Name:

Enrolment No:

UPES

End Semester Examination, December 2023

Course: Introduction to Microbiology

Semester: I

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

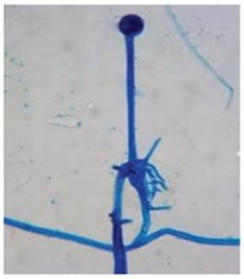
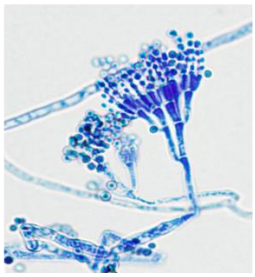
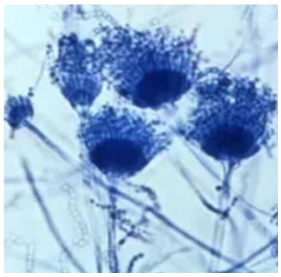
Course Code: HSMB1011 **Max. Marks: 100**

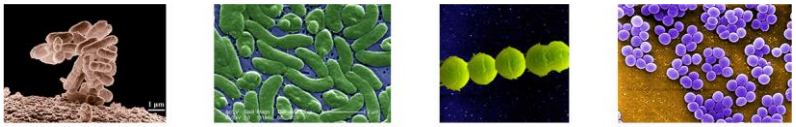
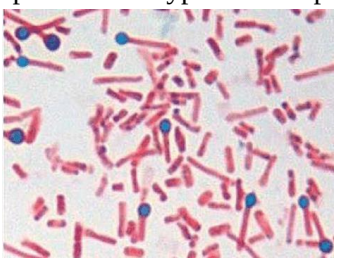
Instructions:

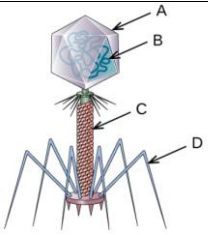
(A) Answer all the questions after carefully reading through the instructions.

(B) Do not scribble anything on question paper.

S. No.	Section A Short answer questions/ MCQ/T&F (20Qx1.5M= 30 Marks)	Marks	COs
Q 1	The most 'critical' step during gram staining is use of: a. Crystal violet b. Gram's Iodine c. Alcohol d. Saffranine	1.5	CO3
Q 2	When a cell divides in 3D, below morphologies are possible: a. *Bacillus* b. *Streptococcus* c. *Staphylococcus* d. *Sarcina* e. Both (c) and (d)	1.5	CO2
Q 3	Endospore-staining techniques are important for identifying: a. *E coli* b. *Clostridium* c. *Mycobacterium* d. *Pseudomonas*	1.5	CO3
Q 4	When you see light bend as it moves from air into water, you are observing the principle of Reflection. **True or False.**	1.5	CO3
Q 5	Prokaryotic ribosomes are 70S, and consists of: (a) 16 S and 64S subunits (b) 40 S and 30 S subunits (c) 50 S and 30 S subunits (d) 18 S and 52 S subunits	1.5	CO2

Q 6	Ziehl-Neelsen staining, is a type of differential staining to observe *Pseudomonas*: **True or False**	**1.5**	**CO3**
Q 7	What is the function of condenser in a brightfield microscope?	**1.5**	**CO3**
Q 8	Identify *Rhizopus* from the below wet mounts?    (A) (B) (C)	**1.5**	**CO3**
Q 9	Electron microscope was invented by: a. Carl Zeiss b. Franck and Henderson c. Knoll and Ruska d. Marvin Minsky	**1.5**	**CO1**
Q 10	Which of the following term refers to a bacterial cell having a single tuft of flagella at each of opposite ends? a. Monotrichous b. Amphitrichous c. Peritrichous d. D. Lophotrichous	**1.5**	**CO2**
Q 11	Paul Ehrlich introduced an arsenic-containing chemical called_____ to treat syphilis and trypanosomiasis. a. Salvarsan b. Arsenophenylglycine c. Atoxyl d. Tuberculin	**1.5**	**CO1**
Q 12	The correct taxonomic hierarchy of *Escherichia coli* is: a. Eubacteria; Proteobacteria; γ-proteobacteria; Enterobacterales; Enterobacteriaceae; *Escherichia; E coli* b. Eubacteria; Proteobacteria; β-proteobacteria; Enterobacterales; Enterobacteriaceae; *Escherichia; E coli* c. Eubacteria; Proteobacteria; β-proteobacteria; Enterobacteriaceae; Enterobacteriales; *Escherichia; E coli* d. Eubacteria; Proteobacteria; γ-proteobacteria; Enterobacteriales; Enterobacteriaceae; *Escherichia; E coli*	**1.5**	**CO1**
Q 13	*Moraxella catarrhalis* is a gram-positive diplococcus: **True or False**	**1.5**	**CO1**

