

Name:

Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2023, Set 1

Course: Diagnostic Microbiology **Semester: 5th**
Program: Integrated (B.Sc.) - (M.Sc.) Microbiology **Duration: 3**
Hours Course Code: HSMB 3014 **Max. Marks:**
100

Instructions: Read all questions carefully.

S. No.	Section A Short answer questions/ MCQ/T&F (20Qx1.5M= 30 Marks)	Marks	COs
Q			
1	Create a chart outlining the key steps in identifying an unknown bacterial species.	1.5	CO 1
2	How does the Gram stain help differentiate bacteria?	1.5	CO 1
3	Why is pneumonia more common in the winter months? a) Warmer temperatures inhibit bacterial growth. b) People are less likely to gather indoors during the winter. c) Respiratory viruses thrive in cold, dry conditions. d) Pneumonia is not affected by seasonal changes.	1.5	CO 1
4	If a patient with pneumonia is suspected of having a bacterial infection, what diagnostic test might be ordered to identify the specific pathogen? a) Chest X-ray b) Blood culture c) Urinalysis d) Electrocardiogram (ECG)	1.5	CO 1
5	What is the primary objective of aseptic techniques in microbiology? a) To enhance bacterial growth b) To prevent contamination c) To increase bacterial virulence d) To improve staining procedures	1.5	CO 1
6	In a diagnostic bacteriology lab, which step of antimicrobial susceptibility testing involves measuring the diameter of inhibition zones? a) Inoculation b) Incubation c) Interpretation d) Isolation	1.5	CO 1
7	When analyzing the results of an antimicrobial susceptibility test, what does a larger inhibition zone diameter indicate? a) High susceptibility to antibiotics b) Low susceptibility to antibiotics c) No bacterial growth	1.5	CO 1

	d) A need for repeat testing		
8	What is a common characteristic of endospore-forming bacteria? a) They are always Gram-positive. b) They are obligate aerobes. c) They cannot form spores. d) They are non-pathogenic.	1.5	CO 1
9	What is a key feature of aerobic endospore-forming bacteria? a) They thrive in the absence of oxygen. b) They are commonly found in anaerobic environments. c) They form spores under anaerobic conditions. d) They are highly sensitive to oxygen.	1.5	CO 1
10	How do immunoassays, such as ELISA, work in the diagnosis of infectious diseases? a) By detecting the presence of pathogens b) By measuring the levels of specific antibodies or antigens c) By culturing the infectious agent d) By directly visualizing the pathogen under a microscope	1.5	CO 1
11	A patient presents with symptoms of an infectious disease. Which diagnostic test would you recommend for rapid pathogen identification? a) Serological test b) PCR c) Blood culture d) Stool examination	1.5	CO 1
12	Which of the following best defines Minimum Inhibitory Concentration (MIC)? a) The lowest concentration of an antibiotic that inhibits bacterial growth b) The highest concentration of an antibiotic that kills bacteria c) The point at which bacteria become resistant to antibiotics d) The total number of bacteria present in a culture	1.5	CO 1
13	In a laboratory setting, what specific test would be performed to determine the Minimum Bactericidal Concentration (MBC) of an antibiotic? a) A broth dilution test b) A Gram staining procedure c) A bacterial culture test d) An antibiotic resistance test	1.5	CO 2
14	Judge the limitations of antibiotic susceptibility testing methods in accurately determining the MIC and MBC for all types of bacteria. a) The methods are always highly accurate. b) Testing methods are limited in their ability to assess drug resistance. c) Test results vary depending on the bacterial strain and environmental conditions. d) MIC and MBC are irrelevant in antibiotic therapy.	1.5	CO 2
15	In which situation would immunosuppressive drugs be used for medical treatment? a) To treat a severe bacterial infection b) To boost the immune response in a viral infection c) To prevent organ rejection in a transplant patient d) To cure a genetic immunodeficiency disorder	1.5	CO 2

16	<p>What is the primary mode of transmission for zoonotic infections?</p> <p>a) Person-to-person contact b) Airborne droplets c) Direct or indirect contact with animals d) Contaminated food and water</p>	1.5	CO 2
17	<p>Why are zoonotic infections of concern to public health?</p> <p>a) They primarily affect animals, not humans. b) They are easily treatable with antibiotics. c) They can lead to disease outbreaks in human populations. d) They do not cause any severe symptoms in humans.</p>	1.5	CO 1
18	<p>Which body areas typically harbor the highest concentration of normal microbiota?</p> <p>a) Eyes and ears b) Heart and lungs c) Skin and digestive tract d) Bones and muscles</p>	1.5	CO 1
19	<p>What is the primary purpose of isolating normal microbiota from the human body for research?</p> <p>a) To identify potential pathogens b) To investigate microbial genetics c) To evaluate the effectiveness of antibiotics d) To study the roles of these microbes in human health</p>	1.5	CO 1
20	<p>How do urinary catheters contribute to the risk of urinary tract infections in healthcare settings?</p> <p>a) They decrease the risk of infection. b) They introduce bacteria into the urinary tract. c) They have no effect on UTI risk. d) They promote natural bladder function.</p>	1.5	CO 1

Section B (4Qx5M=20 Marks)			
1	How does HAT get its nickname "sleeping sickness," and what are the neurological symptoms associated with the late stage of the disease?	5	CO 2
2	Explain how this staining technique works and how it helps differentiate between two major groups of bacteria.	5	CO 3
3	Describe the process of isolating and identifying normal microbiota from the human body.	5	CO 2
4	Explain the difference between Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) in the context of antibiotic susceptibility testing.	5	CO 3
Section C (2Qx15M=30 Marks)			
1	<p>A 30-year-old female visit to the primary care clinic with complaints of frequent urination, a burning sensation during urination, and lower abdominal pain. She also mentions that her urine appears cloudy and has an unusual odor. The patient has no history of urinary tract infections (UTIs) and is otherwise healthy.</p> <p>(a) Describe the possible clinical findings and symptoms that may support the diagnosis of a urinary tract infection (UTI) in this patient? (10)</p> <p>(b) What steps would you recommend for the diagnosis and management of this suspected UTI case? (5)</p>	15	CO 3
2	<p>Malti, a 26-year-old woman arrives at the urgent care clinic with a persistent cough, fever, and difficulty breathing for the past five days. She reports greenish-yellow sputum production, fatigue, and discomfort in her chest.</p> <p>(a) What diagnostic tests and assessments should be performed to confirm the diagnosis and determine the causative agent? (5)</p> <p>(b) Describe the risk factors that can increase an individual's susceptibility to pneumonia. (5)</p> <p>(c) Explain the principles of pneumonia treatment, including the use of antibiotics and supportive care. (5)</p>	15	CO 3
Section D (2Qx10M=20 Marks)			
1	In what specific way does an ELISA test detect the presence of a target antigen in a patient's sample, and how can it be useful in clinical diagnostics?	10	CO 3
2	Explain the importance of using various laboratory techniques, such as serology, molecular diagnostics, and culture methods, in the accurate diagnosis of infectious diseases.	10	CO 2