

AUGUST - 2005

[KN 703]

Sub. Code : 4163

FIRST B.Pharm. DEGREE EXAMINATION.

(Revised Regulations)

**Paper III — PHARMACEUTICAL PHYSICAL
CHEMISTRY**

Time : Three hours

Maximum : 90 marks

**Theory : Two hours and
forty minutes**

Theory : 70 marks

M.C.Q. : Twenty minutes

M.C.Q. : 20 marks

I. Long Essay :

(2 × 15 = 30)

Answer any TWO questions.

1. (a) Derive a relation-ship between the elevation of Boiling point of a solution and the molecular weight of a solute.

(b) A solution containing 0.26 grams of naphthalene (molecular weight 128.2) in 25 grams of carbon tetrachloride yields a boiling point elevation of 0.402°C, while a solution of 0.31 grams of an unknown solute in the same weight of the solvent gives a boiling point elevation of 0.647°C. Find the molecular weight of the unknown substance. (10 + 5)

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2. (a) State and explain distribution law.
(b) Discuss the important applications of distribution law. (10 + 5)
3. Define the term "Transport number" of an ion and describe a method for determination of transport number. (5 + 10)
4. State and explain phase rule. Discuss its applications to a one component system. (10 + 5)

II. Short notes on : (8 × 5 = 40)

Answer any EIGHT questions.

1. State and explain law of mass action.
2. Define the terms specific conductance, equivalent conductance and cell constant.
3. What is Ostwalds dilution law?
4. Suggest and describe a method for determination of pH of a solution.
5. State and explain Hess's law of constant heat summation.

6. What are the characteristics of a catalytic reaction?
7. What is polymorphism and isomorphism?
8. Give a brief account of dipole moment.
9. Discuss in brief about Raoult's law of relative lowering of vapour pressure.
10. Classify crystal forms and lattices.

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Theory : 70 marks

M.C.Q. : Twenty minutes

M.C.Q. : 20 marks

I. Long Essay :

(2 × 15 = 30)

Answer any TWO questions.

Each question carries 15 marks.

1. (a) Explain the terms phase rule, component, degree of freedom and phase.

(b) Discuss the application of phase rule to equilibrium between different phases of water.

2. (a) What are the Buffer Solutions? Derive Buffer equation for weak acid and its salt.

(b) Write a note on Solubility product and its applications.

3. (a) Define surface tension and interfacial tension. Describe how surface tension is determined by means of a stalagmometer.

(b) What is meant by parachor? How is its determination helpful in the elucidation of molecular structure?

4. State and explain Kohlrausch law of ionic mobilities. Give its application for the determination of equivalent conductivities of weak electrolytes at infinite dilution.

II. Short notes :

(8 × 5 = 40)

Answer any EIGHT questions.

Each question carries 5 marks.

1. State and explain Hess's law of constant heat summation.

2. Describe Ebullioscopic method of determining molecular weight of a non-volatile solute.

3. State and explain Ostwald's dilution law. What are its limitations?

4. Experimental determination of Transport number.

5. Write a note on Law of Mass action and Le Chatelier's principle.

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6. State and explain distribution law. Mention its limitations. Explain the practical application of distribution law.
7. Derive an expression for hydrolysis constant and degree of hydrolysis in the case of salt of weak acid and strong base.
8. What is meant by coefficient of Viscosity? How is it determined?
9. State and explain Henry's Law for solubility of a gas in liquid.
10. Define pH and ionic product of water. How is pH determined?
11. Write a note on Hydrogen electrode.
12. Define heat of neutralisation. Explain why heat of neutralisation of strong acid and strong base is a constant.

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Maximum : 90 marks

Theory : Two hours and
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Theory : 70 marks

M.C.Q. : Twenty minutes

M.C.Q. : 20 marks

Answer any TWO questions.

I. Long Essay : (2 × 20 = 40)

1. (a) State Raoult's law. Briefly describe the method of determination of molecular weight of a solute using elevation of Boiling point method.

(b) Describe a method of determining Surface-tension of a liquid. Write the applications of surface tension.

2. (a) State phase rule. Explain the various terms involved in it. Write its applications.