Q 14	Which of the following cell wall components is unique to gram-negative cells? a. lipopolysaccharide b. teichoic acid c. mycolic acid d. peptidoglycan	**1.5**	**CO2**
Q 15	Molecules bearing both polar and nonpolar groups are said to be which of the following? a. Hydrophilic b. Amphipathic c. Hydrophobic d. Polyfunctional	**1.5**	**CO2**
Q 16	Use of immersion oil while visualizing a specimen in a 100x objective, at visible wavelength is to: a. Increase refractive index b. Increase Numerical aperture and hence (a) c. Decrease refractive index d. Increase Numerical aperture and hence (c)	**1.5**	**CO3**
Q 17	Which of the following is an example of Staphylococci?  A B C D	**1.5**	**CO2**
Q 18	Staining of gangrene samples reveals typical endospores:  Identify the possible pathogen from above image: (A) *Bacillus* (B) *Clostridium* (C) *Pseudomonas* (D) *E coli*	**1.5**	**CO3**
Q 19	Name three structures that various protozoa uses for locomotion.	**1.5**	**CO2**
Q 20	Name important components of Fungal cell wall?	**1.5**	**CO1**
	Section B **(4Qx5M=20 Marks)**		
Q 1	a. State the Germ theory of Disease. (1) b. What are Koch's postulates? (2) c. How did they influence the development of microbiology? (2)	**5**	**CO1**

Q 2	Explain the process of Binary fission in bacteria with a neat-labelled diagram.	**5**	**CO2**
Q 3	Name the causative agents of the following diseases with proper binomial nomenclature. a. Whooping Cough b. Plague c. Cholera d. Tuberculosis e. Anthrax	**5**	**CO1**
Q 4	Write down salient features of Carl Woese's three domain classification system and its significance.	**5**	**CO2**
	Section C **(2Qx15M=30 Marks)**		
Q 1	a. Explain how Pasteur's work influenced Lister and Koch (3) b. What was the principle behind design of swan-necked flasks by Louis Pasteur? (2) c. How did Edward Jenner introduce modern method of vaccination? (2) d. What is the concept of pure culture? Who first obtained pure culture of bacteria and how? (3) e. Describe the notable contributions of Elie Metchnikoff and Martinus Beijerinck during golden era of Microbiology. (5)	**15**	**CO1**
Q 2	 a. Identify the virus and label the different parts. (5) b. Write down salient characteristics of a virus. (2) c. Explain the geometric differences among helical, polyhedral, and complex viruses with diagram. (3) d. Describe the lytic cycle of (A) with help of a diagram. (5)	**15**	**CO2**
	Section D **(2Qx10M=20 Marks)**		
Q 1	Explain the differences between cell wall and cell membrane chemistry of Eubacteria and Archaebacteria in details with labelled diagrams.	**10**	**CO2**
Q 2	a. What is the function of staining in Microscopy? (2) b. 'Bacteria tend to stain more readily with cationic dyes.' Justify the statement. (2) c. Explain the principle of negative staining and acid-fast staining. (3+3)	**10**	**CO3**