

## QUESTION BANK

### PHARM D I YEAR- PHARMACEUTICAL INORGANIC CHEMISTRY

#### ERRORS, VOLUMETRIC ANALYSIS:

##### 5MARKS:

1. How do you prepare and standardize 0.1N sodium hydroxide solution?
2. What are primary, secondary standard substances? Give example. Give standardisation of 0.1N Perchloric acid.
3. How do you prepare and standardize 500ml of N/10 Sodium hydroxide solution.
4. What is a primary standard? Give example. What are the properties of a primary standard?
5. Write the methods of preparation and standardisation of 250ml of 0.1M Sodium hydroxide
6. Explain various methods of minimization of errors.
7. Explain different sources of errors. Write the methods to minimize them.
8. Define 1. Accuracy 2. Precision 3. Significant figures 4. Quality control
9. Explain the different types of errors in volumetric analysis and ways to minimize them.
10. Classify determinate errors. Explain the steps to minimize the errors.
11. Discuss the different methods to minimize errors
12. Explain briefly theories of neutralization indicators.
13. Explain ostwalds theory for acid base indicators.
14. Write briefly the various theories of neutralization indicators.
15. Classify and explain different types of neutralization indicators.

##### 2MARKS:

1. Define acidimetric and alkalimetric titrations.
2. Explain the term "mEq". Calculate the number of mEq of NaCl in one litre of 0.76% solution.
3. What are primary standards? Give examples.
4. Uses of dilute HCl and oxalic acid.
5. Indicators used in acid base titration
6. Define normality and molarity.
7. How do you prepare 100ml of 0.1 N oxalic acid solution?
8. Methods to express concentration of solutions.
9. Primary and Secondary standards.
10. What are primary standard substances? Give examples.

11. How do you prepare 100ml of 0.1N Oxalic acid solution?
12. Methods for expressing concentration of solutions.
13. How many ml of 0.2N hydrochloric acid is required for the complete neutralization of 25ml of 0.5N sodium hydroxide solution?
14. Define the terms molality and mole fraction.
15. Give the pH range of phenolphthalein and methyl orange indicators.
16. 25ml of 0.2N sodium hydroxide consumed 50ml of Hydrochloric acid for complete neutralization. What is the normality of hydrochloric acid?
17. Write a note on back titration.
18. 10ml of HCl is required for 20ml of 0.2N NaOH for complete neutralization. Calculate the exact normality of HCl.
19. Complete the following reactions.
20.  $\text{KMnO}_4 + \text{H}_2\text{SO}_4 + \text{H}_2\text{C}_2\text{O}_4 \longrightarrow 2\text{H}_2\text{O}$
21.  $\text{NH}_4\text{Cl} + \text{HCHO} \longrightarrow$
22. Explain the importance of significant figures.
23. Define accuracy and precision.
24. What are errors? Classify them with examples.
25. Precision and accuracy.
26. Sources of errors.
27. Types of errors with examples.
28. What are universal indicators give examples.

### **REDOX TITRATIONS:**

#### **10MARKS:**

1. What are redox titrations? Explain the preparation, assay and uses of copper sulphate.
2. What is iodometry and iodimetry? Taking a suitable example explain the concept of redox titration by iodimetry and iodometry.
3. Explain the theory of redox titrations. Add a note on iodimetry and iodometry.
4. Give the Nernst equation. Explain the terms. Explain the importance of Nernst equation in redox titrations.
5. Highlight the importance of iodimetry and iodometry with appropriate official compounds
6. Define iodometry and iodimetry? Taking a suitable example explain the concept of redox titration by iodimetry and iodometry.

#### **5 Marks:**

1. Explain iodometry and iodimetry with examples.
2. Explain the principle and reactions involved in iodometry titrations.
3. Explain different types of redox titrations with examples.
4. Explain Iodometry and Iodimetry with examples.

5. How is potassium permanganate standardized?
6. Write the preparation and standardisation of 0.1N Potassium permanganate
7. Define permanganometry titrations and explain with one example.

**2 Marks:**

1. What is Iodimetry? Explain with an example.
2. Write the reactions involved in the standardization of 0.1N sodium thiosulphate.
3. Equivalent weight of potassium permanganate.
4. Explain the role of starch as indicator.
5. Iodimetry
6. Oxidizing and reducing agents.
7. Differentiate Iodimetry and Iodometry.
8. Indicators used in Iodine titrations.
9. Write a note on preparation and storage of volumetric solution of iodine.
10. List the 4 advantages of ceric sulphate over potassium permanganate.
11. Classify and give examples of redox indicators.
12. Name four primary standards for redox titrations.
13. Write the reaction between potassium bromate and potassium bromide with hydrochloric acid.

