Name:

Enrolment No:

UPES

End Semester Examination, December 2024

Course: Antimicrobial Drug Resistance and Drug Development

Semester:3rd

Program: MSC-MICROBIOLOGY **Duration: 3 Hours**

Course Code: HSMB8016P **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	The development of antimicrobial resistance (AMR) is a natural process, but excessive use of antibiotics accelerates it. (True/False)	**1.5**	**CO1**
Q 2	Interferons are used in the treatment of bacterial infections. (True/False)	**1.5**	**CO2**
Q 3	Vancomycin resistance is primarily caused by changes in bacterial ribosomal subunits. (True/False)	**1.5**	**CO2**
Q 4	Antiretroviral drugs can completely eliminate HIV from the body. (True/False)	**1.5**	**CO2**
Q 5	Penicillin resistance can occur through the production of beta-lactamase, which destroys the antibiotic. (True/False)	**1.5**	**CO2**
Q 6	What are macrolides?	**1.5**	**CO1**
Q 7	What is the significance of antibiotic resistance in the environment?	**1.5**	**CO1**
Q 8	What are interferons?	**1.5**	**CO3**
Q 9	What are Echinocandins?	**1.5**	**CO3**
Q 10	Which of the following antimicrobial drugs works by disrupting the fungal cell membrane? a) Amphotericin B b) Echinocandins c) Metronidazole d) Tinidazole	**1.5**	**CO3**
Q 11	Which class of drugs inhibits bacterial cell wall synthesis by binding to the fungal enzyme beta-glucan synthase? a) Penicillins b) Echinocandins	**1.5**	**CO4**

	c) Tetracyclines d) Quinolones		
Q 12	What is the primary mechanism of action of Metronidazole and Tinidazole? a) Inhibition of protein synthesis b) Disruption of DNA synthesis c) Disruption of the cell wall d) Inhibition of folate synthesis	**1.5**	**CO2**
Q 13	Which antiviral drug is used to inhibit RNA-dependent RNA polymerase and is effective against hepatitis C and respiratory viruses? a) Trifluridine b) Ribavirin c) Interferons d) Zidovudine	**1.5**	**CO4**
Q 14	Which of the following mechanisms of bacterial resistance is linked to the production of beta-lactamase enzymes? a) Vancomycin resistance b) Penicillin resistance c) Macrolide resistance d) Aminoglycoside resistance	**1.5**	**CO2**
Q 15	The development of antibiotic resistance is accelerated by the overuse and misuse of antimicrobial drugs. (True/False)	**1.5**	**CO2**
Q 16	Penicillin resistance in bacteria is mainly due to the alteration of ribosomal subunits. (True/False)	**1.5**	**CO4**
Q 17	Macrolide antibiotics bind to bacterial ribosomes and prevent protein synthesis. (True/False)	**1.5**	**CO3**
Q 18	Antiretroviral drugs are used to treat HIV by inhibiting its reverse transcriptase enzyme. (True/False)	**1.5**	**CO2**
Q 19	The molecular basis for penicillin resistance often involves the production of beta-lactamase, which degrades the antibiotic. (True/False)	**1.5**	**CO2**
Q 20	The primary mechanism of action of Trifluridine is as a DNA polymerase inhibitor. (True/False)	**1.5**	**CO1**
Section B **(4Qx5M=20 Marks)**			
Q 1	What is the history of antimicrobial drug development? *(2.5 marks)* Provide examples of the first antimicrobial drugs and how they revolutionized medicine. *(2.5 marks)*	**5**	**CO2**
Q 2	Describe the mechanism of action of Amphotericin B. *(2.5 marks)*	**5**	**CO3**

	How does it affect fungal cells, and what are the potential side effects? *(2.5 marks)*		
Q 3	What are Echinocandins, and how do they inhibit fungal cell wall synthesis?	**5**	**CO2**
Q 4	Compare and contrast the mechanisms of action of Metronidazole and Tinidazole. *(2.5 marks)* How are these drugs effective against anaerobic infections? *(2.5 marks)*	**5**	**CO2**
Section C (2Qx15M=30 Marks)			
Q 1	What are macrolides, and how do they function as ribosome-binding antibiotics? *(10 marks)* How has bacterial resistance to macrolides evolved? *(5 marks)*	**15**	**CO2**
Q2	Provide an overview of the development and design of new antimicrobial drugs. *(5 marks)* Discuss the current strategies for combating antimicrobial resistance, including computer-aided drug design, targeting enzymes, and receptors. *(10 marks)*	**15**	**CO3**
Section D (2Qx10M=20 Marks)			
Q 1	Explain the mechanism of action of common antimicrobial drugs such as Amphotericin B, Echinocandins, Metronidazole, and Ribavirin. *(5 marks)* Discuss their clinical uses, potential side effects, and limitations. *(5 marks)*	**10**	**CO2**
Q2	Discuss the molecular mechanisms of drug resistance, including the resistance mechanisms for penicillin and vancomycin. *(5 marks)* How do these mechanisms lead to treatment failures in bacterial infections? Include strategies to overcome these resistances. *(5 marks)*	**10**	**CO3**