

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
T-2 EXAMINATION-2016BTDD XIth/ M.Tech. (BT) II Semester

COURSE CODE:14M11BT215

MAX. MARKS: 25

COURSE NAME: Metabolic Engineering

COURSE CREDITS: 03

MAX. TIME: 1.5 HRS

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

- Q1. Why atropine is considered as true alkaloids while caffeine is considered as pseudo alkaloid? (2 marks)
- Q2. Explain with suitable examples, how living organisms preserve their internal order from surrounding and attain their metabolic requirements? (2 marks)
- Q3. Explain the relation of transcriptomic profiling with proteomics profiling of an organism and why it is advisable using both methods for giving answers of a biological problem with high confidence? Justify the answer with suitable example. (2 marks)
- Q4. Define the relation of ΔG , ΔG^0 , and $\Delta G'^0$ and which term of Gibbs free energy is best suited for explaining biological system? (3 marks)
- Q5. How amino acid levels affect the biosynthesis of lignan in plants. Explain with suitable example. (3 marks)
- Q6. In a metabolic experiment, for increment of levels of monoterpene indole alkaloids in *Catharanthus roseus* plant, a researcher had done the complete quantitative metabolome profiling. After this, he got monoterpenes, phenyl-propanoids, monoterpene indole alkaloids and flavonoids levels in decreasing order. Further, he cultured the plants under controlled in tissue culture and supplemented the culture media with exogenous pyruvate and again subjected it to complete quantitative metabolome profiling. This time he got monoterpenes, monoterpene indole alkaloids, phenyl-propanoids, and flavonoids levels in decreasing order. Explain a method by which researcher get high content of monoterpene indole alkaloids in his next experiment. (4 marks)
- Q7. Explain the following in brief. (3X3= 9 marks)
- Reversible enzyme inhibitions and their inference in metabolic pathway
 - Turnover number and Catalytic efficiency of enzymes
 - Mode of soft ionization for biological molecules in mass spectrometry