**NON AQUEOUS TITRATIONS:**

**10 MARKS:**

1. What are non-aqueous titrations? Explain in detail the types of solvents used in NAT. Write a note on application in pharmacy.

**5 MARKS:**

2. What are non-aqueous titrations? Explain the assay of sodium benzoate.
3. What are non-aqueous titrations? Write the different solvents used in these titrations.
4. Give the principle and reaction for the assay of sodium benzoate.
5. How do you prepare and standardize 0.1N  $\text{HClO}_4$ .
6. Write the principle of non-aqueous titration.
7. Write the preparation and assay of sodium benzoate.
8. Define non aqueous titrations. Explain about the important conditions of non aqueous titrations.

**2MARKS:**

1. Give the brief classification of solvents used in non-aqueous titration.
2. What are non-aqueous titrations? Write the different solvents used in these titrations.

3. Explain the types of solvents used in non-aqueous titrations.
4. Classify solvents used in non-aqueous titrations.
5. Precautions to be taken while preparing perchloric acid titrant.
6. Solvents used in Non-aqueous titrations.
7. Name four solvents used in non-aqueous titrations.

#### PRECIPITATION TITRATIONS:

##### 10 MARKS:

1. Define and classify precipitation titration and the principle and reaction involved in assay of NaCl.
2. Explain Volhard's method of estimation of halides. Write the mechanism of action of indicator in Fajan's method.
3. Write in detail the principle and procedure involved in Mohr's, Volhard's and Fajan's methods.
4. Explain Volhard's method of estimation of halides. Write the theory of adsorption indicator in Fajan's method.

##### 5 MARKS:

1. Write the principle involved in the Volhard's method of determination of halide?
2. What is Volhard's method and modified Volhard's method? Explain taking suitable examples.
3. What is Fajan's method? Explain by taking suitable example.
4. Explain different methods of estimation of halides.
5. What is Volhard's and Modified Volhard's method of estimation? Explain taking a suitable example.
6. What are argentometric titrations? Explain different methods of estimation of halides.
7. How is silver nitrate standardized?
8. Write the Mohr's method for the estimation of halides.
9. What is the principle involved in precipitation method of titration. Briefly explain it with one example.
10. What are argentometric titrations? Explain Mohr's methods of estimation of halides.
11. Explain modified Volhard's method for the estimation of halides.

##### 2 MARKS:

1. Write a note on adsorption indicators.
2. Define co-precipitation and post precipitation.
3. Write the reactions involved in Mohr's method.
4. What are adsorption indicators? Give example.
5. What is the solubility product of silver chloride if its solubility at 25 °C is  $1.86 \times 10^{-4}$ .

## COMPLEXOMETRIC TITRATIONS:

### 10 MARKS:

1. What are Complexometric titrations? List out different types of complexometric titrations with examples. How do you estimate calcium gluconate?

### 5MARKS:

2. Write in detail the theory of complexometric titrations with suitable examples. What are ligands? Explain the types of ligands with examples.
3. List out different methods in complexometry. Add a note on masking and demasking agents.
4. How do you prepare and standardize 0.05M disodium EDTA?
5. Write in detail the principle for complexometric titrations with suitable example.
6. Write the general principle involved in the complexometric titration. What are ligands and their types.
7. What are the different types of EDTA titrations.
8. 2MARKS:
  9. What are sequestering agents? Give examples.
  10. Write briefly on chelating/complexing agents.
  11. What are ligands? Explain types of ligands with example
  12. Masking and demasking agents

## GRAVIMETRY:

### 2 MARKS

1. Define gravimetric analysis. Write the importance of it
2. Explain the principle involved in the gravimetric analysis with one example.
3. Enumerate the different steps involved in gravimetric analysis.
4. What are the limitations of gravimetric analysis.
5. What is Co-precipitation.
6. What is digestion? What is its effect?
7. What is post -precipitation.
8. Define gravimetry and mention various steps.

## LIMIT TESTS:

### 10 MARKS:

1. Describe the various sources of impurities present in pharmaceutical substances.
2. Write briefly the different sources of impurities present in pharmaceutical substances.
3. Write the principle, reactions and procedure involved in the limit test of arsenic. Draw neat labelled diagram of Gutzeit's apparatus.

