

INSTITUTE OF TEACHING AND RESEARCH IN AYURVEDA
[INSTITUTE OF NATIONAL IMPORTANCE]

MINISTRY OF AYUSH, GOVERNMENT OF INDIA

B. PHARM. (AYU.) II YEAR

PHARMACEUTICAL MICROBIOLOGY

Question Bank

SECTION A

Chapter 1: Contribution of various scientists

10 marks or 5 marks

1. What is the contribution of Louis Pasteur in the field of Microbiology?
2. Write note on Louis Pasteur. Enumerate his important contributions.
3. Anton von Leuwenhoek.
4. Robert Koch/ Write about Robert Koch & its postulate
5. John Tyndall
6. Joseph Lister

2 marks:

1. Who know as father of bacteriology and modern microbiology?

Chapter 2: Important microbiology techniques and equipments

10 marks:

1. Give detail about principle and application of light microscopy
2. Explain in detail Electron microscope
3. Phase contrast microscopy work on which principle and write its application
4. Explain principle and application of dark background microscopy
5. Write principle and application of PCR

5 marks:

1. Write application of PCR
2. Difference between Electron microscope and Light microscope
3. Explain principle of light microscopy

2 marks:

1. Application of light microscope
2. Which type of information we can get from PCR?

3. What are the advantages of electron microscope?
4. Advantages of phase contrast microscopy

Chapter 3: Bacteria, fungi and viruses: Classification and structural details

10 marks: **Bacteria**

1. Enlist external & internal structure of bacteria and explain any three external structure in detail.
2. Explain bacterial cell-wall composition and difference between Gram+ve and Gram-ve bacteria. OR Discuss cell-wall of bacteria in detail.
3. Enlist internal structure of bacteria and explain cytoplasmic membrane, membrane inclusion and cytoplasm.
4. Discuss morphology of bacteria in detail.
5. Describe the structure found in a typical bacterial cell & the function of each structure in brief.

5 marks: Bacteria

1. Structure of bacterial cell.
2. Difference between Gram+ve and Gram-ve bacteria.
3. Difference between pilli and fimbriae.
4. Discuss cell-wall of Gram+ve eubacteria.
5. Discuss cell-wall of Gram-ve eubacteria.
6. Difference between central mesosome and peripheral mesosome.
7. Difference between prokaryotes and eukaryotes

2 marks: Bacteria

1. What are prokaryotes?
2. What are eukaryotes?
3. Cell-wall of Archaeobacteria.
4. What are the functions of fimbriae?
5. Name two Gram+ve cocci. And Name two Gram-ve cocci.
6. Name Gram+ve and Gram-ve bacilli.
7. Name bacteria having flagella.
8. Name bacteria having endospore(spore).
9. In which atmospheric condition bacteria produce spore?
10. Name bacteria having capsule.
11. What is the function of flagella.
12. Name acid fast organism.
13. What is the function of bacterial spore?
14. Which layers and components in spore are responsible for chemical and heat resistance?
15. Why protoplast prepare from Gram+ve and spheroplast from Gram-ve eubacteria?

16. What is protoplast and spheroplast?
17. Difference between protoplast and spheroplast.
18. What is function of intracellular membrane system in bacteria?

10 marks: **Fungi**

1. Explain beneficial and harmful effect of fungi.
2. Explain fungal reproduction.

5 marks: Fungi

1. Compare physiology of Bacteria with Fungi.
2. Nutrition of fungal growth.
3. Salient features of fungi.

2 marks: Fungi

1. Give a name of important fungi.
2. Give a name of harmful fungi.
3. Fungi are _____ & bacteria _____ (prokaryotes, Eukaryotes) select appropriate.

10 marks: **Viruses**

1. Explain structure and morphology of viruses.

5 marks: Viruses

1. General characteristics of viruses.
2. Difference between bacteria and viruses

2 marks: Viruses

1. Give a name of viruses which cause disease.
2. Viruses contain _____ (DNA,RNA) and bacteria contain _____ (DNA,RNA). Select any one, none or both
3. Size of virus is measured in _____ and size of the bacteria is measured in _____ (nm,μ,mm,cm) select appropriate unit.
4. Virus _____ by antibiotics, bacteria _____ by antibiotics(affected, not affected) select appropriate.

Chapter 4: Anaerobic and Aerobic cultivation of Bacteria, Nutrition, Isolation and Identification of Bacteria

10 marks:

1. Discuss physical condition require for the growth of bacteria./ factors affecting bacterial growth
2. Discuss methods of cultivation of anaerobic bacteria./ anaerobiasis
3. Cultivation of aerobic bacteria.

