

**FIRST YEAR BSc MLT**  
**BASIC MICROBIOLOGY AND IMMUNOLOGY**  
**BACTERIAL CELL**

**ESSAY**

1. Draw a neat labeled diagram of a bacterial cell and explain detail function of each structure?
  - Draw diagram
  - mention all cell structure and mention atleast 3 important functions
  - Should mention cell wall Capsule, volutine granules ,ribosome,mesosome and cytoplasm
2. Explain bacterial cell wall. Differentiate both gram positive and gram negative bacterial cell wall?
  - Structure of peptidoglycan, function
  - mention 5 differentiating feature
3. Explain layers outside the cell wall ?
  - Mention capsule, slime layers layer
4. Explain structures outside the cell wall ?
  - Mention capsule, slime layer, s- layer, flagella, fimbria
5. Explain a neat labelled diagram of a spore structure and explain sporulation ?
  - Spore structure,
  - sporulation
  - diagram
  - functions
6. List out the structures of a bacterial cell and explain detail about any one structure ?
  - Enumerate structures
  - Detail about cell wall/capsule/flagella anyone

## SHORT ESSAY

1. Difference between prokaryotic and eukaryotic cell?
  - Mention nucleus, cell wall, cytoplasm, cellular organelles, and other features.
2. Classification of bacteria based on shape ?
  - Cocci, bacilli, vibrio, spirilla, spirochetes, actinomycetes, mycoplasma with example3 and structure
3. Classification of bacteria based on arrangement ?
  - Diplococci, streptococci, tetrads, sarcina, staphylococci, diplobacilli, strepto bacilli etc with examples and structures.
4. Gram positive bacterial cell wall ?
  - Explain the features – Peptidoglycan, teichoic acid etc and draw a neat labeled diagram of gram positive cell wall.
5. Gram negative bacterial cell wall ?
  - Explain the features – peptidoglycan, outer membrane, , lipopolysaccharide and draw a neat labelled diagram of gram negative cell wall .
6. Explain the functions of bacterial cell wall?
  - Mention 5 functions such as protection , rigidity etc
7. Spheroplast ?
  - Definition
  - Function
8. Explain structure and functions of bacterial cytoplasmic membrane ?
  - Fluid mosaic model
  - functions )
9. Bacterial ribosome ?
  - Mention subunits
  - Function
10. Plasmid
  - Definition
  - Structure

- Functions
  - Examples
11. Volutine granules
- polymetaphosphates
  - functions
  - demonstration
  - examples
12. Intracytoplasmic inclusions
- Brief notes on volutingranule, sulphurgranule, glycogengranules, poly hydroxyl alconate granules etc.
13. Capsule
- Structure
  - function
  - examples
  - demonstration
  - Role in pathogenesis
14. Flagella
- Structure - filament ,basal body, hook
  - Classification based on arrangement
  - Demonstration
  - mechanism of movement
15. Fimbriae
- Structure and functions)
16. Spore
- Structure
  - size
  - shape
  - position of spore
  - demonstration
  - examples

## **SHORT NOTE**

1. Peptidoglycan
2. Lipopolysaccharide
3. Protoplast
4. Spheroplast
5. Ribosome
6. Mesosome
7. Plasmid
8. Volutin granules
9. Capsule
10. Slime layer
11. S layer
12. Flagella
13. Fimbria
14. Spore
15. Pleomorphism
16. Involution forms
17. L forms
18. Bacterial Cell wall
19. Teichoic acid
20. Units of measurement in microbiology ( micrometry )

## STERILIZATION AND DISINFECTION

1. Classification of sterilization and explain detail about autoclave along with its uses
  - Classification based on agents,
  - Autoclave: principle, working, preparation of articles for sterilization, holding period, sterility control, different types, limitation and uses
2. Explain detail about moist heat sterilization
  - Below 100<sup>0</sup>c-Pasturization, Inspissation
  - At 100<sup>0</sup>c –Tyndallization, boiling
  - Above 100<sup>0</sup>c-Autoclave
3. Briefly describe dry heat sterilization & explain in details about dry heat sterilization.
  - Flaming
  - Incineration
  - Hot air oven etc
  - Principle, holding period, uses and sterilization control of hot air oven, limitation, articles to be sterilized
4. Explain mechanical method of sterilization
  - Filtration
  - Application of filtration
  - Different types of filters
5. Enumerate disinfectants, explain mode of action of phenols.
  - At least 4 disinfectants such as alcohols, aldehydes, gases, dyes, and phenol
  - Mode of actions
  - Uses
  - Advantages, disadvantages
6. Enumerate different disinfectants used in hospitals and explain details about gases.
  - Enumerate 4 disinfectants used in hospitals such as glutaraldehyde, phenol, hydrogen peroxide fogging
  - Detail about formaldehyde and glutaraldehyde
  - Mode of action

