Ex/MSBT/1/1/53/2018

M. Sc. Bio-Technology Part I Examination, 2018

Microbiology

Paper - MSBT 1/1

Time : Four hours Full Marks : 100

Group A

1. Answer *any ten* questions [First ten answers will be checked] 10 ×1=10

   i) Mention two human diseases that are caused by protozoa.

   ii) How yeast cells could be lysed ?

   iii) Why mycoplasma are special ?

   iv) Why exponential growth of bacteria could not be sustained?

   v) What are interferons ?

   vi) How do you propose to clean and decontaminate an incubator where one of your bacterial culture (5ml) got spilled ?

   vii) What is the working principle of a laminar flow work station ?

   viii) Koch's postulates are not always valid Explain

ix) What is prion? Name one disease that is caused by prion.

x) How to get a pure culture of algae ?

xi) How different microbes compare based on their sizes ?

xii) How to detect viable but non-culturable bacteria in beverages?

xiii) Unlike vaccination protocol in India, USA opted not to vaccinate against Typhoid and Tuberculosis. Why ?

xiv) Give two examples of human diseases that are not caused by any microbes.

xv) Capsule producing bacteria have special advantages Explain.

2. Answer *any five* questions [First five answers will be checked] $5 \times 10 = 50$

i) a) Although primitive, prokaryotes are still the dominant from of life on earth–explain.

b) Mention the major contribution of Paul Ehrlich, Charles Laveran, Sir Ronald Ross, Sambhu Nath De, Sir Upendra Nath Brahmachari. 5+5

ii) a) What are the major differences between Gram positive and Gram negative bacteria ?

GROUP B

Answer *any four* questions

4. Explain with examples of the biochemical process carried out by the microorganisms in carbon cycle. 5

5. "Microorganisms contribute greatly to the sulfur cycle"...please explain with schematic diagram. 5

6. Describe the two-step process that occurs in nitrification with the name the bacterial genus responsible for each step. 5

7. What is difference between assimilatory nitrate reduction and denitrification ? Which microbe is respossible for the reaction and which is of a more specialized metabolic capacity. 3+2

8. Why we need to study the normal human microbiota ? Balance between *Bacteroidetes* and *Mathanobrevibacter* smithii affects our body weight, explain. 3+2

9. Describe the endophytes microorganisms. Mention the reasons for their mutualism relationship with examples 2+3

b) Give schematic experimental design to purify both organisms from a mixture of *Escherichia coil* and *Staphylococcus aureus*. 5+5

iii) a) Explain the role of flagella in bacterial Chemotaxis,

b) How bacterial chemotaxis could be demonstrated expeirmentally ? 5+5

iv) How bacteria are classified based on their requirement of (a) temperature, (b) Oxygen, (c) pH, (d) Carbon and (e) energy sources 2×5

v) a) Brifly describe the method for "pasteurization" of milk; is the method sterilize the milk ? Why you think "pasteurization" works at all ?

b) What are the desirable properties of an ideal antibiotic ? 5+5

vi) a) Describe different methods used to monitor the growth of bacteria.

b) It is said that only about 1% of soil bacteria are culturable-what exactly in meant by the statement ? Suggest experiment to prove or disprove it. 5+5

vii) a) Nitrogenase enzyme is usually oxygen sensitive– Explain how different nitrogen fixing bacteria protect their nitrogenase from oxygen.

b) Bacterial photosynthesis are mostly anoxygenic– explain. 5+5

3. Answer *any five* questions [Firstvfive answers will be checked] $5 \times 4 = 20$

i) How TB management is done in India ?

ii) Mention the importance of four different species of *Clostridium* in microbiology.

iii) Extremophiles are mostly archase–Explain

iv) What are the special fratures of Sabouraud's media to grow yeast and mold ?

v) Describe the structure and function of bacterial LPS.

vi) What are the useful products obtained from algae ?

vii) Explain the special properties of bacteriorhodopsin in *Halobacterium salinarum*

viii) Describe Baltimore classification of virus.

ix) Mention the special properties of H1N1 virus.

x) What is pulse polio vaccination ? Is it safe ? Explain.