CS/B.Tech/BT (NEW)/SEM-4/BT-402/2013

2013

INDUSTRIAL MICROBIOLOGY & ENZYME TECHNOLOGY

Time Allotted : 3 Hours *Full Marks* : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$

i) To be suitable for industrial use, a microorganism should

a) be capable of growth and product formation in large scale culture

b) grow rapidly and produce product in a relatively short period of time

c) be genetically stable

d) all of these.

ii) ..... are microbially produced and can serve as gelling agents.

a) Amino Acids b) Lipids

c) Polysaccharides d) Fatty Acids.

iii) The precursor for the biosynthesis of Glutamate by *Coreynebacterium glutamicum* is

a) Starch b) Cellulose

c) Glucose d) Lactose.

iv) Which of the following is not *true* for antibiotic

producing strains of bacteria used in industry ?

a) They are often highly modified to produce much more antibiotic than the original isolate of the microbe.

b) More recently, many newer strains contain gene amplifications.

c) They are essentially the wild type strains, so extensive modification of the strain is rarely needed.

d) None of these.

v) Extremophillic enzymes are obtained more from

a) Archaea b) Yeast

c) Virus d) Fungi.

vi) Enzyme used in Breweries and Wine industries is

a) Lipase b) Amylase

c) Pectinase d) Fumerase.

vii) Commercial Streptomycin production is carried out by using

a) *S. aureus* b) *S. pyogenes*

c) *S. griseue* d) *Streptococcus* sp.

viii) Stability of enzyme activity means preservation of its

a) Structure

b) Either (a) or (b)

c) Activity

d) Both (a) & (b) simultaneously.

ix) Aldolase enzymes belongs to E.C. group are

a) 2 b) 3

c) 4 d) 5.

x) Alginate forms gel in presence of

a) potassium b) sodium

c) calcium d) zinc ion.

xi) Polysaccharide matrix is activated to bind amino group of enzyme, by :

a) Glutaraldehyde b) Epichlorohydrin

c) Cynogen bromide d) Phosphoric acid.

xii) Biopolishing of textile is done with

a) cellulase b) lipase

c) pectinase d) xylanase.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. What is xanthan ? How is it produced by fermentation ?

3. What are idiolites ? Give example. Name producer organism for production of idiolite.

4. What are the factors that govern the stability of an enzyme ?

5. Describe the citric acid production process.

6. Write short notes on the following :

i) Protoplast fusion

ii) Enzyme electrodes and their application. $2\frac{1}{2} + 2\frac{1}{2}$

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. What are β-lactum antibiotics ? Schematically illustrate Penicillin production with a flow sheet. Name the producer organism and all other relevant parameters. How is Penicillin recovered ? 2 + 7 + 3 + 3

8. Write a detailed note on the strain development for commercial production of ‘Thermolysins’ with special

reference to ‘subtilisins’.

9. Define with a specific example the use of recombinant DNA technology and Genetic engineering in Strain development programs. Elucidate with a specific example.

10. Write down the starter culture used for production of acetic acid. How B_{12} is produced ? Name one semi-synthetic penicillin. Name at least two mutagenic agents with their mode of action. What is feedback inhibition ?

2 + 5 + 2 + 4 + 2

11. Compare merits and demerits of immobilization of enzyme by simple adsorption, ionic adsorption and covalent binding onto inert matrix. Describe shortly methods for the estimation of blood cholesterol, lipid and ethanol during fermentation. 6 + (3 × 3)