[This question paper contains 5 printed pages.]

Your Roll No. .....

5150 **B**

B.Sc. Prog./II

BIO–202—BIOLOGY OF PLANTS : FORM, STRUCTURE AND FUNCTION

Time : 3 *Hours* *Maximum Marks* : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt any *Five* questions.

Parts of a question should be answered together.

All questions carry equal marks.

1. (*a*) Write short notes on any *three* of the following : 3×3=9

   (*i*) Index Kewensis

   (*ii*) Scalariform conjugation in *Spirogyra*

   (*iii*) Suitable example(s) of the Phylogenetic system of classification

   (*iv*) Sporangiospores

   (*v*) Scarification.

   (*b*) With the help of well-labelled diagrams, draw the stages in the life cycle of *Puccinia* occurring on barberry. 6

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2. (*a*) Differentiate between any *three* of the following : 3×3=9

(*i*) Homologous versus analogous traits.

(*ii*) Differences between black tea and green tea, with regard to the post-harvest processing.

(*iii*) Companion cells and albuminous cells in phloem.

(*iv*) Oxidative phosphorylation and substrate-level phosphorylation.

(*v*) Sunken stomata and stomatal crypt.

(*b*) Give a brief account of the economic importance of fungi. 6

Or

Describe Hatch-Slack pathway of carbon-fixation in photosynthesis.

3. Attempt any *three* of the following : 3×5=15

(*i*) Describe the characteristic roles of gibberellins in growth and development of plants.

(*ii*) Without drawing any molecular structures, make a schematic, flow-sequence diagram of the part of cellular respiration which occurs outside mitochondria in cellular matrix, citing the names of intermediates,

enzymes involved and the sites of dehydrogenation and phosphorylation.

(*iii*) Give an account of the methods of establishing essentiality of an inorganic element in plant nutrition.

(*iv*) Describe the Pulsation Theory by J.C. Bose explaining the ascent of sap, citing the evidence given in favour of this hypothesis.

(*v*) List the major anatomical differences between typical root and stem.

4. (*a*) Without detailing the molecular structures, make a flow-sequence diagram of Calvin cycle of photosynthesis, citing the names of intermediates, enzymes involved and the sites of carboxylation, reduction and ATP-consumption. 10

(*b*) Give an account of various factors affecting the rate of transpiration. 5

Or

Differentiate between conservative and non-conservative traits and their relative importance in biological classification.

5. Write short notes on any *five* of the following : 5×3=15

(*i*) Parboiling in rice

(*ii*) Oogamy in *Volvox*

(*iii*) Bacterial transduction

(*iv*) Formation of clamp connection in fungi

(*v*) Role of temperature in the dormancy-mechanism of certain seed-types

(*vi*) 'Sulphur-shower' in a conifer

(*vii*) Protonema and its role in the reproduction of a moss

(*viii*) Effect of pH on stomatal movement.

6. Differentiate between any *five* of the following pairs of contrasting terms, with suitable examples wherever required : 5×3=15

(*i*) Apogamy and Apospory.

(*ii*) Lytic and Lysogenic life cycles in viruses.

(*iii*) T^2 bacteriophage and TMV.

(*iv*) Soredium and Cephalodium.

(*v*) Uredospore and Telentospore.

(*vi*) Capillarity theory and Imbibition theory regarding the mechanism of ascent of sap.

(*vii*) SDP and SLDP in photoperiodism.

7. Draw well-labelled diagrams of any *three* of the following : 3×5=15

(*i*) T.s. of young dicot stem, with a vascular bundle separately magnified to show details.

(*ii*) L.s. megasporangiate strobilus of *Selaginella*.

(*iii*) T.s. leaflet of *Cycas*, showing centrifugal and centripetal xylem.

(*iv*) T.s. root of a legume plant, passing through a nodule.

(*v*) L.s. archegoniophore of *Marchantia*.

(*vi*) T.s. needle of *Pinus*, showing transfusion tissue.