



**Part-III**

**Only Long Answer Type Questions (Answer Any Two out of Four)**

- Q3** Draw CSTR? State the advantage of running fed batch process of fermentation over batch process? **(16)**
- Q4** How do you interpret the batch reactor data to obtain the kinetics of a reaction? Explain integral method of analysis using first-order irreversible reaction as an Example. **(16)**
- Q5** Explain in detail mass transfer of immobilised enzymes /cells in packed bed reactor? **(16)**
- Q6** Describe in detail how the study of a heterogeneous reaction is useful to a bioprocess engineer? Give some reactions in support of your ideas? **(16)**