7. Define sterilization and disinfection and explain detail about sterilization by radiation
  - Definition- sterilization, disinfection , sterilants, disinfectants
  - Ionizing radiations –X ray ,gamma ray and cosmic ray
  - Non ionizing radiations-UV rays and Infra red rays. Mention mode of action and uses
  
8. Define disinfection and antiseptics . Classify the disinfectants .Describe in detail about Halogens
  - Define disinfection and antiseptics, antiseptics, sepsis
  - Classify disinfectant
  - Halogen and its classification , mode of actions and its uses
  - Advantages ,disadvantages

## **SHORT ESSAY**

1. Dry heat method of sterilization.
  - Heat –Dry heat ,Moist heat
  - Explain dry heat –Redhot, flaming,incineration,hot air oven
  
2. Hot air oven.
  - Principle
  - Working
  - Sterility control
  - Uses
  - Advantages
  - Disadvantages
  
3. Pasteurization.
  - Working
  - Principle
  - Uses
  - Advantages
  - Disadvantages
  - Different methods

4. Inspissation.
  - Working
  - Temperature
  - Name of instrument
  - Uses
  - Advantages
  - Disadvantages
  
5. Tyndallisation.
  - Principle
  - Working
  - Uses
  
6. Autoclave.
  - Different types of autoclave
  - Working principle
  - Structure
  - Sterility control
  
7. Asbestose filter.
  - Structure
  - Uses
  - Examples
  
8. HEPA filter
  - Expansion
  - Absorbing capacity
  - Advantages
  - Uses
  - Sterilization method
  
9. Candle filter
  - Uses
  - Methods of sterilization
  - Examples

10. Radiation.
  - Ionizing radiation –X Rays,gammarays,cosmic rays
  - Non ionizing radiation – IR rays,UV rays.
  - Mode of action
11. Cold sterilization
  - Explain ionizing radiation
12. Testing of disinfectants.
  - Phenol coefficient
  - Capacity test
  - Kelsey Sykes test(Inuse test.)
13. Phenol coefficient testing
  - Explain Rideal walker test
  - Chick martin test
14. Plasma sterilization.
  - New method of sterilization of heat sensitive articles
  - Plasma-4<sup>th</sup> state of matter
  - Hydrogen peroxide vapour are introduced into the article
  - It generate a state of plasma containing free radicals of hydrogen and oxygen
  - Uses –Arthroscopes, urethroscopes
15. Spaulding's classification
  - Classification based on ,uses on the patient
  - Mention – critical items ,semi critical items ,non critical items

## **SHORT NOTES**

16. Hot air oven.
17. Pasteurization.
18. Inspissation.
19. Dessication.



20. Autoclave.
21. Sietz filter.
22. HEPA filter.
23. Membrane filters.
24. Phenol.
25. Gluteraldehyde.
26. Formaldehyde.
27. Ethylene oxide.
28. Properties of an ideal disinfectant.
29. Dyes used in sterilization.
30. Hydrogen peroxide fogging.
31. Surface active agents.
32. Carries test.
33. Agar plate technigue.
34. Rideal Walker test.
35. Chick martin test.
36. Incineration.
37. Plasma sterilization.
38. Non ionizing radiation.
39. Ionizing radiation.
40. Cold sterilization.

41. BPL.
42. In use test.
43. KelseySyke's test.
44. Tyndallisation
45. Preparation of disinfectant for laboratory use
46. Decontamination of equipments and wastes in microbiology lab
47. Storage of sterile articles
48. Classification of microbes on the basis of hazards
49. Decimal reduction time
50. Segregation, decontamination of equipment and waste in microbiology
51. Sterilization of operation theater
52. Intermittent sterilization
53. Candle filter
54. 3 sporicidal agents
55. Sterilisation control

# BIOSAFTY CABINET

## ESSAY

1. Describe the different types of bio safety cabinets .what is its application in microbiology
  - Mention detail about classI ,classII,& class III,

