

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

Date of Examination: **23-02-2018 FN** Full Marks: 30 Time: 2 h
Spring Mid-Semester 2018 Course: M. Tech. in *Agricultural Biotechnology*
Subject No. **AG60132** Subject Name: **Pharmacognosy & Metabolic Engineering**
No. of Students: 07

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

1. a) With appropriate examples, define three different strategies for formation natural products in plants as defence responses.
b) How plant secondary metabolism differs from primary metabolism both in the context of concept and reaction dynamics?
c) How allosteric regulation of primary metabolism evolves secondary metabolism?
d) List the different approaches for meeting the objectives of metabolic engineering.
e) Name two secondary metabolites that attained primary function in plants.

(3+3+3+2+1=12)

2. a) Briefly discuss the complexities arisen with the *m*-hydroxylation of phenolic ring in the context of monolignol biosynthesis.
b) Explain with appropriate background information and pathway diagram the reasons for not accumulation of vanillin in tobacco plants upon the expression of bacterial HCHL gene.
c) Name three genes along with their sources that were targeted to create blue rose.
d) Outline the metabolic engineering strategy for making yellow colour in white *Petunia* flower by targeting the flavonoid pathway.

(2.5+3+1.5+3=10)

3. a) Briefly discuss the discovery of two modern medicines based on the folklore and legends.
b) "Similae similibus curentur"- Discuss this fundamental tenet with suitable examples.
c) What is Aromatherapy?
d) Write brief note on St. John's wort.

(2.5+2.5+1.5 +1.5=8)