discovered Restriction Enzyme
27. S Cohen: method to transfer plasmid DNA in host cells
28. R. Mishra: Father of Indian Ecology
29. E. Wilson: coined the term Biodiversity
30. P. Ehrlich: Rivet Popper Hypothesis
31. Sanger: DNA/Protein sequencing

### LIST OF ABBREVIATIONS TO BE STUDIED

1. ADA- Adenosine Deaminase
2. CMI- Cell Mediated Immunity
3. CPCB- Central Pollution Control Board
4. DFC- Detritus Food Chain
5. EFB- European Federation of Biotechnology
6. EST- Expressed Sequence Tags
7. ET- Embryo Transfer
8. GFC- Grazing Food Chain
9. GMO- Genetically Modified Organism
10. GPP- Gross Primary Productivity
11. hnRNA - Heterogeneous Nuclear Ribo Nucleic Acid
12. IARI- Indian Agricultural Research Institute
13. IMR- Infant Mortality Rate
14. IRRI- International Rice Research Institute
15. ICSI - Intra Cytoplasmic Sperm Injection
16. IUCD/IUD – Intra uterine contraceptive device
17. IUCN- International Union for Conservation of Nature and Natural Resources
18. IUI- Intra Uterine Insemination
19. IUT- Intra Uterine Transfer
20. JFM- Joint Forest Management
21. MALT- Mucosal Associated Lymphoid Tissue
22. MMR- Maternal Mortality Rate
23. MOET- Multiple Ovulation Embryo Transfer Technology
24. NACO- National AIDS Control Organisation
25. NPP- Net Primary Productivity
26. PID- Pelvic Inflammatory Diseases
27. PKU- Phenyl ketonuria
28. RCH- Reproductive and Child Health Care Programmes
29. SCID – Severe Combined Immuno Deficiency
30. SNPs - Single Nucleotide Polymorphisms
31. snRNA- Small Nuclear Ribo Nucleic Acid
32. SSBP – Single Strand Binding Protein
33. UTR - Untranslated Region
34. VNTRs - Variable Number of Tandem Repeats