## SHORT ESSAY

1. Classification of microbes on the basis of hazards
  - Mention in detail about classI ,class II ,class III & class IV
2. Bio safety levels
  - Level I ,level II ,level III ,level IV
3. Biosafety cabinet
  - Principle
  - Working
  - Uses of class I ,class II ,& class III
4. Class III bio safety cabinet
  - Principle
  - Working
  - Uses of class III
5. Class II bio safety cabinet
  - Principle
  - Working
  - Uses of class II
6. Class I bio safety cabinet
  - Principle
  - Working
  - Uses of class I

# INCUBATORS

## ESSAY

1. Describe in detail about incubators
  - Design
  - Different models
  - Working principle
  - Precautions
  - Calibration of temperature

## SHORT ESSAY

1. Anaerobic incubators
  - Working principle
  - Parts
  - Application
2. BOD Incubators
  - Principle working parts application maintenance precautions calibration of temperature

## SHORT NOTES

1. Walk in incubator
2. Incubators.
3. Anaerobic incubators.
4. Temperature calibration in incubators.

# STAINING

## ESSAY

1. Describe differential staining in detail
  - Principle of gram staining , Acid fast staining
  - Procedure
  - Example
  - Observation
  - Modification
  - Theories
  - Diagram
  - Examples
  - Clinical application
2. Define stains. What are the differential staining techniques . Describe the method of differential staining and discuss the clinical application. Add a note on special stains and purpose of such stains an automation in staining.

## SHORT ESSAY

1. Gram staining
  - Principle of gram staining
  - Procedure
  - Example
  - Observation
  - Modification
  - Theories
  - Diagram
2. Acid fast staining
  - Principle of Acid fast staining
  - Procedure
  - Example
  - Observation

- Modification
  - Theories
  - Diagram
3. Capsular staining
- Different methods
  - Procedure
  - Observation
  - Diagram
  - Example for capsulated bacteria
4. Spore staining
- Different methods
  - Procedure
  - Observation
  - Diagram
  - Example for spore forming bacteria
5. Volutine granules staining
- Different methods
  - Procedure
  - Observation
  - Diagram
  - Examples
6. Flagellar staining
- Different methods
  - Procedure
  - Observation
  - Diagram
  - Examples
7. Flouochrome staining method
- AFB modification
  - Procedure
  - Observation

8. Negative staining
  - Capsule staining
  - Principle
  - Example
  - Observation
  
9. Differential staining
  - Principle of gram staining
  - Acid fast staining
  - Procedure
  - Example
  - Observation
  - Modification
  - Theories
  - Diagram

## **SHORT NOTES**

1. Gram staining
2. Acid fast staining
3. Capsular
4. Spore staining
5. Volutine granules staining
6. Flagellar staining
7. Flouochrome staining method
8. Negative staining
9. Differential staining

# HISTORY OF MICROBIOLOGY

## SHORT ESSAY

1. Louis Pasteur.
  - Father of microbiology
  - Contributions to microbiology
  - Vaccine introduction for hydrophobia
2. Robert Koch.
  - Father of bacteriology
  - Contributions
  - Koch's postulates
3. Edward Jenner.
  - Father of immunology
  - Contributions
4. Koch's postulates
  - Should mention all the five postulates without any spelling mistakes and with correct sentences
5. Anton van Leeuwenhoek
  - Contributions
  - Microscope
6. Alexander Fleming
  - Mention penicillin introduction & other contributions

## SHORT NOTES

1. Joseph Lister.
2. Louis Pasteur
3. Robert Koch



4. Koch's postulates
5. Edward Jenner
6. Anton van Leeuwenhoek
7. Alexander Fleming

## **IMMUNOLOGY**

### **INFECTION**

#### **ESSAY**

1. Method of transmission of infection ?
  - Contact
  - Inhalation
  - Ingestion
  - Inoculation
  - Insects
  - Congenital
  - Iatrogenic infection
2. Factors contributing to microbial pathogenicity ?
  - Define the term pathogenicity and virulence
  - Exaltation and attenuation
  - Adhesion
  - Invasiveness, toxigenicity-exotoxin and endotoxin
  - Plasmids
  - Bacteriophage
  - Communicability
  - Bacterial enzymes
  - Biofilm
3. Difference between exotoxin and endotoxin?