4. Explain the principle and procedure involved in the limit test of arsenic with a neat labelled diagram of Gutzeit's apparatus.
5. Give principle, procedure, reactions and role of reagents involved in the limit test for a) Iron b) Lead based on IP 1996 method.
6. Explain the various sources of impurities in pharmaceuticals. Discuss the importance of limit tests in quality control of pharmaceuticals.
7. Write briefly the different sources of impurities present in pharmacopoeial substances.
8. What are impurities? Explain different sources of impurities with examples.
9. Write the procedure and principles for the limit tests for a) Sulphate b) Iron. Describe the principle, apparatus and procedure for the limit test of arsenic.
10. Define limit test? List out different limit tests you have studied. Discuss in detail the limit test for sulphate and iron.
11. What are limit tests? Explain the procedure and principle involved in the limit test of arsenic with a neat labelled diagram of Gutzeit's apparatus.
12. What is limit test? Write in detail the principle, procedure and Gutzeit's apparatus used for limit test for arsenic.
13. Explain in detail the various sources of impurities present in pharmaceutical substances.
14. Define limit test? Explain the various sources of impurities. Describe the principle involved in the limit test for iron.

**5MARKS:**

1. Write the principle, reactions and procedure involved in the limit test for iron.
2. Write the principle and reactions involved in the limit test for Arsenic.
3. Write the principle involved in the limit test for Sulphate.
4. Write the principle and reactions involved in the limit test for sulphate.
5. How do you carry out the limit test for chlorides in the given sample of sodium bicarbonate and sodium benzoate?
6. Explain the principle and procedure for the limit test for sulphates.
7. Write in detail the principle and reactions involved in the limit test for Arsenic.
8. Give the principle and reactions involved in the limit test for sulphates.
9. Give the principle and procedure involved in sulphate limit test.
10. Write the principle involved in the limit test for Arsenic.
11. Write the principle of limit test for lead.
12. Write the procedure and principle with reactions for limit test for lead.
13. Write the principle and reaction involved in heavy metals (IP) limit test.
14. Give the principle, reactions involved in the limit test for Iron and Lead.
15. Write in detail the principle, reactions and procedure for the limit test for Iron.

**2MARKS:**

1. Explain the principle and procedure for the limit test for Iron.
2. Define limit test. Give examples.
3. Write the use of alcohol in the limit test for chlorides in  $\text{KMnO}_4$ .
4. Write the principle and reactions involved in the limit test for sulphate.

5. Write the use of citric acid and ammonia in Iron limit test.
6. Role of acetic acid and ammonia in the limit test for heavy metals.
7. What is the role of thioglycolic acid in iron limit test.
8. Give reason: Nitric acid used in limit test for chloride.
9. Role of lead acetate cotton wool in arsenic limit test.
10. What is a limit test? Why it is carried out?
11. Reagents used in arsenic limit test.
12. Discuss the limit test for chloride.
13. Why alcohol is used in the limit test for chloride in  $\text{KMnO}_4$ .
14. Ethanol sulphate standard solution is used in limit test for sulphates. Give reason.
15. How do you carry out the limit test for chloride in  $\text{KMnO}_4$ ?
16. Why citric acid is used in the limit test for iron?
17. Preparation and use of Barium Sulphate reagent.
18. What is the basis for fixing the limits for impurities?
19. Why dilute nitric acid is used in the limit test for chloride?
20. Differentiate between limit test and test for purity.
21. Why ammonia is used in the limit test for iron?
22. State the meaning of the term opalescence
23. Write the use of citric acid, thioglycolic acid and ammonia in Iron limit test.

#### MEDICINAL GASES:

#### 2MARKS:

1. Give the medicinal uses for Nitrous oxide and Carbon dioxide.
2. What are acidifiers? Give example.
3. Name two medicinal gases with their uses.
4. Inhalants.
5. Give the uses of Oxygen and Carbon dioxide.
6. What are inhalants?
7. Write the labelling and storage conditions for Oxygen.
8. Write the methods of preparation and uses of Nitrous oxide gas
9. What are inhalants? Give the method of preparation, labelling, storage condition and medicinal uses of Nitrous oxide.
10. Give the preparation, storage uses and labelling condition of carbon dioxide.
11. Discuss the role of Oxygen and Carbon dioxide in biological system.

#### ACIDIFIERS ,ANTACIDS& CATHARITICS:

#### 10 MARKS:

1. What are Antacids? Give the idea properties of antacids. Discuss the preparation, assay and uses of Sodium bicarbonate.
2. What are GIT agents? Add a note on antacid combination therapy and assay of sodium bicarbonate.

