

College of Science

Department of Botany & Microbiology

كلية العلوم

قسم النبات والاحياء الدقيقة

Final Exam  
Academic Year 1446 Hijri- First Semester

Exam Information معلومات الامتحان			
Course Name	Antibiotics	مضادات حيوية	اسم المقرر
Course Code	463 MBIO	463 حنق	رمز المقرر
Exam Date	2024-12-22	1446-06-21	تاريخ الامتحان
Exam Time	01 00 PM		وقت الامتحان
Exam Duration	2 hours	ساعتان	مدة الامتحان
Classroom No.	1 B ١١ B. 5	اب ١١ م	رقم قاعة الاختبار
Instructor Name	Dr. Naiyf S Alharbi	د. نايف بن سلطان الحربي	اسم أستاذ المقرر

Student Information معلومات الطالب		
Student's Name		اسم الطالب
ID number		الرقم الجامعي
Section No.	4569	رقم الشعبة
Serial Number		الرقم التسلسلي

**General Instructions:**

- Your Exam consists of  PAGES (Except this page). صفحة (باستثناء هذه الورقة).
- Keep your mobile and smart watch out of the classroom. يجب إبقاء الهواتف والساعات الذكية خارج قاعة الامتحان.

هذا الجزء خاص بأستاذ المادة

This section is ONLY for instructor

#	Course Learning Outcomes (CLOs)	Related Question (s)	Points	Points earned	Final Score	Actual Point
١	CLO 1 Initial concepts of antibiotics	Q1 (4) Q3 (8) Q4 (1, 11, 12, 15, 21, 24, 26)	2+0.5+0.5+0.5+0.5+0.5+0.5	<u>6</u>	٤٠	
٢	CLO 2 Comprehension of extracting and measuring the rate of reaction of antibiotics and antibiotic biosynthesis	Q1 (2) Q3 (2, 6, 9) Q4 (6, 7, 10)	2+0.5+0.5+0.5+0.5+0.5+0.5	<u>5</u>		
٣	CLO 3 How to use antibiotic treatment and methods of use in the prevention	Q1 (5) Q2 (1, 5) Q3 (3, 7) Q4 (4, 8, 14, 17, 19, 20, 29)	2+1+1+0.5+0.5+0.5+0.5+0.5+0.5+0.5	<u>8.5</u>		
٤	CLO 4 Learn how to detect the activity of antibiotics	Q2 (2, 6) Q3 (4, 5) Q4 (22, 23)	1+1+0.5+0.5+0.5+0.5	<u>4</u>		
٥	CLO 5 Discuss where antibiotics come from.	Q2 (8, 9) Q3 (1, 10) Q4 (3, 5, 9, 13, 30)	1+1+0.5+0.5+0.5+0.5+0.5+0.5	<u>5.5</u>		
٦	CLO 6 Discuss the causes of the development of antibiotic resistance	Q1 (1) Q2 (7, 10) Q4 (2, 18, 25, 27, 28)	٢+١+1+0.5+0.5+0.5+0.5+0.5	<u>6.5</u>		
٧	CLO 7 How to use antibiotics in the treatment and side effects.	Q1 (3) Q2 (3, 4) Q4 (16)	2+2+1+1+0.5	<u>4.5</u>		

## EXAM COVER BAGE

**Q1: Mention and discuss as required (Answer only 5 of the following questions): (10 Marks)**

**1- What are the four mechanisms of antimicrobial resistance?**

**2- Describe the principles and applications of automated systems and molecular methods in antimicrobial susceptibility testing?**

**3- Plasmids have many different functions and may contain genes that promote the survival of the organism, what are the functions of plasmids?**

**4- What are Mobile Genetic Elements (MGEs) in bacteria?**

**5- Discuss the pharmacokinetics of  $\beta$ -lactam antibiotics?**

**6- Mention the eight quality characteristics that an antibiotic should have?**

**Q2: Select the correct answer for the following multiple choice questions. (10 Marks)**

**1- Plasmids shapes .....**

- A. Open circular DNA      B. Linear DNA      C. Supercoiled DNA      D. All of the above

**2- ..... is the activity of the antibiotic grouping equal to the most active antibiotic in the antibiotic grouping.**

- A. Addition      B. Antagonism      C. Synergism      D. Indifference

**3- ..... These are specialized antibiotics that kill or inhibit parasites.**

- A. Antiseptic      B. Antiparasitic      C. Antiviral      D. Antibacterial

**4- Peptidoglycan is inhibited in the growth bacterial cell at the stage .....**

- A. First      B. Second      C. Third      D. Fourth

**5- Antibiotics  $\beta$ -lactams inhibit cell wall synthesis and work by inhibiting the enzyme .....**

- A. Autolytic enzymes      B. Transpeptidase      C. Transaminase      D. Gyrase

**6- A standard method for determining the effect of antibiotic activity is ..... It is based on the measurement of scattered light.**

- A. Turbidimetry      B. Nephelometry      C. Enzyme Activity      D. All of the above

**7- The importance and benefit of administering 2 drugs in synergy occurs in certain situations such as .....**

- A. Broaden the spectrum of effects      B. Reduce the severity of side effects  
C. Reduce the duration of treatment continuity      D. All of the above

