

## JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2016

B.Tech XI<sup>th</sup> Semester

COURSE CODE: 14M11BT215

MAX. MARKS: 15

COURSE NAME: Metabolic Engineering

COURSE CREDITS: 03

MAX. TIME: 1 HR

*Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.*

- Q1. Differentiate between Primary and secondary metabolism. Also explain the relationship between these two types of metabolic processes. (2 marks)
- Q2. Explain the biological significance of Shikimate pathway in plants and Does Shikimic acid pathway exist in humans? Explain the consequences of absence/presence of this pathway in humans. (3 marks)
- Q3. Explain the pathway of Dopamine biosynthesis. A mutation in the enzymes results in the accumulation of following metabolites: PEP, Anthranilate, Arogenate, Tyramine and (S)-Norcoclaurine. Give the names of the enzymes which were mutated and how does this mutation effects the Dopamine biosynthesis? Explain with the help of schematic diagram. (3 mark)
- Q4. Explain the significance of pH, temperature and substrate concentration on enzymatic activity in a metabolic reaction. (2 marks)
- Q5. Justify the statement: anabolic and catabolic nature of Acetyl- CoA. (2 marks)
- Q6. A person wants to increase the level of Artemisinin and Picroside in the plants. For this, he took two different plants and he treated first plant with lovastatin and second plant with fosmidomycin drugs. Interestingly, he found normal levels of desired secondary metabolites, i.e. Picroside and Artemisinin in the first and second plant, respectively. Detailed investigation revealed the accumulation of HMG-CoA in first plant and DOXP in second plant but the reason behind the normal production of Picroside and Artemisinin was not known. Further, he overexpressed the enzymes such that he got increased level of IPP in both the plants. Upon analysis, he got satisfactory increase in Artemisinin content in second plant but the Picroside content showed non-satisfactory increase in first plant. He is confused with the results obtained and now thinking what is missing in his experiment? Please help the person to interpret the results obtained with the help of schematic diagram showing the results at each step of the experiment and find out the reasons for failure? (3 mark)