


Name:			
Enrolment No:			
UPES End Semester Examination, December 2024 Course: Antimicrobial Drug Resistance and Drug Development Semester: 3rd Program: MSC-MICROBIOLOGY Course Code: HSMB8016P			
		Duration: 3 Hours	Max. Marks: 100
Instructions: Attempt all questions			
S. No.	Section A Short answer questions/ MCQ/T&F (20Qx1.5M= 30 Marks)	Marks	COs
Q 1	Amphotericin B is a broad-spectrum antifungal drug that works by binding to ergosterol in the fungal cell membrane. (True/False)	1.5	CO1
Q 2	Metronidazole is effective only against aerobic bacteria. (True/False)	1.5	CO2
Q 3	The mechanism of action of macrolides involves inhibiting bacterial RNA synthesis. (True/False)	1.5	CO2
Q 4	Antiretroviral drugs are designed to prevent the replication of HIV by targeting its reverse transcriptase, integrase, and protease enzymes. (True/False)	1.5	CO2
Q 5	Ribavirin is primarily used as an antiviral drug that inhibits DNA synthesis. (True/False)	1.5	CO2
Q 6	Vancomycin is effective against Gram-negative bacteria. (True/False)	1.5	CO1
Q 7	The development of antimicrobial resistance is primarily due to the overuse of antibiotics in humans, not in agriculture. (True/False)	1.5	CO1
Q 8	Which of the following drugs works by inhibiting fungal cell membrane synthesis? a) Amphotericin B b) Metronidazole c) Vancomycin d) Ribavirin	1.5	CO3
Q 9	Which of the following is a key characteristic of macrolides? a) They bind to bacterial ribosomes and inhibit protein synthesis b) They interfere with DNA replication c) They block folic acid synthesis in bacteria d) They inhibit viral RNA replication	1.5	CO3
Q 10	Which of the following drugs is commonly used to treat HIV infections?	1.5	CO3

	<ul style="list-style-type: none"> a) Ribavirin b) Trifluridine c) Zidovudine d) Metronidazole 		
Q 11	<p>Penicillin resistance in bacteria is primarily caused by:</p> <ul style="list-style-type: none"> a) The production of beta-lactamase enzymes b) Alteration of the bacterial ribosome c) Changes in the bacterial DNA polymerase d) Mutation of bacterial cell membrane proteins 	1.5	CO4
Q 12	<p>Echinocandins inhibit which of the following in fungal cells?</p> <ul style="list-style-type: none"> a) Cell membrane synthesis b) Protein synthesis c) Cell wall synthesis d) DNA replication 	1.5	CO2
Q 13	<p>What is the difference between Metronidazole and Tinidazole in terms of their mechanism of action?</p>	1.5	CO4
Q 14	<p>Which class of drugs inhibits bacterial cell wall synthesis by binding to the fungal enzyme beta-glucan synthase?</p> <ul style="list-style-type: none"> a) Penicillins b) Echinocandins c) Tetracyclines d) Quinolones 	1.5	CO2
Q 15	<p>Which of the following is a common mechanism of antibiotic resistance in bacteria?</p> <ul style="list-style-type: none"> a) Protein synthesis inhibition b) Efflux pumps c) DNA synthesis d) RNA interference 	1.5	CO2
Q 16	<p>The primary mechanism of action for metronidazole is to:</p> <ul style="list-style-type: none"> a) Disrupt DNA synthesis b) Inhibit protein synthesis c) Block cell wall synthesis d) Inhibit RNA synthesis 	1.5	CO4
Q 17	<p>What is the function of beta-lactamase in bacterial cells?</p> <ul style="list-style-type: none"> a) Inhibits DNA synthesis b) Breaks down the antibiotic c) Enhances protein synthesis d) Promotes cell wall synthesis 	1.5	CO3
Q 18	<p>Which of the following drugs is an RNA synthesis inhibitor?</p> <ul style="list-style-type: none"> a) Tinidazole b) Ribavirin c) Echinocandin d) Amphotericin B 	1.5	CO2
Q 19	<p>Which drug is commonly used to treat HIV?</p>	1.5	CO2

	a) Trifluridine b) Amphotericin B c) Zidovudine d) Metronidazole		
Q 20	Macrolides work by targeting which part of the bacterial cell? a) Cell wall b) Ribosomes c) DNA d) Cell membrane	1.5	CO1
Section B (4Qx5M=20 Marks)			
Q 1	What is the role of interferons in treating viral infections? (2.5 marks) Discuss how they enhance the immune system's ability to fight viruses. (2.5 marks)	5	CO2
Q 2	Explain the molecular basis of penicillin resistance. (2.5 marks) How does beta-lactamase contribute to this resistance? (2.5 marks)	5	CO3
Q 3	What are the major mechanisms by which bacteria develop resistance to macrolide antibiotics?	5	CO2
Q 4	What is the role of interferons in treating viral infections? (2.5 marks) Discuss how they enhance the immune system's ability to fight viruses. (2.5 marks)	5	CO2
Section C (2Qx15M=30 Marks)			
Q 1	Discuss the molecular mechanisms behind drug resistance to common antimicrobial drugs like penicillin, vancomycin, and macrolides. (10 marks) How can these resistance mechanisms be overcome in clinical settings? (5 marks)	15	CO2
Q2	Provide an overview of the development and design of new antimicrobial drugs. (5 marks) Discuss current methods such as enzyme targeting, receptor targeting, and computer-aided drug design. How do these methods contribute to overcoming antimicrobial resistance? (10 marks)	15	CO3
Section D (2Qx10M=20 Marks)			
Q 1	Explain the mechanism of action of key antiviral drugs like Ribavirin and Trifluridine. (5 marks) How do these drugs interfere with viral replication, and what are their clinical applications and limitations? (5 marks)	10	CO2

Q2	Discuss the global challenges posed by antimicrobial resistance (AMR). <i>(5 marks)</i> Describe the impact of AMR on public health, agriculture, and the environment. What strategies can be employed to curb the rise of antimicrobial resistance? <i>(5 marks)</i>	10	CO3
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