**8- The most important characteristic of antibiotics..... It is the selective inhibition of the growth of microorganisms without causing harm to the host.**

- A. External surface      B. Sanitizer      C. Selective toxicity      D. None of the above

**9- ..... The ability to produce generations that are easily transferred from one incubator to another.**

- A. Microbial alignment      B. Microbial power      C. Microbial infection      D. None of the above

**10- ..... These are chemicals used to kill viruses, bacteria and fungi, and these detergents are inherently harmful (toxic) and therefore used superficially for equipment and devices.**

- A. Antiseptic      B. Germicides      C. Sanitizer      D. None of the above

**Q3: Connect each of the following two columns to form a correct relationship (5 marks)**

- A. Ethambutol  
B. Antagonism effect  
C. Autolytic  
D. *S. aureus*  
E. Aminoglycosides  
F. MIC  
G. Disinfectants  
H. Bacetriocidal  
I. Indifference effect  
J. Turbidimetry  
K. MBC  
L.  $\beta$ -lactamas  
M. Polyene  
N. *In vivo*

( )	1- The ability of the antibiotic to kill the bacterial cell.
( )	2- The most important antibiotics that affect the 30 S subunit.
( )	3- The lowest concentration of antibiotic capable of killing bacteria.
( )	4- It is one of the ways in which antibiotic activity is measured.
( )	5- Tests that are carried out inside the body of an organism.
( )	6- Occurs if the activity of a group of co-antibiotics is lower than the most active antibiotic in the combination.
( )	7- Most important antibiotics affecting the fungal cytoplasmic membrane.
( )	8- Detergents that kill microorganisms on equipment and devices.
( )	9- Used as a standardised sample to measure antibiotic activity.
( )	10- The most important antibiotics that target the cell walls of bacteria.

**Q4: Put a check (✓) mark if the statement is correct and (✗) mark if incorrect. (15 Marks)**

1	A sanitizer is a non-toxic solution that sterilizes external surfaces such as skin.	
2	The degradative plasmid is the plasmid that contains the gene that resists antibiotics and toxins.	
3	Quinolone antibiotics bind to the covalent bond between DNA and Gyrase, thus affecting the process of DNA replication.	
4	Vitek 2 is one of the best devices for identifying all types of pathogenic bacteria and yeasts very accurately and within a short period, identifying their classification and testing their degree of sensitivity to antibiotics.	
5	Tetracyclines are a family of antibiotics that inhibit the synthesis of proteins by binding to the 50 S subunit.	
6	The sedimentation coefficient of ribosomal proteins is different in fungi than in bacteria and protozoa.	
7	<i>E. coli</i> is used as a standard sample to measure the activities of antibiotics on Gram-positive bacteria.	
8	The dosage of the antibiotic is determined by the rate of elimination of the antibiotic and the number of doses during the day.	
9	Alexander Fleming was able to purify penicillin for medical use in 1928.	
10	Antibiotic susceptibility testing is done in two ways on agar plates: disc testing and agar serial dilution testing.	
11	The microbial flora is protective of the body, but when antibiotics are overused, they destroy the natural, non-antibiotic-resistant strains of bacteria.	
12	Bacteriostatic is when an antibiotic is able to destroy bacteria.	
13	Most clinical antibiotics target structures or processes unique to bacteria, such as cell wall synthesis.	
14	Autolytic enzymes (murein hydrolases) are active in cells treated with the antibiotic Trimethoprim.	
15	Virulence plasmid contains a gene that provides resistance to certain metals.	
16	In many pathological cases, it is necessary to give two or more antibiotics, as they work through multiple mechanisms.	
17	$\beta$ -lactams play a role in inhibiting cross-linking during polymerization to form peptidoglycan.	
18	Col –plasmid is a plasmid that contains genes that encode certain bacterial toxins, e.g. Colicin by <i>E. coli</i> , and vibriocins by <i>Vibrio cholerae</i> .	
19	One of the most important mechanisms of action of the Vancomycin is the inhibition of the start compound.	
20	Tetracyclines is a $\beta$ -lactam because it is a bactericidal agent and inhibits the cross-linking of peptidoglycan.	
21	The most important feature of antibiotics in treatment is that they have selective toxicity and differentiate between the metabolism and structure of the microbe and the host being treated.	
22	A synergistic effect occurs if the activity of a group of antibiotics combined is less than that of the most active antibiotic in the group of antibiotics.	
23	Nephelometry is one of the standard microbiological methods for determining antibiotic activity and is not a technical method of measurement.	
24	Antitoxin is an antimicrobial, which is a natural, synthetic or semi-synthetic substance that has the ability to kill or inhibit microbes.	
25	A microbe acquiring resistance to antibiotics is not a natural occurrence, as the microbe expends a large amount of energy to achieve this.	
26	Impedance analysis measures changes in electrical resistance to monitor antibiotic activity.	
27	The primary screening for antibiotics involves two methods of testing: traditional tests and modern tests.	
28	Bacterial membranes contain steroid alcohols while fungi do not have them which are targeted by some antibiotics.	
29	When stopping antibiotic treatment, it should be gradual.	
30	The most important sources of antibiotics are bacteria, actinomycetes and fungi.	

With Best Wishes

**Dr. Naiyf S. Alharbi**