- In both gram positive and gram negative bacteria
- Biological activities of toxins

## **SHORT ESSAY/SHORT NOTES**

1. Bacterial virulence ?
  - Bacterial enzymes
  - Bacterial appendages
  - Biofilm
  
2. Carrier?
  - Definition
  - Healthy carrier
  - Convalescent
  - Temporary
  - Chronic
  - Contact
  - Paradoxical
  
3. Types of infection
  - Definition
  - Different types of infection
  - Examples
  
4. Different sources of infection
  - Humans
  - Animals
  - Soil& water
  - Food
  - Vectors

## **SHORT NOTES**

1. Opportunistic infection
  - Definition
  - examples
  
2. Cross infection
  - Definition
  - examples

## **ANTIGEN**

### **ESSAY**

1. Define antigen. describe the various determinants of antigenicity?
  - Definition
  - Size
  - Chemical nature
  - Susceptibility to tissue enzymes,
  - Foreignness,
  - Antigen specificity
  - Species,iso,auto,organ
  - Heterophile

### **SHORT ESSAY**

1. Biological classes of antigen ?
  - T-cell dependent antigen TD
  - T-cell independent antigen TI
  - Superantigen
  
2. Superantigen?
  - Definition
  - Figure

- Examples of super antigen
  - Disease associated with superantigen
3. Epitope ?
- Definition
  - Sequential or linearised ,
  - Conformational
  - Paratope
  - Antigenic mosaic
4. Hapten?
- Definition
  - Complex hapten
  - Simple hapten
  - Functions
5. Heterophile antigens
- Definition
  - Diagnostic application- weil felix reaction , paul-bunell test , cold agglutination test
6. Adjuvant ?
- Definition
  - Examples – alu,mineral oils, freundscomple and incomplete, lipopolysaccharide, other bacterial products
  - Mechanism of adjuvant action.

# ANTIBODY

## ESSAY

1. Define antibody? Draw a labelled diagram of an immunoglobulin with its different domains?
  - Definition
  - Figure
  - Immunoglobulin structure & chains , hyper variable and framework region, constant region domains, hinge region
2. Describe the various classes of immunoglobulins, their properties and functions ?
  - Introduction to immunoglobulins
  - Properties
  - Functions
  - Diagrams of IgG , IgA, IgM, IgD&IgE
  - Explain about each antibody
3. Monoclonal antibody
  - Definition
  - Preparation
  - Application
  - Examples

## SHORT ESSAY/ SHORT NOTE

1. The effect of enzymatic digestion on immunoglobulin molecules?
  - Papain
  - Pepsin
  - Cleavage
  - Figure
2. Structure of IgM molecule?
  - Figure
  - Properties
  - Functions

3. Structure of IgG molecule?
  - Figure
  - Properties
  - Sub classes
  - Functions
  
4. Structure of Ig molecule?
  - Figure
  - Properties
  - Sub classes
  
5. Abnormal immunoglobulins?
  - Definition
  - Multiple myeloma
  - Waldenstrom's macroglobulinemia
  - Heavy chain disease
  - Cryoglobulinemia
  
6. Immunoglobulin specificities?
  - Isotype
  - Allotype
  - Idiotype

# ANTIGEN ANTIBODY REACTION

## ESSAY

1. Define the precipitation reaction. properties and Types of precipitation reaction?
  - Definition
  - Phase-prozone,zone of equivalence,post zone
  - Mechanism of precipitation
  - Ring test, slidetest, tube test, immunodiffusion- diffusion
2. Enumerate the types of antigen antibody reaction and describe in detail about agglutination reaction?
  - Definition
  - Slide agglutination, tube, heterophile, coombs, passiveagglutination, haemagglutination, latex,co agglutination

## SHORT ESSAY

1. Precipitation reaction?
  - Definition
  - mechanism of precipitation reaction
  - zone phenomenon
  - examples of precipitation reaction
2. Agglutination reaction?
  - Definition
  - Mechanism of agglutination reaction
  - Examples of agglutination reaction
3. Complement fixation test?
  - Definition,
  - Positive CFT and negative CFT procedure,
  - Figure
  - Clinical application

4. Immunofluorescence test
  - Definition,
  - Direct & indirect IF,
  - Principle
  - Figure
  - Uses
  
5. Principle and types of ELISA ?
  - Principle,
  - Types- direct,indirect,
  - Competitive,
  - Capture,
  - Cassette –procedure
  - Application
  