4. Selective, differential and enriched media.
5. How bacterial identification can be done on the bases of metabolism?
6. How bacteria identify on the bases of carbohydrate metabolism?
7. How bacteria identify on the bases of protein metabolism?
8. How bacteria identify on the bases of enzyme metabolism?
9. Classification of media used for cultivation of microorganism.
10. Classify & discuss various media used for cultivation of bacteria.
11. Classify bacteria on the bases of their size, shape, arrangement, oxygen requirement, metabolism and temperature.

5 marks:

1. Nutrition types of bacteria.
2. Selective media
3. Classify culture media based on their physical state and write about liquid media and their uses in brief
4. Differential media
5. Simple media
6. Anaerobiasis
7. Transportation media.
8. Difference between autotrophic & heterotrophic bacteria.
9. Enumerate six types of culture media based on their nutritional factors & provide detail about special media.

2 marks:

1. What is the difference between selective and differential media?
2. Name bacteriological culture media.
3. Name media use for fungal growth/name media used for cultivation of fungi
4. Name selective media
5. Name differential media
6. Name enriched media
7. What is thermophilies? Give any two name of thermophilic bacteria
8. What is mesophilies? Give any two name of mesophilic bacteria
9. What is psychrophilies? /what is Psychrophilics? Give any two name of psychrophilic bacteria
10. What is phototrophs, photoorganotrophs, photolithotrophs?
11. What is chemotrophs, chemoorganotrophs, chemolithotrophs?
12. What are autotrophs?
13. What are heterotrophs?
14. Name aerobic bacteria
15. Name anaerobic bacteria
16. Why bacteria cannot grow in Saubaurase dextrose media?/ Bacteria can't grow in Saubaurase dextrose media: give reason
17. Difference between psychrophilic, mesophilic and thermophilic bacteria

18. Why psychrophilic bacteria can grow on low temperature?
19. Why thermophilic bacteria can tolerate high temperature?
20. Why anaerobic bacteria cannot grow in presence of atmospheric oxygen?
21. What do you mean by culture and media?
22. Write differences between enriched and enrichment media

Chapter 5: Microbial genetics: Transformation, Transduction and conjugation

10 marks:

1. What is transformation? Explain the process of transformation and its significance.
2. Enlist mechanism through which bacterial genome is transferred and explain method in which bacterial plasmid is transferred.
3. Explain gene transfer mechanism in short and what is the significance of transformation?
4. In detail write about specification & mechanism of DNA uptake during transformation.

5 marks:

1. Mechanism of Natural transformation.
2. Artificial transformation.
3. Specialized transformation.

2 marks:

1. What is the difference between Natural and artificial transformation?
2. Role of Transformation?
3. Importance of transformation.
4. Define conjugation
5. Define transformation
6. Define transduction
7. What is a competent cell?
8. What is the difference between conjugation, transformation and transduction?

Chapter 6: Fermentation

10 marks:

1. Describe ideal characteristics of a fermenter.
2. What could be the criteria to prepare an ideal fermenter?
3. What is fermentation? Explain the fermentation process.

5 marks

1. fermentation

SECTION B

Chapter 7: Control of Microbes: Sterilization and Disinfection

Sterilization:

10 marks

1. Discuss methods of sterilization
2. Define sterilization. Discuss physical methods of sterilization
3. Discuss mechanical methods of sterilization
4. Discuss radiation methods of sterilization
5. Define sterilization. Describe the various physical methods/agents of sterilization. Discuss in detail sterilization by heat
6. Why validation is require? And how validation is carried out?
7. What is sterilization? Which are the chemical methods of sterilization?
8. Define sterilization, describe various chemical agent for sterilization. Discuss surface active agent in detail.

5 marks:

1. Sterilization by dry heat
2. Sterilization by filtration
3. Principle of Autoclave
4. Bacteriological filter
5. Sterilization by moist heat
6. Difference between dry heat and moist heat
7. Validation of sterilization processes.

2 marks:

1. Difference between dry heat and moist heat
2. Difference between sterilization & pasteurization process
3. How do U.V. rays inhibit bacterial growth?
4. What is the principle of Autoclave?
5. What is pasteurization?

Disinfection

10 marks:

1. What are the difference between Sterilization & disinfection? Discuss chemical methods of sterilization.
2. Which are various methods of evaluation of disinfectants? Explain any one in detail.
3. Chemical disinfectants.

5 marks:

1. Rideal- walker test (RW test).

2. Dilution test.
3. Chick-Martin test(CM test)
4. Kelsey-sykes(KS test)
5. Factors affecting disinfectant action.
6. Describe properties of disinfectant.

2 marks:

1. What is bacteriostatic?
2. What is bactericidal?
3. What is the meaning of bactericidal & bacteriostatic effect?
4. Define sterilization and Disinfection
5. Name two gases used as chemical sterilizers.

