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UNIVERSITY EXAMINATIONS 2023/2024

FOURTH YEAR, SECOND SEMESTER EXAMINATION FOR THE DEGREE OF
BACHELOR OF SCIENCE IN COMMUNITY HEALTH AND DEVELOPMENT

HMM 3421: PHARMACEUTICAL MICROBIOLOGY

DATE: APRIL 2024

TIME: 2 HOURS

INSTRUCTIONS:

Part I: Multiple Choice Questions (MCQs)

Part II: Short Answer Questions

Part III: Long Answer Questions

PART I MULTIPLE CHOICE QUESTIONS

- Which of the following is a common indicator organism for the presence of fecal contamination in water?
 - Escherichia coli
 - Staphylococcus aureus
 - Bacillus subtilis
 - Pseudomonas aeruginosa
 - Mechanism of action of sulphonamide (Sulfonamide) is
 - Folic acid synthesis inhibitor
 - Protein synthesis inhibitor
 - DNA-Gyrase inhibitor
 - Topoisomerase IV inhibitors
 - Which of the following is example of cell wall inhibitors
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- a. Penicillin
 - b. Cephalosporin
 - c. Cycloserine
 - d. All of the above
4. Penicillin was originally obtained from
- a. *Penicillium notatum*
 - b. *Penicillium chrysogenum*
 - c. *Penicillium*
 - d. *Penicillium staphyllum*
5. What is the purpose of the Dey-Engley Neutralizing Agar in environmental monitoring?
- a. Measurement of microbial growth
 - b. Detection of bacterial endotoxins
 - c. Neutralization of disinfectants
 - d. Identification of specific microorganisms
6. Which of the following is a characteristic feature of aseptic technique in microbiology?
- a. Use of aseptic clothing
 - b. Sterilization of equipment
 - c. Prevention of microbial contamination during handling
 - d. All of the above
7. What is the purpose of the Total Viable Count (TVC) in environmental monitoring?
- a. Detection of bacterial endotoxins
 - b. Measurement of microbial growth
 - c. Assessment of microbial contamination in the air
 - d. Determination of the total number of viable microorganisms
8. Which of the following is a method for the detection of bacterial motility in a liquid medium?
- a. Gram staining
 - b. Motility agar test
 - c. API strip system
 - d. Kirby-Bauer test
9. What is the purpose of the *Bacillus stearothermophilus* spore strip in autoclave validation?
- a. Measurement of air pressure
 - b. Detection of bacterial endotoxins
 - c. Assessment of microbial contamination in the air
 - d. Verification of autoclave sterilization efficacy
10. Penicillin is currently obtained from
- a. *Penicillium notatum*
 - b. *Penicillium chrysogenum*



- c. Penicillium
 - d. Penicillium staphylum
11. Chloramphenicol mechanism of action is-
- a. Protein synthesis inhibitor
 - b. Cell wall inhibitor
 - c. DNA- Gyrase inhibitor
 - d. Folic acid synthesis inhibitor
12. Erythromycin was obtained from
- a. Streptomyces erythreus
 - b. Streptomyces Gyrasium
 - c. Streptomyces Monoabicious
 - d. None of the above
13. Fluoroquinolones mechanism of action is-
- a. Protein synthesis inhibitor
 - b. Topoisomerase- IV Inhibitors
 - c. DNA- Gyrase inhibitor
 - d. Both B and C
14. Example of Quinolones is
- a. Nalidixic Acid
 - b. Penicillin
 - c. Ampicillin
 - d. All of the above
15. Tetracycline act on
- a. 30s ribosomal subunit
 - b. 50s ribosomal subunit
 - c. Both
 - d. None of the above
16. By which of the following process tetracycline is taken up by microorganism
- a. Passive transport
 - b. Active Transport
 - c. Endocytosis
 - d. All of the above
17. Which of the following may be adverse reaction related to the chloramphenicol
- a. Bone marrow suppression
 - b. Grey baby syndrome
 - c. Super infection
 - d. All of the above
18. Find the correct statement



- a. Beta lactamase is good for antibiotic activity
 - b. Beta lactamase inhibitor is good for antibiotic activity
 - c. Both
 - d. Beta lactamase has not any relation with antibiotic action
19. Penicillinase resistant penicillin are
- a. Damaged by penicillinase
 - b. Prevent them self from hydrolysis
 - c. Provide better activity along with beta lactam antibiotics
 - d. Both B and C
20. Which of the following is true for aminoglycoside
- a. Loop diuretic should be avoided
 - b. Curarimimetic drugs should be avoided
 - c. Should not mix any other antibiotic in same syringe
 - d. All of the above are correct

PART II (40 MARKS) – SHORT ANSWER

1. Describe the following:
 - i. Capsular polysaccharide vaccines (5 Marks)
 - ii. Toxoid vaccines (5 Marks)
 - iii. Selective toxicity and give examples (5 Marks)
2. Highlight the characteristics of a good antibiotic (5 Marks)
3. Differentiate Bacterial conjugation with bacteria transformation (10 Marks)
4. Highlight the inhibition of cell wall synthesis and nucleic acid synthesis by antimicrobial agents (10 Marks)

PART III (40 MARKS) – LONG ANSWER QUESTIONS (ANSWER TWO QUESTIONS)

1. Describe the stepwise process of antibiotic production (20 Marks)
2. Describe primary and secondary metabolites elaborating their production process (20 Marks)
3. Differentiate between passive immunity and Active Immunity (20 Marks)
4. Discuss Spoilage of Pharmaceutical products under the following topics
 - i. Types of spoilage
 - ii. Sources of spoilage



- iii. Factors affecting Spoilage
- iv. Pharmaceutical products susceptible to microbial attack (20 Marks)



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