

SEM I,

3 HOURS)

(100 marks)

N.B. (1) Attempt **all** questions. (2) Draw labeled diagrams wherever necessary.

**Q1. A. Define the following terms:**

(5)

1. Cyanophycin granules - are composed of large polypeptides containing approximately equal amounts of the amino acids arginine and aspartic acid. The granules often are large enough to be visible in the light microscope and store extra nitrogen for the bacteria.
2. Endocytosis - it is a process to bring materials into cell from outside.
3. Dictyosomes - Stacks of cisternae in Golgi apparatus is called as dictyosomes.
4. Resistance factor - name for a plasmid that codes for antibiotic resistance. R-factors may code for more than one antibiotic resistance factor.
5. Diastereomers - Pairs of stereoisomers that are not mirror images of each other are called diastereomers.

**Q1 B. State whether the following statement is true or false:**

(5)

1. Lysozymes act on peptidoglycan - **True**
2. Intrinsic proteins are loosely associated with the cell membrane in bacteria - **False**
3. Lysosomes maintain an acidic environment by pumping protons into their interior - **True**.
4. The nucleus is bounded by nuclear envelope - **True**.
5. The end residue of a peptide chain having free carboxyl group is N- terminal amino acid - **False**

**Q1 C. Give one example for each of the following:**

(5)

1. Bacteria possessing PHB granules. *Bacillus cereus*, *B. Megatherium*, *Azotobacter*, *Rhizobium*
2. Mineral compound present in magnetosomes. magnetite, ( $Fe_3O_4$ ) particles
3. Potentially Hazardous Procedures in microbiology lab - use of contaminated syringe, needles, pipettes, shaking of loop, improper mixing, shaking, centrifuging etc.
4. External cell coverings in eukaryotes - cell wall, pellicle.
5. Hexose sugar - Glucose, Fructose, Mannose, Galactose.

**Q1 D. Select the correct alternatives and rewrite the statement.**

(5)

1. Pili are responsible for conjugation
2. Majority of bacteria have a circular DNA .
3. The semiliquid matrix of the nucleus is called nucleoplasm
4. Skin and work surfaces can be decontaminated with 70% ethyl alcohol
5. Polysaccharides are polymers of simple sugars.

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**Q II. Answer briefly any two of the following:**

(20)

1. Discuss the structure, function and modifications of bacterial cell membrane.  
**Prescott, 8<sup>th</sup> ed, pages 38,39,40**
2. Draw a diagram of Golgi apparatus; discuss its structure and role in eukaryotic cell.  
**(Prescott 8<sup>th</sup> edition –page 85-86)**
3. Discuss Stereoisomers and their importance in biological interactions.  
Ans: Pg 16-19 Lehninger 4<sup>th</sup> edn

**Q III. A. Answer briefly any three of the following:**

(18)

1. Discuss the following types of plasmids in bacteria- Col plasmids, virulence plasmid and metabolic plasmids. **Prescott, 8<sup>th</sup> ed, pages 46.**
2. Discuss the variations in morphology exhibited by bacteria with appropriate examples  
**Prescott, 8<sup>th</sup> ed, pages 38,39,40**
3. Explain the ultrastructure of flagella of bacteria. **Prescott, 8<sup>th</sup> ed, pages 55,56**
4. Discuss the capsule, glycocalyx and slime layer of bacteria and their functions.  
**Prescott, 8<sup>th</sup> ed, pages 53,54**
5. Discuss the contribution of Robert Koch **Stanier, pages 8,9.**
6. Discuss the structure and properties of bacterial endospores. **Prescott, 8<sup>th</sup> ed, pages 60,61**

**Q III B. Do as directed any two of the following:**

(2)

1. State the function of fimbriae- **Some types of fimbriae attach bacteria to solid surfaces such as rocks in streams and host tissues, and some are involved in motility**
2. Name the scientist who designed enrichment culture technology.. **Winogradsky**
3. Name the scientist who used rabies vaccine for the first time.. **Louis Pasteur**
4. State the function of periplasmic space in Gram negative bacteria **Stores hydrolytic enzymes and transport proteins, site of energy conservation in some bacteria**

**Q IV. A. Answer briefly any three of the following:**

(18)

1. Compare (2)and contrast (4)between cilia and flagella in a eukaryotic cell (**Prescott 8<sup>th</sup> edition –page 95-96).**
2. How are materials contaminated with culture disposed in a Microbiology laboratory?  
**(IS:12035 - 1986 Indian Standard code of safety in microbiological laboratories document pg 9)**
3. Write a short note on microtubules and intermediate filaments (**Prescott 8<sup>th</sup> edition – page 83-84).**
4. Explain the structure and function of endoplasmic reticulum in eukaryotic cell  
**(Prescott 8<sup>th</sup> edition –page 83-84).**
5. Write a short note explaining the similarities and differences between mitochondria and chloroplast (**Prescott 8<sup>th</sup> edition –page 88-90).**
6. Write a short note on comparisons in Eukaryotic and prokaryotic cell(**Prescott 8<sup>th</sup> edition –page 96-97).**

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**Q IV B. Do as directed any two of the following:**

(2)

1. Define lysosome and state the role of its enzyme.  
lysosomes are spherical bodies involved in intracellular digestion and contain the enzymes, hydrolases needed to digest all types of macromolecules
2. plasma membrane lipids in eukaryotes.  
Phosphoglycerides, sphingolipids, and sterol.
3. Mitochondria or chloroplast
4. Give significance of nuclear pore.  
It serves as transport route between nucleus and surrounding cytoplasm.

**Q.V.A. Answer any three of the following**

(18)

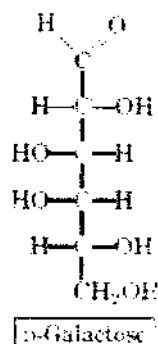
1. biological role of proteins
2. Write a note on the common structural features of amino acids.  
**Ans: 76-77 Lehninger 4<sup>th</sup> edn.**
3. different types of RNA? Give their functions  
**Ans : Pg 273-275 Lehninger 4<sup>th</sup> edn.**
4. Write a note on disaccharides and their biological role.  
**Ans: Pg 245-246 Lehninger 4<sup>th</sup> edn**
5. List six functional groups in biomolecules. (1 mark each)  
Ans: Functional groups: Pg 13-14 Lehninger 4<sup>th</sup> edn macromolecules: Pg 15-16 Lehninger 4<sup>th</sup> edn
6. Discuss the significance of water in biological systems.  
Ans : Water as a solvent and pg 54-56 Lehninger 4<sup>th</sup> edn.

**Q V B. Attempt any two of the following:**

(2)

1. Give the structure of galactose.

Ans



2. Haemoglobin
3. Polyunsaturated fatty acid
4. Beta-furanose

