GOVERNMENT COLLEGE AUTONOMOUS, RAJAMAHENDRAVARAM

Department of Microbiology

Question Bank for II B.Sc. Microbiology Honours

IV Semester, MINOR **C 10 (- MICROBIAL PHYSIOLOGY AND METABOLISM)**

Time : 3Hrs Max Marks : 50

SECTION – A

Answer all the following questions, Draw labelled diagrams wherever necessary

(5x8=40 Marks)

UNIT	Q.No.	Questions	Marks
I	1.	Explain Nutritional requirements of Microorganisms	8
	2	Describe Nutritional groups of microorganisms-based on C, energy and electron sources	
	3	Explain Growth media - synthetic, nonsynthetic, selective, enrichment and differential media	8
II	1.	Explain different phases of growth in batch cultures.	8
	2	Write notes on Factors influencing microbial growth	
	3	Describe Methods for measuring microbial growth - Direct microscopy, viable count estimates,turbidometry and biomass	8
III	1	Explain First and Second law of Thermodynamics. Open and Closed system.	8
	2	Write about the Structure and Function of NAD and FAD.	
	3	Explain Glycolytic pathway and mention its significance.	
IV	1	Explain ETS and oxidative phosphorylation.	
	2	Briefly anaerobic respiration.	
	3	Explain Fermentative modes in microorganisms with special reference to alcoholic, Lactic acid fermentations	
V	1	Explain Photosynthetic pigments, Photosynthetic apparatus in prokaryotes	8
	2	Explain Outline of oxygenic photosynthesis in bacteria	8
	3	Explain Outline of anoxygenic photosynthesis in bacteria	

Section -B

Answer any five of the following
(10x1=10)

UNIT-1

1. Photoautotrophs obtain both their energy and carbon from organic compounds. (False)
2. Facilitated diffusion requires ATP to transport molecules across the membrane. (False)
3. Iron uptake in microorganisms often involves siderophores to help transport iron into the cell. (True)
4. _____ is a transport process that moves molecules against their concentration gradient using ATP. (Primary active transport)
5. Microorganisms that use organic carbon as their carbon source are called _____. (Heterotrophs)

UNIT-2

1. The lag phase in batch culture is a period of intense cell division. (False)
2. Generation time is the time required for a microbial population to double. (True)
3. Turbidometry is a method used to directly count individual microbial cells. (False)
4. The time required for a microbial population to double in number is called _____. (Generation time)
5. In direct microscopic counting, a special slide called a _____ chamber is often used. (Petroff-Hausser or Hemocytometer)

UNIT-3

1. The first law of thermodynamics states that energy can be created and destroyed. (False)
2. ATP is considered a high-energy molecule due to its phosphoanhydride bonds. (True)
3. The _____ law of thermodynamics states that entropy of a closed system always increases over time. (Second)
4. The standard free energy change of ATP hydrolysis is approximately _____ kcal/mol. (-7.3 kcal/mol)
5. The _____ cycle is a central metabolic pathway that generates NADH and $FADH_2$ for oxidative phosphorylation. (TCA/Krebs)

UNIT-4

1. Oxidative phosphorylation generates ATP using a proton gradient established by the ETS. (True)
2. Chemoautotrophs obtain their energy by oxidizing inorganic compounds such as ammonia or hydrogen sulfide. (True)
3. Lactic acid fermentation produces ethanol and carbon dioxide as major byproducts. (False) (It produces lactic acid, not ethanol.)
4. _____ is the final electron acceptor in aerobic respiration. (Oxygen / O_2)
5. In anaerobic respiration, microorganisms use electron acceptors such as _____ instead of oxygen. (Nitrate / Sulfate / CO_2 / Ferric ions)

UNIT-5

1. Chlorophyll a is the only photosynthetic pigment found in all photosynthetic bacteria. (False)
2. The photosynthetic apparatus in prokaryotes is located in the plasma membrane or specialized membrane structures. (True)
3. Anoxygenic photosynthesis uses water as an electron donor, similar to oxygenic photosynthesis. (False)
4. The _____ is the structure in prokaryotes where photosynthesis takes place. (Photosynthetic apparatus)
5. In oxygenic photosynthesis, water is split to generate electrons, releasing _____ as a byproduct. (Oxygen/O_2)