

Department of Biochemical Engineering & Biotechnology
BBI431 (Bioprocess Technology)
Minor Test 1

Feb 3, 2017
11-12 hrs
Venue: LH-310

Maximum Marks-20

Note: Attempt all questions.

- Q.1. (a). Define metabolic yield and volumetric productivity of a bioprocess, for example, for fermentation of sucrose to ethanol by *Saccharomyces cerevisiae*. (2)
- (b). Why does low metabolic yield adversely affect the economics of a bioprocess? (2)
- (c). How does increasing ethanol concentration affect specific productivity of ethanol fermentation using *Saccharomyces cerevisiae*. What types of process interventions can be employed to increase the specific productivity? (2+2=4)
- Q.2. You have isolated an organism which can utilize starch and hydrolyze it completely to glucose. It can then ferment glucose to ethanol by following a pathway which generates 2.5 ATP per mole of glucose. What will be the yield of ethanol per gram of starch, if all 2.5 ATP are utilized by it for growth? (4)
- Q.3. Sugar cane is not a suitable raw material for production of ethanol by *Zymomonas mobilis*, while it is suitable for *Saccharomyces cerevisiae*. What is its biochemical basis? (2)
- Q.4. Describe the mashing step and its purpose in the manufacture of beer by *Saccharomyces cerevisiae*? (3)
- Q.5. What is SSF (simultaneous saccharification and fermentation) process? What are its advantages over SHF (separate hydrolysis and fermentation) process in converting cellulose to ethanol? (1+2=3)