Name: **Enrolment No:**	

UPES

End Semester Examination, December 2024

Course: Diagnostic Microbiology

Semester : V

Program: INT-BMSC-MICROBIOLOGY **Duration : 3 Hours**

Course Code: HSMB3014_2 **Max. Marks: 100**

S. No.	Section A Short answer questions/ MCQ/T&F (20Qx1.5M= 30 Marks)	Marks	COs
1	Select the option that best describes 'zoonotic infections.' a) Infections transmitted from humans to humans only b) Infections transmitted from animals to humans c) Infections transmitted through air d) Infections transmitted through water	1.5	CO 1
2	_____ is commonly responsible for causing streptococcal throat infections. a) *Streptococcus pyogenes* b) *Streptococcus pneumoniae* c) *Enterococcus faecalis* d) *Streptococcus viridans*	1.5	CO 1
3	'MIC' (Minimum Inhibitory Concentration) is: a) The lowest concentration of an antibiotic that kills bacteria b) The lowest concentration of an antibiotic that inhibits bacterial growth c) The highest concentration of antibiotic tolerated by humans d) The concentration at which bacteria are most virulent	1.5	CO 1
4	A major diagnostic test for bacterial infections is a) Polymerase chain reaction (PCR) b) Chest X-ray c) Enzyme-linked immunosorbent assay (ELISA) d) Urine analysis	1.5	CO 1
5	A primary mode of transmission for *Rickettsia* species is a) Airborne transmission b) Direct contact	1.5	CO 1

	c) Arthropod vectors (e.g., ticks, lice) d) Fecal-oral route		
6	The major challenge in diagnosing anaerobic infections is a) Lack of appropriate growth media b) Difficulty in collecting specimens c) Low bacterial load in clinical samples d) Absence of clear clinical symptoms	**1.5**	**CO 1**
7	…..…… is an example of a zoonotic infection. a) Tuberculosis b) Rabies c) Influenza (seasonal flu) d) Common cold	**1.5**	**CO 1**
8	A characteristic feature of *Clostridium* species is a) Aerobic metabolism b) Spore formation and anaerobic growth c) Gram-negative morphology d) Non-motility	**1.5**	**CO 1**
9	Select the disease most commonly diagnosed with a sputum culture a) Urinary tract infection b) Pneumonia c) Tuberculosis d) Syphilis	**1.5**	**CO 1**
10	…..……. pathogen can cause both respiratory and gastrointestinal diseases. a) *Escherichia coli* b) *Salmonella enterica* c) *Shigella dysenteriae* d) *Campylobacter jejuni*	**1.5**	**CO 1**
11	The main symptoms of Guinea Worm Disease are a) Fever and rash b) Severe abdominal pain and vomiting c) A painful, burning blister usually on the lower limbs d) Paralysis of the limbs	**1.5**	**CO 1**
12	The option that best describes the intermediate host for *Dracunculus medinensis* is: a) Fish b) Mosquito c) Copepod (a tiny water flea) d) Snail	**1.5**	**CO 1**
13	…..…… is commonly used to detect antibodies in the	**1.5**	**CO 1**

	blood. a) Direct ELISA b) Indirect ELISA c) Sandwich ELISA d) Competitive ELISA		
14	Select the consequence of a loss of microbial diversity in the gut. a) Enhanced immune system activity b) Greater resistance to infections c) Increased susceptibility to chronic diseases d) Improved digestion	**1.5**	**CO 1**
15	Mechanism of action of tetracyclines is a) Inhibition of cell wall synthesis b) Inhibition of protein synthesis by binding to the 30S subunit c) Inhibition of RNA polymerase d) Disruption of the bacterial membrane	**1.5**	**CO 1**
16	……. is the mechanism of action of fluoroquinolones. a) Inhibition of DNA replication b) Inhibition of protein synthesis c) Inhibition of cell wall synthesis d) Inhibition of folic acid synthesis	**1.5**	**CO 1**
17	_____ is most commonly associated with infections in transplant recipients due to immunosuppression. a) Cytomegalovirus (CMV) b) Herpes simplex virus (HSV) c) Epstein-Barr virus (EBV) d) Human papillomavirus (HPV)	**1.5**	**CO 1**
18	In cases of suspected foodborne illness, which clinical specimen is often collected for laboratory analysis? a) Stool b) Blood c) Sputum d) Cerebrospinal fluid	**1.5**	**CO 1**
19	……. specimens are used to diagnose parasitic infections like *Giardia* or *Entamoeba histolytica.* a) Blood b) Stool c) Urine d) Sputum	**1.5**	**CO 1**

20	Select an advantage of PCR over traditional culture methods in diagnosing infections. a) PCR provides faster results than cultures b) PCR can detect infections caused by non-culturable organisms c) PCR is less expensive than traditional culture methods d) PCR identifies the pathogen based on its clinical symptoms	**1.5**	**CO 1**
Section B (4Qx5M=20 Marks)			
Q 1	Explain the various types of clinical specimens commonly collected for the diagnosis of infectious diseases.	**5**	**CO 2**
Q 2	Discuss the common infectious diseases in guinea pigs, their clinical signs, transmission routes, and methods of diagnosis and treatment.	**5**	**CO 2**
Q 3	Describe how normal microbiota differ from pathogenic microorganisms in terms of their roles in the human body.	**5**	**CO 2**
Q 4	Define the concepts of Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC).	**5**	**CO 2**
Section C (2Qx15M=30 Marks)			
Q 1	Mrs. Hency is 12 weeks pregnant and has no significant medical history. She has no history of previous UTIs or chronic diseases. She is in her first trimester of pregnancy and has had regular antenatal care. A) Discuss the diagnosis for Mrs. Hency based on her symptoms and findings. (5) B) Explain the importance to treat a UTI promptly in a pregnant woman? (5) C) Discuss the lifestyle or preventive measures which would you recommend to Mrs. Hency to prevent future UTIs during pregnancy. (5)	**15**	**CO 3**
Q 2	Ms. Lata has been HIV-positive for the past 6 years and has poorly controlled HIV with a CD4 count of 180 cells/mm^3. She has been non-compliant with her antiretroviral therapy (ART) and is currently immune-suppressed. Ms. Lata presents with chronic cough, fever, night sweats, and unintentional weight loss over the past 2 months. She denies hemoptysis, but her symptoms have progressively worsened. She recently traveled to an endemic area for tuberculosis (TB). A) Write the most likely diagnosis for Ms. Lata, and why is she at increased risk for developing this infection? (5) B) Explain the strategies, which can be employed to prevent the transmission of TB in a healthcare setting, especially for	**15**	**CO 3**

	immunocompromised patients like Ms. Lata? (10)		
Section D (2Qx10M=20 Marks)			
Q 1	A) Describe the principle of ELISA (Enzyme-Linked Immunosorbent Assay). B) Discuss its various types, including their applications and limitations.	**5+5**	**CO 3**
Q 2	A) Describe the structural characteristics of bacterial spores. B) Explain how each of these features contributes to the survival of the bacterium under extreme environmental conditions.	**5+5**	**CO 3**