

CS/B.Sc(H), MICROBIO/SEM-4/MBT-404/2012

2012

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 answers for any *ten* of the following :

10 × 1 = 10

i) The alga which can produce SCP is

- a) Chlorella b) Spirulina
- c) Both (a) and (b) d) none of these.

ii) The ideal temperature for biogas production is :

- a) 40° C-50° C b) 37° C
- c) 30° C-40° C d) 25° C-27° C.

iii) Antibiotics is considered as

- a) primary metabolite b) secondary metabolite
- c) amino acid d) hormone.

iv) Ethanol can be used as

- a) red petrol b) green petrol
- c) blue petrol d) brown petrol.

v) Acetic acid is produced by

- a) *Clostridium botulinum*
- b) *Gluconobacter aceti*
- c) *Lactobacillus acidophilus*
- d) none of these.

- vi) The bacteria which degrades toluene is
- a) *Acinetobacter calcoaceticus*
 - b) *Achromobacter xylosoxidans*
 - c) *Pseudomonas fluorescens*
 - d) *Ochrobacterium sp.*
- vii) The micro-organism which is not an inhabitant of the biofilm in trickling filter is
- a) *Alcaligenes* b) *Ulothrix*
 - c) *Spirogyra* d) *Flavobacterium*.
- viii) The device which has high BOD removal efficiency is
- a) Trickling filter
 - b) Rotating biological contactor
 - c) Aerobic ponds
 - d) Anaerobic ponds.
- ix) The source(s) for production of Bio-diesel is/are
- a) *Jatropha* b) Soybean
 - c) Microalgae d) all of these.
- x) The organism(s) responsible for bioleaching of metals from their respective ores is/are
- a) *Acidithiobacillus ferrooxidans*
 - b) *Ferroplasma sp*
 - c) both (a) and (b)
 - d) *Pseudomonas aeruginosa*.
- xi) Tetracycline was first isolated from
- a) *Streptomyces gresius*
 - b) *Streptomyces aureofaciens*
 - c) Actinomycetes
 - d) *Paecilomyces sp.*
- xii) Vermicomposting involves conversion of carbon rich

organic compounds to

- a) sulphur rich compounds
- b) nitrogen rich compounds
- c) hydrogen rich compounds
- d) sulphide rich compounds.

GROUP – B

(Short Answer Type Questions)

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

- 2. What is the biochemistry for microbial leaching of FeS_2 ?
Differentiate tank bioleaching from heap bioleaching. $3 + 2$
- 3. Why is Mercury considered as a health hazard ?
- 4. Write in general the production procedure for Antibiotics.
- 5. How does *Pseudomonas putida* degrade oil spill ? Name the plasmid which is responsible for oil spill degradation. $4 + 1$
- 6. How does *Bacillus thuringiensis* work ? What do you mean by primary and secondary metabolites ? $3 + 2$

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

- 7. What is biofuel ? Classify biofuel. What are the microorganisms involved in optimum biogas production ? What is biodiesel and what are the sources from where biodiesel can be isolated ? Describe in brief the production procedure for biodiesel production. How can you characterize biodiesel ?

$2 + 3 + 3 + 5 + 2$

- 8. Differentiate chemostat from turbidostat. What is a batch culture ? Draw the growth curve for a typical batch culture. Derive Monod's equation for continuous culture. Differentiate batch from continuous culture. What is fed batch culture ?

3 + 2 + 3 + 4 + 2 + 1

9. Describe the process of Orleans method for vinegar production. What is the role of acidification in vinegar production ? Why acidification is 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. Why is bacterial heavy metal resistance evolved ? What are metallothionein ? What are the five mechanisms to evade metal toxicity ? Why is nutrient removal necessary for tertiary sewage treatment ?

4 + 2 + 5 + 4

11. What role is played by amylase in textile industries ? Name the organisms used for assay of Vitamin B12. How can you use micro-organisms as pesticides ? Give an example. What are its advantages over chemical pesticides ? Justify. What is the purpose and the strategy of biological phosphorus removal in tertiary treatment of water ?

2 + 2 + 3 + 4 + 4

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