

21.2.11 (AN)
ADVA

**AGRICULTURAL & FOOD ENGINEERING DEPARTMENT
INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR**

Date of Examination: 21-02-2011 AN Full Marks: 30 Time: 2 h
Spring Mid-Semester 2011 Course: M. Tech. in *Applied Botany*
Subject No. AG60132 Subject Name: **Pharmacognosy & Metabolic Engineering**
No. of Students: 21

Instructions: All questions are compulsory. Answers should be concise and to the point.

1. a) With the help of a suitable diagram, represent how genetic program controls uniformity and variability among primary and secondary metabolism.
b) Define three different strategies for inducing natural products in plants as defence responses.
c) How plant secondary metabolism differs from primary metabolism both in the context of concept and reaction dynamics?
d) What are the different approaches of metabolic phytochemistry?
(3+1.5+3.5+2)

2. a) Diagrammatically represent the co-transformation mechanism of transferring and expressing a gene of secondary metabolism in hairy root system.
b) Discuss with suitable example, the possibilities and difficulties of producing a plant-based compound in a microbial system.
c) Briefly discuss the complexities arisen with the *m*-hydroxylation of phenolic ring in the context of monolignol biosynthesis.
d) Schematically represent the concept of the evolution of metabolic pathways with an appropriate example.
(3+3+3+3)

3. a) Briefly describe about 'Siberian Ginseng'.
b) Discuss the following statement – "Pharmacognosy is not only an academic exercise, it is the infrastructure on which evolution of modern medicine depends".
c) Write a brief note on complementary medicines.
(2+3+3)