6. Principle of immunoelectrophoresis ?
  - Principle,
  - Counterimmunoelectrophoresis,
  - Rocket electrophoresis,
  - Two dimensional electrophoresis
  
7. Radioimmuno assay?
  - Principle,
  - Procedure
  - Figure
  - Uses
  - Application

## **SHORT NOTES**

1. Rocket immunoelectrophoresis?
  - Principle
  - Procedure
  - Figure



2. Coombs test?
  - Principle
  - Direct & indirect procedure,
  - Figure
  
3. Immunoelectroblot/ western blot?
  - Principle
  - Procedure
  - Application
  
4. Neutralisation test?
  - Definition,
  - Principle
  - Procedure
  - Figure
  
5. Counter current immune electrophoresis
  - Definition,
  - Principle
  - Procedure
  - Figure
  
6. Chemiluminescence assay
  - Definition,
  - Principle
  - Procedure
  - Figure
  
7. Indirect immunofluorescence test
  - Definition,
  - Principle
  - Procedure
  - Figure
  
8. Passive agglutination test
  - Definition,

- Principle
- Procedure
- Figure

## **CHAPTER 4 : COMPLEMENT SYSTEM**

### **ESSAY**

1. Describe the basic properties of the complement system and the classical complement pathway?
  - Properties
  - Pathway
  - Biological functions of complements
  
2. Briefly explain the alternative pathway of the complement system?
  - Pathway diagram
  - Explain
  
3. Biological functions mediated by the complement system?
  - Phagocytosis
  - Inflammatory response
  - Hypersensitivity reactions
  - Autoimmune disease
  - Endotoxic shock
  - Immune adherence
  - Conglutination

### **SHORT ESSAY**

1. Classical complement pathway ?
  - Pathway
  - Diagram
  - Explain

## **SHORT NOTE**

2. Alternative (properdin) path way?
  - Pathway diagram
  - Explain
3. Lectin complement pathway ?
  - Pathway diagram
  - Explain

## **CHAPTER 5: IMMUNODEFICIENCY DISEASES**

### **ESSAY**

1. Primary immune deficiency disorder
  - Definition
  - Humoral
  - Combined
  - Complement
  - Phagocytosis
  - Immune deficiency

### **ANSWER BRIEFLY**

1. Secondary immuno deficiency disorders?
2. Humoralimmuno deficiency disorders ?
  - X- linked aggamaglobulinemia,
  - Common variable immunodeficiency
  - Selective immunoglobulin deficiencies
  - Immunodeficiencies with hyper IgM
  - Transcobalamin II deficiency
2. Cellular immune deficiencies ?
3. Combined B and T cell defect ?

4. Nezel of syndrome?
5. Disorders of phagocytosis?
6. Immunodeficiency diseases?

## **CHAPTER 6: IMMUNITY**

### **ESSAY**

1. What is immunity? Describe in detail about innate immunity.
  - Immunity-definition,
  - Innate immunity-definition,
  - Different levels of innate immunity with example,
  - Its defensive barriers,
  - Factors effecting innate immunity
2. What is immunity? Explain in detail about acquired immunity.
  - Immunity –definition,
  - Acquired immunity-definition
  - Types
  - Describe about each type of acquired immunity with examples

### **SHORT ESSAY**

1. Innate immunity
  - Refer essay
2. Acquired immunity
  - Refer essay
3. Difference between active and passive acquired immunity
  - Acquired immunity – definition
  - write only about differences between active and passive acquired immunity)
  - Natural and artificial active
  - Passive immunity

## **SHORT ANSWERS (REFER SHORT ESSAY)**

1. Innate immunity
2. Acquired immunity
3. Local immunity
4. Herd immunity
5. Sub unit vaccines

## **VACCINES**

### **ESSAY**

1. Vaccines. Classify& write about vaccines.
  - Definition & classification of vaccine
  - Actions
  - Write about vaccines with example

### **SHORT ESSAY**

1. Cold chain
  - Definition
  - Temperature
2. Subunit vaccines
3. Booster effect in vaccination
  - Schedule
  - Importance of booster vaccine
  - Effects
4. Viral vaccines
  - Definition

- Examples
- 5. Bacterial vaccines
  - Definition
  - Examples
- 6. Live vaccines
  - Definition
  - Examples
- 7. Killed vaccines
  - Definition
  - Examples
- 8. Adjuvants
  - Definition
  - Examples