Chapter 8: Sterility testing of different pharmaceutical products

10 marks:

1. What is mean by sterility testing? What is the significance of sterility testing in Pharmaceutical industry and which are media used to carry out sterility testing?
2. Which are the methods for sterility testing of different pharmaceutical products?
3. Which are the methods for sterility testing?
4. Explain Indian pharmacopeia microbiological guidance for herbal drugs
5. Which are the method which can be use for the counting of bacteria?

5 marks:

1. Membrane filtration
2. Direct transfer

2 marks:

1. What is difference between fluid thioglycollate medium(FTM) and Soyabean casein digest medium(SCDM)?

Chapter 9: Immunology

10 marks:

1. Define and classify hypersensitivity and discuss Anaphylaxis.
2. Discuss Anaphylaxis
3. Define and classification of hypersensitivity.
4. Discuss various Ag-Ab reaction
5. Explain labelled Ab assays
6. Enlist Ag-Ab reaction. Explain any one in detail
7. Explain types of Immunity.

8. Structure and function of Immunoglobulin.

5 marks:

1. Mechanism of Autoimmunity./what are the mechanism of autoimmunity?
2. Discuss type-IV delayed hypersensitivity reaction in short
3. Explain hypersensitivity in brief & enumerate types of hypersensitivity reactions.
4. Agglutination reaction
5. Precipitation reaction
6. Discuss in brief Complement fixation test
7. ELISA
8. RIA
9. Immunofluorescence
10. Define antigen. Explain general properties of antigen
11. Explain various types of Immunoglobulin.
12. Explain cells of immune system in brief.

2 marks:

1. Name tests based on precipitation reaction
2. What is principle of precipitation reaction?
3. What is principle of RIA test?
4. What is principle of ELISA test??
5. What is the principle of widal (Agglutination) test?
6. Name tests based on agglutination reaction
7. Application of ELISA test (clinical significance)
8. Application of RIA test (clinical significance)
9. Clinical significance of Agglutination based reaction test
10. What is the application of V.D.R.L. and Widal test?
11. What is full form of ELISA?
12. What is hypersensitivity? (Define Hypersensitivity).
13. Define Immunity.
14. What is antigen?
15. Difference between B cell and T cell
16. Draw the structure of immunoglobulin.
17. Which are the factors responsible for antigenicity?
18. What is the difference between antigenicity and immunogenicity?

Chapter 10: Antibiotic susceptibility (sensitivity) testing and resistance

10 marks:

1. Discuss antibiotic susceptibility testing?
2. Drug sensitivity test and resistance.
3. Explain drug resistance and its type in detail.
(I)Primary resistance (II) Acquire resistance

5 marks:

1. Drug resistance due to change in detail structure.: Explain
2. Drug resistance due to change in gene of bacteria.
3. Explain methods of transfer of plasmid/ genetic material with respect to drug resistance.

2 marks:

1. What is antibiotic?
2. Difference between bacteriostatic agent and bactericidal agents
3. Write full form of MIC and MBC
4. Name the test perform for assessing antimicrobial susceptibility in given sample
5. Give example of two antifungal and two antimicrobial agent

Chapter 11: Microbiology of Food and Microbiology of water

10 marks:

1. What is bacterial enumeration? Explain various methods by which it can be done
2. Explain preservation methods of foods
3. Explain (Discuss) food borne infection
4. Discuss food borne intoxication and infection.
5. Explain bacteriological techniques which are used for biological analysis of water.

5 marks:

1. Microbial examination of food
2. Which type of normal flora are found in fresh food?/ explain normal flora of food
3. Explain bacteriological process through food is spoil
4. Bacterial toxins
5. Exotoxin
6. Difference between Exotoxins & Endotoxins
7. Microbial spoilage of foods
8. Microbial flora of fresh foods
9. Pasteurization process
10. Write in brief about water purification
11. The phosphatase test
12. Microbial examination of water
13. Discuss microorganism live in water other than coliform

2 marks:

1. What is phosphate test?
2. What information phosphatase test gives about milk?
3. What is the importance of phosphatase test for milk?

4. What is food intoxication?
5. What is B.O.D.?
6. What is significance of *Streptococcus fecalis* in water?
7. What is pasteurization of milk?
8. What is the function of Alum in water purification?
9. What is the function of chlorine in water?
10. Which type of change can be carried out in water for purification?
11. What is potable water?
12. What is non-potable water?
13. Why the presence of coliform organism are check in water?
14. Why *E.coli* considered an indicator of pollution in water?
15. Which test distinguished *E.coli* from *E. aerogen* in water?
16. Which type of organism are found (bacteria, virus) found in water?
17. Which organisms are responsible for change in raw milk?
18. Which type of organism based on temperature can survive in bacteria?
19. Which are the reactions responsible for spoilage of food?
20. Full form of BOD and MPN
21. Which types of bacteria are found in water?