

Major Exam: BEL 419

April 2015

Time : 2 hours

MM: 30

Note: All parts of a question must be answered together

Q1.) Fill in the blank:

- (a) FOS stands for \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_  
class of enzymes is used for their synthesis. These are useful as \_\_\_\_\_ (2)
- (b) One reason antibiotic resistance develops is because microbial enzymes acquire \_\_\_\_\_ (1)
- (c) At high temperature, \_\_\_\_\_ product dominates, for two parallel irreversible reactions, \_\_\_\_\_ product is formed. (2)

Q2.) Explain briefly (in less than 5 sentences):

(2 x 5 = 10)

- (a) Meaning of *ee* and *E* in the context of obtaining enantiopure substances. Why enantioselective synthesis is preferable to kinetic resolution?
- (b) Strategies of co-enzyme regeneration based upon co-substrates. Which co-substrate does not require a thermostable ADH?
- (c) Three classes of enzyme promiscuity
- (d) Effect of log *P* of the solvent on reaction rate of the enzymes
- (e) Importance of *a<sub>w</sub>* in designing biocatalysis in low water systems

Q3.) Name the class of enzymes used for industrial level production of the following: (5)

- (i) Aspartame  
(ii) (S)-2-chloropropanoic acid  
(iii) Glycidyl butyrate  
(iv) Paclitaxel derivatives  
(v) (S)-2-octanol

Q4.) (a) Name three enzymes important in obtaining useful products from nitriles. Clearly indicate the products obtained with each enzyme. (2.5)

(b) Briefly discuss the importance of penicillin acylase in obtaining synthetic penicillins. (5)

(c) Discuss the production of acrylamide and compare approaches based upon chemical catalysts and biocatalysts. (2.5)