Name: **Enrolment No:**	

UPES

End Semester Examination, May 2025

Course: Antimicrobial resistance & drug development **Semester : VI**

Program: Int.BSc.MSc. Microbiology **Duration : 3 hours**

Course Code: HSMB3025P **Max. Marks: 100**

Instructions:

S. No.	Section A Short answer questions/ MCQ/T&F (20Qx1.5M= 30 Marks)	Marks	Cos
Q 1	Write at least 3 characteristics of an ideal antimicrobial drug.	**1.5**	**CO2**
Q 2	Spot which of the following is considered a broad-spectrum antibiotic. a) Penicillin G b) Vancomycin c) Tetracycline d) Rifampin	**1.5**	**CO2**
Q 3	Define MLC.	**1.5**	**CO2**
Q 4	MLC > MIC. Comment if the statement 'True' or 'False'	**1.5**	**CO1**
Q 5	Write the full form of CADD.	**1.5**	**CO1**
Q 6	Define selective toxicity.	**1.5**	**CO1**
Q 7	Recollect, which of the following antibiotics is effective in treating oral Candidiasis: a) Nystatin b) Bacitracin c) Tetracycline d) Griseofulvin	**1.5**	**CO2**
Q 8	Recall, which of the following antibiotics is most likely to cause depression of the bone marrow: a) PencillinG b) Tetracycline c) Trimethoprim d) Amphotericin B	**1.5**	**CO2**
Q 9	Identify, which of the following interferes with the regeneration of the monophosphate form of Bactoprenol from the pyrophosphate Form: a) Vancomycin b) Ampicillin c) Bacitracin d) Cephalosporins	**1.5**	**CO2**

Q 10	Recall, which of the following is not an appropriate target for antifungal drugs: a. ergosterol b. chitin c. peptidoglycan d. β(1→3) glucan	**1.5**	**CO1**
Q11	Identify which of the following resistance mechanisms describes the function of β-lactamase? a) Efflux pump b) Target mimicry c) Drug inactivation d) Target overproduction	**1.5**	**CO2**
Q12	Recall, which of the following techniques cannot be used to determine the minimum inhibitory concentration of an antimicrobial drug against a particular microbe? a) E-test b) Microbroth dilution test c) Kirby-Bauer disk diffusion test d) Macrobroth dilution test	**1.5**	**CO2**
Q13	Fill in the blank that the group of soil bacteria known for their ability to produce a wide variety of antimicrobials is called the _____.	**1.5**	**CO2**
Q14	Identify, which of the following is not a target for drug design? a) Enzymes b) Receptors c) Ribosomes d) Vitamins	**1.5**	**CO2**
Q15	Antiviral drugs, like Tamiflu and Relenza, that are effective against the influenza virus by preventing viral escape from host cells are called _____.	**1.5**	**CO1**
Q16	Write that in the Kirby-Bauer disk diffusion test, the _____ of the zone of inhibition is measured and used for interpretation. a) Diameter b) Microbial population c) Circumference d) Depth	**1.5**	**CO1**
Q17	Comment in one line, when is using a broad-spectrum antimicrobial drug warranted?	**1.5**	**CO1**
Q18	Identify the correct answer. Vancomycin resistance in enterococci is primarily due to: a) Efflux pumps b) Enzymatic degradation c) Cell wall modification d) Ribosome methylation	**1.5**	**CO1**
Q19	Spot the correct answer. Macrolides act on the: a) DNA b) 50S ribosomal subunit c) Cell membrane d) RNA polymerase	**1.5**	**CO1**

Q20	Recall, Bacterial resistance to macrolides often involves: a) Ribosomal methylation b) Cell wall alteration c) DNA mutation d) Viral vectors	**1.5**	**CO2**
Section B **(4Qx5M=20 Marks)**			
Q 1	Describe which bacterial structural target would make an antibacterial drug selective for gram-negative bacteria. Provide one example of an antimicrobial compound that targets this structure.	**5**	**CO2**
Q 2	Write a note on adverse drug reaction caused by various antimicrobials (antibacterials/antivirals and anti-amebic drugs). Cite specific examples.	**5**	**CO1**
Q 3	Write the major mechanism of resistance to Chloramphenicol.	**5**	**CO2**
Q 4	a. 'Chloramphenicol and Streptomycin are not in use.' Reason why (2) b. Explain how they can be put to use given that drug resistance is not an issue with them. (3)	**5**	**CO1**
Section C **(2Qx15M=30 Marks)**			
Q 1	You are part of a team tasked with designing a drug against multi-drug resistant *Mycobacterium tuberculosis*. a) Describe the key steps will you take in the rational drug design process? (6) b) Explain how will you ensure the drug targets are specific to the bacterium? (5) c) Discuss the role of in silico tools and wet lab validation in this process. (4)	**15**	**CO2**
Q 2	An HIV-positive patient on antiretroviral therapy (ART) shows rising viral load. Resistance testing reveals mutations in the reverse transcriptase gene. a. Describe what could be the cause of this resistance? (1) b. Outline how therapy should be adjusted in this case. (5) c. Enlist and explain mode of action of major antiviral drugs. (7) d. Write about the different types of reverse transcriptase inhibitors. (2)	**15**	**CO2**
Section D **(2Qx10M=20 Marks)**			
Q 1	Describe in detail the molecular mechanisms of resistance against macrolides and vancomycin.	**10**	**CO1**
Q 2	Describe in detail the mode of action of anti-fungal drugs. (at least 4)	**10**	**CO1**