

Note:

The paper setter is required to set questions of 3 types contained in 3 Sections (**Section A**- 10 questions, **Section B**- 10 questions and **Section C**- 4 questions) from the 5 units of each paper. There will be 10 questions in **Section A** which will be asked from all the 5 units, i.e., 2 questions from each unit. These questions have to be answered in one word or a few words only. Each question will be of one mark. All the questions in **Section A** are compulsory. In **Section B**, 10 questions will be set from the 5 units, i.e., 2 questions from each unit. Students are required to attempt at least 1 question from each unit. Each question will carry 10 marks. The answers of each question should be given in about 250 words. In **Section C** there will be 4 descriptive type questions set from all the 5 units, not more than 1 question from each unit. These questions may also have subdivisions. The students are required to answer 2 questions, each in approximately 500 words. Each question will carry 20 marks .

PAPER-IV
PRINCIPLES AND PRACTICE OF PLANT
AND ANIMAL CELL CULTURE

Duration: 3 hrs.

M.M.:100

UNIT – I

Introduction and history of plant tissue culture.

Tissue culture media (composition and preparation).

Initiation and maintenance of callus and suspension culture; single cell clones, somaclonal variation.

Organogenesis; somatic embryogenesis, and clonal propagation transfer and establishment of whole plants in soil.

UNIT – II

Application of plant tissue culture in plant pathology, development of virus free plants, growth of obligate parasites in culture, development of disease resistance, screening of germplasm.

In vitro pollination, embryo culture and embryo rescue.

Protoplast isolation, culture and fusion; selection of hybrid cells and regeneration of hybrid plants; symmetric and asymmetric hybrids; cybrids.

UNIT – III

Anther and pollen culture; production of haploid plants and homozygous lines.

Cryopreservation and germplasm conservation.

Gene transfer and transgenic plants; RELP, RAPD and other molecular markers.

Natural products with special reference to alkaloids; production in plant tissue culture; optimization for growth and production, time course of production, extraction of alkaloids and steroids, selection for cells for higher yields, cloning, mechanism of production.

Biotransformation, immobilization, elicitors and hairy root cultures for production of useful metabolites.

UNIT – IV

Introduction to the balanced salt solutions and simple growth medium. Brief discussion on the chemical, physical and metabolic functions of different constituents of culture medium.

Biology of the cultured cells, measuring parameters of growth.

Basic technique of mammalian cell cultures *in vitro*.

UNIT – V

Microcarrier culture, cell synchronization and cell culture.

Application of animal cell culture.

Hybridoma technology and monoclonal antibodies.

Introduction to the basic techniques and principles of RIA, ELISA, Immunofluorescence microscopy.

Organ and Histotypic culture.

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