CS/B.Sc (H)/Micro. Bio./SEM-4/MBT-404/2013

2013

MICROBIAL BIOTECHNOLOGY

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) The following compound is a secondary metabolite

a) amino acid b) vitamins

c) hormones d) steroids.

ii) The main component of biogas

a) oxygen b) nitrogen

c) carbon dioxide d) methane.

iii) The trickling filter is used in waste water treatment in

a) primary treatment b) secondary treatment

c) tertiary treatment d) preliminary treatment.

iv) The organism which produces parasporal crystal

a) *Bacillus subtilis* b) *Bacillus cereus*

c) *Pseudomonous* sp. d) *Bacillus thuringiensis.*

v) The organism having OCT plasmid

a) *Streptococcus pneumoniae*

b) *Staphylococcus aureus*

c) *Bacilus subtilis*

d) *Pseudomonas putida.*

vi) The molecular weight of active Bt toxin is

a) 200 KDa b) 50 KDa

c) 60 KDa d) 100 KDa.

vii) Which of the following expression represents Monod Equatioin ?

a) $\mu = \mu_{max}$ b) $\mu = \mu_{max} S / Ks$

c) $\mu = \mu_{max} S / Ks + S$ d) $\mu = \mu_{max} S + Ks/S$.

viii) The type of bacteria involved in bio-mineralization of ore is

a) Mesophilic b) Thermophilic

c) Acidophilic d) All of these.

ix) The bioreactor used for pigment synthesis

a) Air lift b) Photo bioreactor

c) Bubble column d) Stirred tank.

x) The catalyst used in biodiesel production

a) Methanol b) Ethanol

c) Sodium hydroxide d) Potassium hydroxide.

xi) The gene of TOL plasmid responsible for production of xylene oxidase

a) XyIC b) XyIA

c) XyID d) XyIL.

xii) Antifoam used in the fermentor is

a) Mustard oil b) Silicon oil

c) Olive oil d) None of these.

GROUP – B

(Short Answer Type Questions)

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

2. Derive the equation for generation time (g) from the equation of mean growth rate equation (k).

3. Write a short note on air-lift fermentor.

4. Give the method of production of penicillin.

5. Differentiate between primary and secondary metabolites and also their modes of production.

6. Describe the role of microorganisms in the treatment of agricultural waste water.

GROUP – C

(Long Answer Type Questions)

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

7. Write short notes on the following : 3 × 5

a) Bioremediation

b) Biosorption

c) Bioleaching.

8. Define biodiesel. State the chemistry involved in the production of biodiesel and discuss the role of it as a biofuel used in transport processes. 3 + 8 + 4

9. Describe the process of Orleans method for vinegar production. What is the role of acidifcation in vinegar production ? Why acidification if never recommended before the completion of sugar fermentation ? What is the cause for darkening of vinegar ? Name the genera for acetic acid bacteria. Write the reaction for acetic acid production where oxygen is required. 5 + 2 + 2 + 2 + 2 + 2

10. Define chemostat and turbidostat. Compare between batch, fedbatch and continuous culture. Draw the bacterial growth curve for typical batch culture. 4 + 6 + 5

11. a) Give the ways to increase the yield of microbes.

b) What do you mean by bioremediation ? Write a short note on the degradation of heavy metals.

c) Which microorganisms is used to clear the oilspills ? Describe the process.

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