Total number of printed pages: 01 **UG/3rd Semester/UFET304**

2023

BASIC MICROBIOLOGY

Full Marks: 100

Time: Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1.	a)	Describe ABC transporter system of microbial nutrition uptake using an appropriately labeled schematic diagram.	12
	b)	What are "prions"? What is the structural difference between healthy and infectious prions?	2+2
	c)	List **four** major differences between Gram positive and Gram negative cell wall structures.	4
2.	a)	Use an appropriate microbial growth curve to describe "lag", "log", "stationary" and "death" phases of microbial lifecycle.	10
	b)	What are "plasmids" – Give an Example? What are their primary functions?	2+2
	c)	Describe magnification principle of a compound light microscope using a simple, appropriately labeled schematic diagram.	6
3.	a)	Describe DNA double-helix structure with an appropriately labeled schematic diagram showing the sugar, the phosphate bridges and the nucleic acids.	12
	b)	Show that microbial cell doubling time (T_D) can be mathematically calculated by the equation $T_D = T / [\log_2(N_T) - \log_2(N_0)]$, where N_0 = initial microbial count, N_T = Microbial count at time T, and T = Time for n times doubling of microbial counts.	6
	c)	What are archaea? Give an example.	2
4.	a)	Describe lytic cycle of bacteriophage using an appropriately labeled schematic diagram.	10
	b)	How did Louis Pasteur proved germ theory using his "goose neck" / "swan neck" experiment?	8
	c)	Who is considered as the "father of microscopy"? What did he study / observe under microscope?	2
5.	a)	Elaborate contribution of microbial changes in carbon cycle in nature. Use a schematic diagram to enrich your description.	12
	b)	Write short-notes on ***any two*** of the following: (i) Basidiomycota, (ii) Capsid of a bacteriophage, (iii) Eukaryotic vs prokaryotic cells	2×4
6.	a)	Describe the cell wall structure of a yeast cell using an appropriately labeled schematic diagram. What is the "powerhouse" of a yeast cell?	11+1
	b)	List **three** major characteristics desirable in an antibiotic. Describe how penicillin and cephalosporin group of antibiotics work against bacteria.	3+5

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