### 5MARKS:

1. Give the method of preparation and uses of Aluminium hydroxide gel.
2. Define and classify antacids with examples. Add a note on combination antacid preparations (Therapy).
3. Define cathartics. Give the preparation, assay and used of Magnesium sulphate.
4. Write the method of preparation and assay of Aluminium hydroxide gel.
5. What are GIT agents? Classify them with examples. Write a note on acidifiers.
6. Give the method of preparation. Assay principle, medicinal use of magnesium sulphate with its chemical formula and synonym if any.
7. Give the preparation and assay of Magnesium sulphate.
8. Write the principle for the assay of magnesium sulphate.
9. What are cathartics? Explain the assay of magnesium sulphate.
10. Give a method of preparation of Magnesium sulphate.
11. What are antacids? Classify them with examples. State requirements for an ideal antacid.
12. Define and classify antacids? Discuss the preparation, assay principle and medicinal uses of Baking soda.
13. Give the preparation and assay of Magnesium sulphate.
14. Write the principle for the assay of magnesium sulphate.
15. What are cathartics? Explain the assay of magnesium sulphate.
16. Give a method of preparation of Magnesium sulphate.
17. What are saline cathartics? What is their mechanism of action?
18. What are cathartics? Explain the assay of Magnesium sulphate.
19. Enlist different antacids. Write the preparation and uses of aluminium hydroxide gel.
20. Write the method of preparation and assay of Aluminium hydroxide gel.
21. Enlist different antacids. Write the preparation and uses of aluminium hydroxide gel.
22. What are antacids? Write the characteristics of an ideal antacid. Write the preparation of magnesium hydroxide mixture.
23. What are antacids? Write the method of preparation of aluminium hydroxide gel.
24. What are local antacids? Add a note on antacid combination therapy.
25. Write the composition and uses of talk and kaolin.
26. Write the methods of preparation and assay principle of magnesium hydroxide mixture.
27. What are antacids? Classify them with examples. Give the method of preparation and assay principle of Sodium bicarbonate.
28. What are antacids? Give examples.
29. Write the method for preparation and uses of Milk of Magnesia.

### 2MARKS:

1. Give a brief note on Talc.
2. What are antacids? Give examples.
3. Examples for protective.

4. Give the method of preparation of Milk of magnesia.
5. Composition and medicinal uses of talc.
6. What is achlorhydria?
7. Define 1. Cathartic 2. Emetic 3. Accuracy 4. Antioxidant.
8. Define: a) Saline cathartics b) Achlorhydria c) Limit test d) Antiseptic
9. Write the molecular formula and uses of Milk of Magnesia.
10. What are protective and absorbents? Give example.
11. Write the composition and uses of kaolin.
12. Explain the chemical nature and uses of Talc.
13. Non-systemic antacids.
14. Acidifiers.
15. Chemical composition and uses of magnesium trisilicate.
16. What are cathartics? Give example.
17. Physiological role of copper
18. Define saline cathertics give example.
19. Write the different types of cathertics.

### **ELECTROLYTES:**

#### **10 MARKS:**

1. Explain the mechanism of maintenance of physiological acid base balance. Write a note on biochemical and biological role of  $\text{Na}^+$  and  $\text{HCO}_3^-$  ions in the body.
2. List out major intra and extracellular electrolytes. Explain the preparation and uses of dextrose and sodium chloride injection.
3. Explain major physiological ions with their role. Explain the preparation and assay of sodium chloride injection.
4. Discuss briefly about major physiological ions and physiological acid base balance. Write the method of preparation and principle involved in the assay of calcium gluconate.
5. physiological ions Name major and write their role in the body. Add a note on physiological acid-base balance.
6. Name the major physiological ions and write their role in the body. Add a note on physiological acid- base balance.

#### **5MARKS:**

1. Discuss the physiological acid base balance in the body.
2. Write a note on electrolytes used in replacement therapy.
3. Describe the important functions of bicarbonate and Sodium ions in the body.
4. Explain the preparation, assay principle, storage conditions and medical uses of calcium gluconate.
5. Describe the physiological mechanism of acid base balance in the body.
6. What is electrolyte combination therapy? Explain ORS.
7. Explain the physiological role of sodium, calcium, chloride and bicarbonate ions.
8. Write a note on buffer systems of the body.
9. Name the natural buffer systems present in human body.
10. Discuss the importance of sodium and calcium ions in the human body.
11. Give the principle and method of assay of Calcium gluconate.