## **CHAPTER 7:**

### **THE STRUCTURE AND FUNCTIONS OF IMMUNE SYSTEM**

#### **ESSAY**

1. List out the cells and organs of the immune system. Describe in detail about primary lymphoid organs.
  - Classify lymphoid organs and list out them,
  - List out the lymphoid cells.
  - Primary lymphoid organs –definition
  - Describe in detail about primary lymphoid organs with neat diagrams

#### **SHORT ESSAY**

1. Primary lymphoid organs
  - What are lymphoid organs
  - Explain primary lymphoid organs with diagram

2. Secondary lymphoid organs
  - What are lymphoid organs,
  - Explain secondary lymphoid organs with diagram
3. Bone marrow
  - Write bone marrow is which type of lymphoid organ,
  - Describe structure and functions
4. Thymus
  - Write thymus is which type of lymphoid organ,
  - Describe structure and functions with diagram
5. Spleen
  - Write spleen is which type of lymphoid organ,
  - Describe structure and functions with diagram
6. Lymph node
  - Write lymph node is which type of lymphoid organ,
  - Describe structure and functions with diagram
7. MALT
  - Write MALT is which type of lymphoid organ,
  - Describe structure and functions with diagram
8. B cells
9. T cells and it's subsets
10. MHC

## **SHORT NOTES**

1. B cells
2. T cells
3. MHC

4. MHC class – 1
5. MHC class-2
6. MHC restriction
7. HLA
8. Null cells
9. Phagocytic cells
10. T<sub>H</sub> cells
11. T<sub>C</sub> cells
12. Cytokines
13. Lymphocyte subsets and their functions.
14. Theories of immune response
15. Central lymphoid organs



## **CHAPTER: 8 AUTOIMMUNITY**

### **ESSAY**

1. What is autoimmunity? Describe various mechanisms of autoimmunity.
  - Autoimmunity – definition
  - Write in detail about mechanisms with example

### **SHORT ESSAY**

1. Organ specific autoimmune diseases
  - What is autoimmune disease
  - Explain organ specific diseases
2. Systemic autoimmune diseases
  - What is autoimmune disease
  - Explain systemic diseases
3. Hashimoto's disease
  - Which type of autoimmune disease
  - Pathogenesis
  - Factors
  - Symptoms
  - Diagnosis and treatment
4. Graves disease
  - Which type of autoimmune disease
  - Pathogenesis
  - Factors
  - Symptoms
  - Diagnosis and treatment
5. Addison's disease
  - Which type of autoimmune disease
  - Pathogenesis

- Factors
  - Symptoms
  - Diagnosis and treatment
6. Myasthenia gravis
- Which type of autoimmune disease
  - Pathogenesis
  - Factors
  - Symptoms
  - Diagnosis and treatment
7. SLE
- Which type of autoimmune disease
  - Pathogenesis, factors
  - Symptoms
  - Diagnosis and treatment
8. RA
- Which type of autoimmune disease
  - Pathogenesis
  - factors
  - symptoms
  - diagnosis and treatment
9. Sjogren's syndrome
- Which type of autoimmune disease
  - Pathogenesis
  - Factors
  - Symptoms
  - Diagnosis and treatment

## **SHORT NOTES**

1. Hashimoto's disease

2. Grave's disease
3. Addison's disease
4. Myasthenia gravis
5. SLE
6. RA
7. Sjogren's syndrome

## **HYPERSENSITIVITY**

### **ESSAY**

1. Classification of hypersensitivity reactions .describe detail about type IV hypersensitivity reaction
  - Classification with examples
  - Mention type IV with examples such as tuberculin type
  - Cutaneous basophil hypersensitivity & contact dermatitis
2. Classification of hypersensitivity reactions with examples .explain any one type hypersensitivity reaction
  - Classification
  - Type I, Type II, Type III or type IV

### **SHORT ESSAY**

1. Type I hypersensitivity
  - Anaphylaxis
  - Atopy
  - diagram
  - Features, mechanism etc.
2. Type III hypersensitivity
  - Arthus reaction

- Serum sickness
  - Features, mechanism etc.
3. Type IV hyper sensitivity
    - Delayed type hypersensitivity
    - Contact dermatitis
    - Tuberculin type

### **SHORT NOTES**

1. Tuberculin type
2. Contact dermatitis
3. Delayed type hypersensitivity
4. Serum sickness
5. Arthus reaction
6. Anaphylaxis
7. Atopy
8. Type II hypersensitivity