BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI
FIRST SEMESTER 2023-24
PLANT PHYSIOLOGY (BIO F312)
COMPREHENSIVE EXAMINATION (CLOSE BOOK)

Max Time: 3 h **Date: 11.12.2023**
Max Marks: 90 (Close book: 40 + Open book: 50)

Note: 1. ***Answer briefly, to the point and in the format asked. Answer all parts of the same question together, in sequence.***
2. ***You have a maximum of 1 h 15 min to answer Close Book paper, but you can turn in any time after 45 minutes to the Invigilator to collect Open Book paper.***

Q1. Write the molecular and physiological perspective on how vernalization induce flowering in plants. In plants, which region receives the vernalization effect. Also mention the epigenetic changes resulting in *Arabidopsis* flowering. **(6)**

Q2. Based on your learning in this course, write scientific justification for the following facts:

(a) Auxin transport in plants is basipetal as well as acropetal. **(3)**

(b) Auxin transport in plants is independent of gravity. **(4)**

(c) Redistribution of ABA in the leaves results due to alkalinization of the xylem sap during water deficit condition. Draw a diagrammatic representation also. **(5)**

Q3. *Agrobacterium tumefaciens* is a prokaryote, but contains eukaryotic genes and can infect dicot plants. Briefly explain the strategy used by this bacterium for infection in plants. What benefit does the bacterium get when it infects the plant? **(5)**

Q4. (a) Shoot apical meristem (SAM) can be divided into cytohistological zones and distinct cell layers. With diagrammatical representation, write about the significance of different zones and cell layers in SAM. **(6)**

(b) Secondary meristem is a type of meristematic tissue responsible for the secondary growth in plants. Which two secondary meristems are formed in stem and how are they responsible for increasing the diameter or length of stem? Support your answer with diagrams. **(6)**

Q5. Phloem loading is the transport of phloem sap components from leaf mesophyll cells to the sieve element. Briefly discuss how polymer trapping model works for symplastic phloem loading in leaf minor veins and what are major predictions of this model. **(5)**

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All the Best