

**BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI**

**FIRST SEMESTER 2023-23**

**PLANT PHYSIOLOGY (BIO F312)**

**MID SEMESTER TEST (CLOSE BOOK)**

**Total Marks: 50**

**Max. Time: 90 minutes**

**Date: 11.10.2023**

**Note: Answer briefly and to the point. Answer all parts of the same question together, in sequence.**

**Q1. (a)** Generally, we soak Chick pea (*Cicer arietinum* or Chana) in water for few hours before cooking. Based on your knowledge, briefly describe the cell types which constitute the hard seed coat of Chick pea. (4)

**(b)** Mention three plant cell types (not tissue system) which do not contain the genetic information required for the development of a new plant. (3)

**(c)** Two separate experiments were performed in the Plant Physiology Lab. In the first experiment, neem seedlings were exposed to radiolabeled minerals. In the second experiment, neem seedlings were provided with CO<sub>2</sub> that is labeled with <sup>14</sup>C. After one day, the stem sections of plants were analyzed for the presence of radiolabeled minerals and radioactive sucrose. Based on your knowledge, explain which tissue(s) would show presence of labeled minerals and radioactive sucrose? (3)

**Q2. (a)** While working on a rehabilitation project, a Ph.D. student decided to grow halophilic plant species A and B in the Sambhar Salt Lake area near Jaipur. The water potential of the soil in Salt Lake area was found to be -3.0 MPa. The solute and pressure potentials of root cells were found to be -0.13 MPa & -2.4 MPa respectively for species A; and -0.24 MPa & -3.6 MPa respectively for species B. Based on your learning, which plant species will be a good candidate for this project? Explain. (4)

**(b)** Serially mention the names of anatomical structures/ layers (in order) crossed by water molecules present in the soil during transport in a dicot plant system. Start from the entry of water in the outer most root cell (S.No. 1) to the atmosphere (Last S.No.). (5)

**(c)** Prepare a flow-chart depicting all the events & reactions which occur while opening of stomata during the day time. (8)

**Q3. (a)** What are functions of mucigel secreted by the root cap cells in dicot plants. (4)

**(b)** Briefly discuss the types of secondary active transport. How they are driven? (4)

**Q4.** Based on what you have learnt in this course, write the scientific justification/ explanation for the following statements/ facts:

**(a)** C<sub>3</sub> plants have lower water use efficiency. (6)

**(b)** In symplast, the passage of ions and molecules between two plant cells is a highly regulated process. (5)

**(c)** The Indian Thar Desert in Western Rajasthan has alkaline soil. (4)

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*All the Best*