UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2022

Course: Bacteriology   **Semester: III**
Program: Int.B.Sc.-MSc. Microbiology   **Duration: 03 hrs.**
Course Code: HSMB 2003   **Max. Marks: 100**
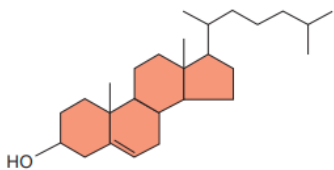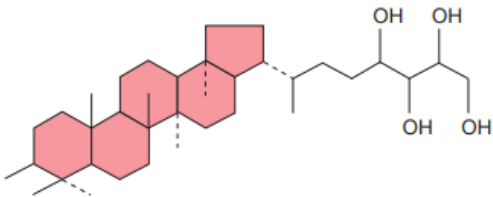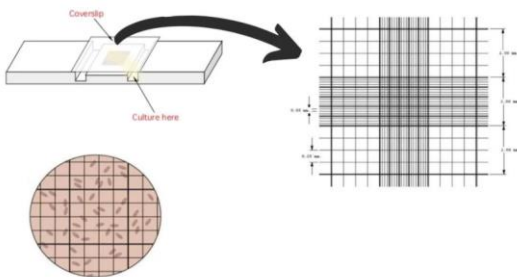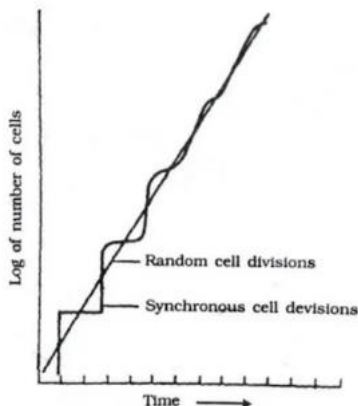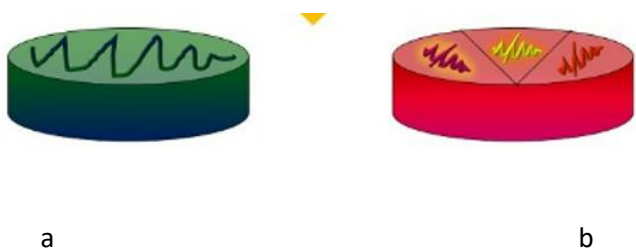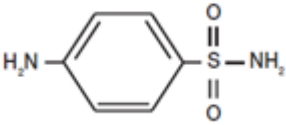
Instructions:

S. No.	Section A **Short answer questions/ MCQ/T&F** **(20Qx1.5M= 30 Marks)**	Marks	COs
1	Define prokaryotes.	**1.5**	**CO1**
2	Define numerical taxonomy.	**1.5**	**CO1**
3	--------------, ------------- and ------------- received Nobel prize for discovery and fermentation of Penicillin.	**1.5**	**CO2**
4	*Bacillus* and *Clostridia* have one characteristic in common. Write that characteristic.	**1.5**	**CO2**
5	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**	**CO2**
6	'Bacteria, Viruses and Eukarya are three domains of life.' Comment on the statement.	**1.5**	**CO1**
7	Certain bacteria, pleomorphic in shape forms fried egg colonies was exposed to hypotonic medium. What is expected to happen? a) Bacterial cells will shrink b) Bacteria cells will remain as it is c) Bacteria will lyse d) Bacteria will accumulate salt	**1.5**	**CO2**
8	Identify bacterial counterparts of sterols from the figure below. A. 	**1.5**	**CO3**

	  B.		
9	Name the technique shown below in the figure. 	1.5	CO2
10	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	CO3
11	Bioluminescence is seen in --------------- (Name the bacterium).	1.5	CO3
12	What kind of growth is depicted in the picture below. 	1.5	CO3
13	--------------- is a bacterium that causes crown gall disease in plants	1.5	CO 1
14	Replication inhibitors are ………..spectrum antibiotics. (Broad/narrow)	1.5	CO1
15	Define bacteriostatic antibiotics.	1.5	CO2
16	Name the two different types of media shown below. a b	1.5	CO2
17	Type III secretion system have components which are homologous to………..	1.5	CO2

	a) Type IV pilus b) Flagellar components c) ABC transporter d) Chaperones		
18	Bacteria have special pilus that aids in conjugation. Name the pilus and what encodes this pilus?	**1.5**	**CO3**
19	Differentiate between bacteria and archaea.	**1.5**	**CO3**
20	Define magnetosomes. Cite an example of where they are found.	**1.5**	**CO1**

Section B
(4Qx5M=20 Marks)

1	What is chemotherapy? What is therapeutic index of antimicrobial? (1+2) Why is it so difficult to treat fungal infections compared to bacterial (2)?	**5**	**CO1**
2	Define two component systems. Explain any one.	**5**	**CO2**
3	Derive the exponential growth curve equation of bacteria or what are different modes of reproduction in bacteria with specific examples.	**5**	**CO2**
4	Differentiate between a Gram positive and Gram negative cell wall.	**5**	**CO1**

Section C
(2Qx15M=30 Marks)

1	A drug was to be given to treat bacterial infection; at a conc. of 228 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) How do you classify antibiotics? Name the classes. (5) (iii) Name the class of antibiotic given below and explain its mode of action (4). H_2N —⬡— $S(=O)(=O)$ — NH_2 (iv) What is disc-diffusion? Explain the Kirby-Bauer disc diffusion method (5).	**15**	
2	There are three tubes below; with motile bacteria and non-motile bacteria. This is agar motility test. Given this; answer the following questions:	**15**	
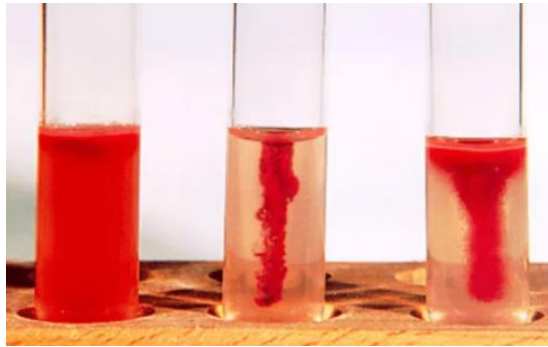
a   b   c

a) Label the tubes with motile and non-motile bacteria. (2)
b) In an experiment, bacteria was motile, then upon addition of antimicrobial agent, an appendage was not formed and therefore bacteria lost motility. Name and explain structure of this appendage. (5)
c) What is chemotaxis? Explain how this appendage aids in chemotaxis. (5)
d) What are the positive and negative controls that one should keep in this experiment. (3)

Section D
(2Qx10M=20 Marks)

1.	Write a note on general secretion systems (7). Differentiate between two major kinds of general secretion systems (3).	10	CO 3
2	What is quorum sensing (2)? What are the differences between quorum sensing systems in Gram positive and Gram negative bacteria (3)? Explain any one quorum sensing system with illustrations. (5)	10	CO 2