12. Write a note on physiological acid base balance.
13. Write a note on electrolyte replacement therapy

**2 MARKS:**

1. Give the composition of Hartman's solution for injection.
2. What is the source and biological importance of iron?
3. Write a note on ORS.
4. Write the formula and uses of ORS.
5. Classify extra and intra cellular electrolytes with examples
6. Give the method of preparation and uses of calcium gluconate injection
7. Physiological role of Zinc.
8. Physiological role of Iodine.
9. Biological role and deficiency of zinc in the body.
10. Write the composition and uses of ORS.

**ANTIMICROBIALS:**

**10 MARKS:**

1. What are antimicrobials? Give their mode on action. Enumerate the official anti-microbials and give the method of preparation and assay principle of Boric acid

**5MARKS:**

2. Write the principle involved in the preparation and assay of Hydrogen peroxide.
3. Describe the various mechanism of action of inorganic anti-microbial agents.
4. What are anti-microbials? Give the method of preparation and principle in the assay of boric acid.
5. Explain the mechanism of action of antimicrobial agents.
6. Give the preparation, assay and uses of boric acid.
7. What are antimicrobials? Write the preparation and uses of Iodine.
8. Write the preparation and uses of Chlorinated lime
9. Explain the principle and reactions in assay of Chlorinated lime.
10. Write the preparation, uses and principle involved in the assay of Chlorinated lime.
11. Describe the principle and procedure of assay of chlorinated lime.

**2MARKS:**

1. What are antimicrobial agents? Give examples.
2. Why sulphuric acid is added in the assay of Hydrogen peroxide.
3. Role of chloroform in the assay of potassium iodide.

4. What is the use of glycerine in boric acid assay?
5. Give reason for the use of glycerine in the assay of boric acid.
6. Define antimicrobial agent. List out the antimicrobial agents with formula.
7. Preparation of boric acid?
8. Give reasons: Dilute sulphuric acid used in the assay of hydrogen peroxide.
9. Explain the mechanism of action of anti-microbial agents.
10. What are antimicrobial agents? Give examples.
11. Name two antimicrobials with their molecular formula.
12. Write the molecular formula of boric acid.
13. Write the molecular formula of boric acid and its uses.

#### **PHARMACEUTICAL AIDS:**

1. Give two examples for anti oxidants.
2. Give the chemical formula and uses of Bentonite and magnesium stearate.
3. Give the chemical formula and uses of sodium meta bisulphate and sodium carboxy methyl cellulose.
4. Differentiate between water for injection and sterile water for injection.

#### **DENTAL PRODUCTS:**

##### **5MARKS:**

1. Discuss the role of fluorides in dental caries.
2. What are dentifrices? Classify them with example. Write a note on role of fluoride as anticaries agent.
3. Enlist the official zinc compounds along with formula and use. Explain the preparation, assay principle and uses of any one of them.
4. Preparation and medicinal uses of calcium carbonate.
5. What are dental products? Discuss the role of fluorides in dental caries.
6. Describe the method of preparation of any two dental products.

##### **2 MARKS:**

1. Write about zinc eugenol cement.
2. What are anticaries agents? Give examples.
3. Desensitizing agents.
4. Give a brief account of fluorides used in dental products.
5. What are expectorants? Give examples.
6. What is dental caries? Name two anticaries agents. .
7. Explain desensitizing agents.
8. Dentifrices.
9. Define dentifrices.
10. What are dental products? Classify them with examples.
11. Write the composition and application of zinc eugenol cement
12. Write about desensitizing agents.
13. What are desensitizing agents? Give example.

## **Misellaneous compounds:**

### **2marks:**

1. give any one eg for sclerosing agents & expectorant
2. give any one eg for expectorant & sedative.
3. What are antidotes? Give two eggs.
4. What are sedatives? Give eggs.
5. uses of ammonium carbonate
6. Give one eg for respiratory stimulant.
7. What is meant by sclerosing agent.
8. Define expectorant with example.
9. Explain the role of ammonium compounds as respiratory stimulants.
10. Write the types of antidotes.
11. What is meant by antidotes? List out the official antidote compounds.
12. Define respiratory stimulant and give example.
13. Define antidotes and its mechanism of action.
14. Define sedative give example.

## **RADIOPHARMACEUTICALS:**

- a. what is meant by radioactivity.
- b. Define Nuclides. Isotopes,
- c. Define the following terms a) Observed activity 2) Absolute activity.
- d. Define radioactive half life.
- e. Define radioisotopes with example.
- f. Define radiopharmaceuticals.
- g. Write any four clinical applications of radiopharmaceuticals.