Name:

Enrolment No:

UPES

End Semester Examination, December 2023

Course: Bacteriology **Semester : III**

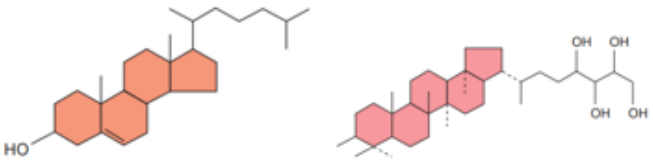
Program: BSc, BMSc Microbiology **Duration : 3 Hours**

Course Code: HSMB2003 **Max. Marks: 100**

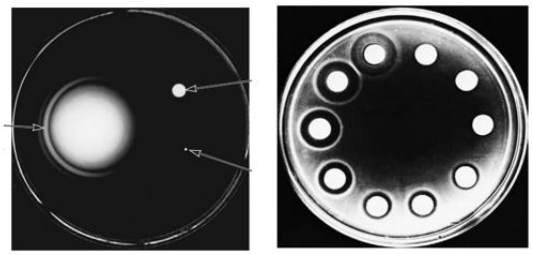
Instructions:

1. All the questions are compulsory.
2. Please write down the Serial Number of the question before attempting it.
3. The question paper consists of 28 questions and it is divided into four sections A, B, C and D.
4. Section A comprises of 20 questions carrying 1.5 mark each.
5. Section B comprises of 4 questions carrying 5 marks each.
6. Section C comprises of 2 questions carrying 15 marks each.
7. Section D comprises of 2 questions carrying 10 marks each.

There is no overall choice. However, an internal choice might be provided.

S. No.	Section A Short answer questions/ MCQ/T&F (20Qx1.5M= 30 Marks)	Marks	COs
Q 1	Name a transcription inhibitor.	1.5	CO2
Q 2	Name few modes of reproduction in bacteria. Which is the mode common mode?	1.5	CO1
Q3	Label bacterial and eukaryotic sterol.  a. b.	1.5	CO1
Q4	Enlist basic differences between bacteria and archaea.	1.5	CO1
Q5	---------- is an enzyme which breaks linkages between peptidoglycan of bacterial cell wall.	1.5	CO1

Q6	A bacterium doubles every minute and there are 60,000 CFU/ml at given time (t =60 mins). What will be conc. of cells at 59 mins?	**1.5**	**CO1**
Q7	Replication inhibitors are ……..spectrum antibiotics. (Broad/narrow)	**1.5**	**CO2**
Q8	Define magnetosomes. Cite an example of where they are found.	**1.5**	**CO1**
Q9	The peptide linkages in bacterial cell wall are unusual because of a) Lysine b) L-amino acids c) D-amino acids d) Amide linkages	**1.5**	**CO1**
Q10	'Bacteria, Viruses and Eukarya are three domains of life.' Comment on the statement.	**1.5**	**CO1**
Q11	'Serological tests are performed on ribosomes of bacteria.' Justify the statement.	**1.5**	**CO1**
Q12	How would you stain capsule?	**1.5**	**CO1**
Q13	'Some bacteria are parasitic.' Are there any parasites of bacteria that you have heard of?	**1.5**	**CO3**
Q14	Illustrate and write briefly on how three domain classification came about.	**1.5**	**CO3**
Q15	'Archaea are prokaryotes.' Justify the statement.	**1.5**	**CO3**
Q16	Define differential and selective media with example.	**1.5**	**CO2**
Q17	'Luria broth is a selective media.' Justify the statement.	**1.5**	**CO2**
Q18	Arrange the following based on their water activity requirements: Fungus, Algae, Bacteria	**1.5**	**CO2**
Q19	Is water activity and moisture content same?	**1.5**	**CO2**
Q20	In which bacteria was Griffith's transformation experiment done and what the difference between two stains he used?	**1.5**	**CO3**
	Section B **(4Qx5M=20 Marks)**		
Q 1	A drug was to be given to treat bacterial infection; at a conc. of 128 μg/ml; the bacteria did not grow in culture. After few hours fresh media without antibiotic was added and the bacteria did not grow. (i) What is this concentration of drug called scientifically? (1) (ii) In another set up with another drug; the bacteria started grow upon addition of fresh media. What would that conc. Of drug be called? (1) (iii) Define therapeutic index of an antimicrobial. (1.5)	**5**	**CO2**

	(iv) If a drug has therapeutic index of 50 and another 25. Which one will you use for treatment? (1.5)		
Q2	Differentiate between a gram positive and gram-negative cell wall.	**5**	**CO1**
Q3	(i) Differentiate between a flagella and pili with examples. (3) (ii) What is F pilus? How is it encoded? (2)	**5**	**CO1**
Q4	Define endospores. What leads to formation of endospore and illustrate the steps involved in the process?	**5**	**CO1**
	Section C **(2Qx15M=30 Marks)**		
Q 1	'A patient was showing response to an antibiotic, then suddenly the patient started to become resistant when he forgot to take one dose.' Based on this answer the following (i) Other than mutation in DNA (assuming it has not happened); what phenomenon in bacteriology based on cell density have you read about which can cause this? (1) (ii) In which bacteria was it first discovered? (1) (iii) Analyze what has happened in two cases. (4) (iv) What is the difference between such systems in gram positive and gram-negative bacteria? (2) (v) Explain one such system and its function in bacteria. (7)	**15**	**CO2**
Q2	'A mixed bacterial culture (3 types of strains) was plated on two plates having Serine and Acetate. When it was grown on Serine, two bacteria grew happily while one formed a tiny colony. When they were grown on Acetate, regions of no growth were observed.' Based on this; answer the following : (i) Elaborate plate is that of Serine and which one is of Acetate? (2)  a. b. (ii) What are acetate and serine called in the context of phenomenon studied in bacteriology responsible for this? (1) (iii) Why do you think has it happened? What is the molecular mechanism involved? (7)	**15**	**CO3**

	(iv) Identify the appendage involved in the process and use suitable illustration to distinguish between that appendage in gram-negative and gram-positive bacteria. (5)		
Section D (2Qx10M=20 Marks)			
Q 1	With suitable illustrations and text; explain what are two component systems and where are they found?	**10**	**CO3**
Q2	Define Chemotherapy. What are modes of actions of different antibacterial drugs. Give examples of each kind. (1+7+2)	**10**	**CO2**