

**Birla Institute of Technology and Science, Pilani – Pilani Campus**  
**Semester-I, 2023-24**  
**Mid-semester Examination (Regular)**  
**CHE F421 Biochemical Engineering**

Date: 10/10/2023

Duration: 1.5 hrs

Day: Tuesday

Marks: 35

**CLOSED BOOK (30 MARKS; 45 Minutes)**

- Q.1.** Discuss the following terms (max. 30 words): **[5]**  
a) Cyanobacteria;      b) Lysogenic cycle;      c) Vacuoles;  
d) Zwitterion;      e) Immune response
- Q.2.** Discuss the effect of particle radius on the effectiveness factor for various enzyme loadings. Also, draw a neat schematic demonstrating the effect. **[5]**
- Q.3.** Write a note on the process of enzyme repression and enzyme induction. Draw a labelled schematic for each of them. **[5]**
- Q.4.** Mention the reaction involved in each of the following:  
a) Light-phase and dark phase of photosynthesis. **[2]**  
b) Overall reaction and oxidative phosphorylation in Krebs's cycle. **[3]**
- Q.5.** What are the various categories in which microbial product are classified? Write an expression of rate of product formation in each category. **[5]**
- Q.6.** Develop an expression for the rate of enzymatic reaction under competitive inhibition. Compare the kinetic parameters for competitive inhibition with the kinetic parameters under the Michaelis-Menten model using a double reciprocal plot along with the necessary discussion on the comparison. **[10]**

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