



WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 2nd Semester Examination, 2022

MCBACOR04T-MICROBIOLOGY (CC4)

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.*

Answer Question No. 1 and any four from the rest.

1. Answer any **four** questions from the following: 2×4 = 8
 - (a) What are the differences between BOD and COD?
 - (b) Define commensalism with proper example.
 - (c) What do you mean by phosphate immobilization? Give two examples of phosphate solubilizing bacteria.
 - (d) What do you mean by biodegradation of pesticides? Explain with suitable example.
 - (e) What is the importance of MPN test in the determination of water potability?
 - (f) What is Nematophagus Fungi? Give one example.
 - (g) What is Nitrification? Give examples of two nitrifying bacteria.

2. (a) What is THM? How it is originated? (1+1)+3+3
 - (b) How microbial degradation of cellulose occurs? Explain with proper example.
 - (c) What do you mean by nitrogen fixation? Explain with proper reactions and example.

3. (a) Why safety is concerned regarding drinking water? 2+(3+1)+2
 - (b) How completed test of water sample is performed? What is synergistic effect in the microbiological analysis of water?
 - (c) How UV ray works in most of the domestic water purification kit to kill bacteria?

4. (a) Write a short note on Composting. 3+(2+2)+1
 - (b) Mention the advantages and disadvantages of sanitary landfill.
 - (c) What do you mean by e-waste?

5. (a) What do you mean by amensalism? 1 $\frac{1}{2}$ +2 $\frac{1}{2}$ +4
 - (b) How microbes thrive in low pH? Explain with proper example.
 - (c) Write a comparative note on microbes in human body and ruminant body.

6. (a) Write a comparative note between symbiotic and non-symbiotic interaction with proper example. 3+3+2
(b) Differentiate parasitism and predation with proper example.
(c) Define ectendo-mycorrhiza with proper example.
7. (a) What are the various types of solid wastes? What are their sources? $1\frac{1}{2} + 1\frac{1}{2} + 3 + 2$
(b) What do you mean by symbiotic and non-symbiotic interactions between microbes-plants?
(c) What is membrane filter technique?
8. (a) Define Phytoremediation with proper example. $2+(2+2)+2$
(b) What are organochlorine pesticides? Give two examples of bacterial genera that degrade organochlorine pesticides.
(c) What are the strategies of pesticide remediation?

N.B. : *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

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WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 2nd Semester Examination, 2022

MCBACOR03T-MICROBIOLOGY (CC3)

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.*

Answer Question No. 1 and any *four* from the rest

1. Answer any *four* questions from the following: 2×4 = 8
 - (a) Pyridine facilitates mutarotation of Glucose. — Explain.
 - (b) Name two aromatic amino acids and also draw their structures.
 - (c) Draw the structure of sucrose in Haworth projection formula. Is this sugar reducing or non-reducing?
 - (d) What is the importance of Iodine number?
 - (e) Differentiate between Amylose and Amylopectin. Which one responds to Iodine test?
 - (f) Do peptide bond has single bond character? Justify.
 - (g) Write down the Haworth projection formula of maltose. Why is maltose called a reducing sugar?
 - (h) Define turn over number of an enzyme.
 - (i) What are the products formed when a triacylglycerol gets hydrolysed? Write down the relevant chemical equation.

2.
 - (a) What are metalloproteins? 1
 - (b) Give an example of an allosteric protein, which is not an enzyme. 1
 - (c) What do you mean about the mechanisms of enzyme inhibition? 3
 - (d) What does K_m value of an enzyme signify? 1
 - (e) What are isozymes? Why are they needed? 2

3.
 - (a) What is the role of cholesterol in determining the membrane properties? 2
 - (b) Write down the reaction showing the inversion of sucrose. Why is this called inversion? 2
 - (c) Do you find polysaccharides in bacterial cell wall? Which is it? 1
 - (d) What is the difference between cellulose and chitin? 1
 - (e) How many stereoisomers will be formed in (i) Threonine (ii) Cysteine? 1
 - (f) What will be the pI of L-glutamate given that its $pK_{a1} = 2.10$ $pK_{a2} = 9.67$ and $pK_R = 4.25$? 1

4. (a) What are buffers? What are the components of a buffer solution? 2
 (b) Why are proteins stored in buffers having a particular pH? 1
 (c) Calculate the equilibrium constants of the hydrolysis of the following compounds at pH 7 and 25°C: 3
 (i) Phosphoenol pyruvate ($\Delta G^{\circ} = -61.9 \text{ kJ/mol}$)
 (ii) Glucose -1- phosphate ($\Delta G^{\circ} = -20.9 \text{ kJ/mol}$)
 (d) Why is ATP considered to be an energy-rich compound? 1
 (e) Calculate the pKa of lactic acid if [lactic acid] = 0.01 (M) and [lactate] is 0.087 (M) when pH is 5. 1
5. (a) How many chiral carbon atoms are present in α -D-glucose? 1
 (b) What are amylose and amylopectin? 1
 (c) What are sphingolipids? 1
 (d) Briefly explain the quaternary structure of proteins. 2
 (e) What are multienzyme complexes? 1
 (f) Define buffer capacity. 1
 (g) In terms of thermodynamic concepts, why is it more difficult to park a car in a small space than it is to drive it out from such a space? 1
6. (a) What are allosteric enzymes? Is it possible to determine the allosteric nature of an enzyme by using kinetic studies? If yes, how? 2
 (b) What are zymogens? Give two examples. 2
 (c) What is the significance of Iodine number of lipids? 1
 (d) Why do all amino acids except proline produce purple-coloured products on reacting with ninhydrin but proline gives a yellow-coloured compound on reacting with ninhydrin? 2
 (e) Show the phenomenon of mutarotation in D-glucose. 1
7. (a) Why is turn important in protein structure? 2
 (b) How do β pleated sheet differ from α -helix? 3
 (c) How can you detect amino acid separated through Thin Layer Chromatography? Give the concerned reaction. 3
8. Write the differences between 2×4 = 8
 (a) Lyase and Ligase
 (b) NAD and FAD
 (c) Storage lipids and Structural lipids
 (d) Homo polysaccharides and Hetero polysaccharides.

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