CS/B.Tech (BT)/SEM-4/BT-402/2010

2010
INDUSTRIAL MICROBIOLOGY AND
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 × 1 = 10

    i)   Enzyme used in biopolishing of cotton is

         a) amylase   b) cellulase

         c) alkaline protease   d) lipase.

    ii) Taq polymerase is isolated from

         a) *Mucor micheli*   b) *Bacillus licheniformis*

         c) *Thermus aquaticus* d) *E.Coli.*

    iii) The equation of motion of Newtonian fluid is known as

         a) Arrhenius equation

         b) Avogadro's equation

         c) Navier-Stokes equation

         d) Momentum transfer.

iv) The moisture level of SSF is

    a) 30% ± 5%   b) 42% ± 5%

    c) 40% ± 5%   d) 45% ± 5%.

v) Stability of enzyme activity means preservation of its

    a) structure   b) activity

    c) pH   d) none of these.

vi) Citric acid is produced by

    a) *Aspergillus niger*

    b) *Candida utilis*

    c) *Trichoderma utilis*

    d) *Saccharomyces cerevisiae.*

vii) β-amylase can hydrolyse starch to produce

    a) glucose & maltose   b) glucose

    c) lactose   d) maltose.

viii) Commercial Streptomycin production is carried out by using

    a) S.aureus   b) S.griseus

    c) S.pyogenes   d) Streptococcus.

ix) The cutting site for α-anylase on the starch is

    a) α-1, 4 glycosidic bond

    b) amide bond

    c) α-1, 6 glycosidic bond

    d) diester bond.

x) Frameshift mutagens intercalate into the DNA molecule and cause errors which result in

    a) formation of cross-links

    b) formation of dimmers

    c) alteration of reading frame

    d) changes in bases.
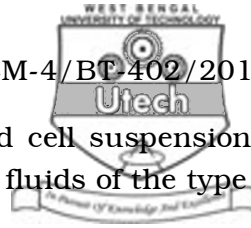
xi) Rheological behaviour of concentrated cell suspensions is given by the type of non-Newtonian fluids of the type

   a)   Bingham plastic   b)   Dilatant

   c)   Pseudoplastic   d)   Thixotrophy.

xii) Acetic acid production is rather than a true fermentation of

   a)   an incomplete oxidation

   b)   a complete oxidation

   c)   an oxidative process

   d)   an aerobic condition.

GROUP – B
(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2.   What are the significances of tropo phase and idio phase in citric acid production ?

3.   Differentiate between spontaneous and induced mutations. What are transition and transversion ? $2 + 3$

4.   Write short notes on the microbial synthesis of the polysaccharides, Dextran and Xanthan.

5.   Describe the following :

   a)   Feedback inhibition
   b)   Concerted inhibition. $2\frac{1}{2} + 2\frac{1}{2}$

6.   Describe the control pathways of Arginine synthesis from Glutamate by *Corynebacterium glutamicum*.

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GROUP – C

(Long Answer Type Questions)

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

7. What are broad spectrum and narrow spectrum antibiotics ? Draw a schematic for streptomycin production. Mention one strain involved in this production. 4 + 10 + 1

8. Using Navier-Stokes equation, derive the expression for velocity distribution for a flow down an inclined plane. What will be the average velocity in this case ? 10 + 5

9. Name the organism for production of citric acid. What are the basic raw materials used in the production ? Schematically write the flow-chart for its production and recovery. 2 + 6 + 7

10. How are cellular controls regulating production of microbial primary metabolites governed ? State an example of a fermentation process to elucidate the process. 8 + 7

11. What do you understand by a strain development program ? Define with a specific example, the use of recombinant DNA technology and Genetic engineering in strain development programs. Elucidate with a specific example. 4 + 6 + 5