(b) State and explain the law which governs the distribution of a solute between two immiscible solvents. Write a note on its applications.

3. (a) State and explain Faraday's laws of electrolysis.

(b) What is dipole moment? How is it useful in the elucidation of molecular structure?

4. (a) Write note on theory of catalysts and its applications in pharmacy.

(b) State Hess's law and explain some of its important applications.

Answer any SIX questions.

II. Short notes : (6 × 5 = 30)

1. What is adsorption? Discuss briefly Langmuir's theory of adsorption and its applications.

2. State and explain the law of mass action. Write the equilibrium constant expression for the reaction



3. Write short notes on :

(a) Buffer solution and its applications in pharmacy.

(b) Common ion effect. (3 + 2 = 5)

4. Write a note on principle's of gas analysis. (5)

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5. **Briefly explain theory of steam-distillation. (5)**
6. **What is Parachor? Mention its applications. (5)**
7. **Explain the following terms with examples**
(a) **Eutectic mixture**
(b) **Efflorescence (3 + 2 = 5)**
8. **What is meant by transport number of ions? Write the applications of Kohlraush's law. (2 + 3 = 5)**
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CHEMISTRY

Time : Three hours

Maximum : 90 marks

Theory : Two hours and
forty minutes

Theory : 70 marks

M.C.Q. : Twenty minutes

M.C.Q. : 20 marks

I. Long Essay :

(2 × 20 = 40)

Answer any TWO questions.

1. (a) Define molal depression constant describe a method of determination of molecular weight of a solute by depression of freezing point method. (12)

(b) Explain diagrammatically any one method to determine the viscosity of a liquid. (8)

2. (a) What is transport number? How will you determine the transport number of an ion by Hittorf's method? (12)

(b) Explain the theory of steam distillation and its application in pharmacy. (8)

3. (a) What is phase rule? Explain the salient features of phase diagram of one component system. (12)

(b) What are buffers? How will you prepare an acidic buffer? What are the applications of buffer in pharmacy and medicine? (8)

4. (a) State Nernst's Distribution law. What are its limitations and applications. (12)

(b) Define the terms :

(i) Deliquescence

(ii) Efflorescence

(iii) Eutectic mixture

(iv) Sublimation. (8)

II. Short notes :

(6 × 5 = 30)

Answer any SIX questions.

1. Explain heterogeneous equilibrium with example.

2. Explain theory of adsorption and its application in pharmacy.

3. Discuss theory of catalyst. Mention its application in pharmacy.

4. What are reference and indicator electrodes? Describe the construction of standard hydrogen electrode.

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5. Define the terms
 - (a) Solubility product
 - (b) Ionic product of water
 6. State Faraday's First and Second laws of electrolysis. Mention its applications.
 7. Write the principles involved in the gas analysis.
 8. Explain :
 - (a) Dipole moment
 - (b) Optical activity.
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August-2007

[KR 703]

Sub. Code : 4163

(Candidates admitted upto 2003-04 onwards)

FIRST B.Pharm. DEGREE EXAMINATION.

(Revised Regulations)

Paper III — PHARMACEUTICAL PHYSICAL
CHEMISTRY

Time : Three hours

Maximum : 90 marks

Theory : Two hours and
forty minutes

Theory : 70 marks

M.C.Q. : Twenty minutes

M.C.Q. : 20 marks

I. Long Essay :

(2 × 15 = 30)

Answer any TWO questions.

Each question carries 15 marks.

1. (a) Explain the terms phase rule, component, degree of freedom and phase.

(b) Discuss the application of phase rule to equilibrium between different phases of water

2. (a) What are the Buffer Solutions? Derive Buffer equation for weak acid and its salt.

(b) Write a note on Solubility product and its applications.

3. (a) Explain phase rule with phase diagram for water.

(b) Write short notes on any TWO :

(i) Polarisation of light.

(ii) Dipole moment.

(iii) Viscosity.

4. (a) Explain theory of indicators and how indicators are chosen for neutralisation titrations such as strong acid and strong base and weak acid and strong base. (11)

(b) What is adsorption isotherm? Explain with illustrations. (4)

II. Short notes : (8 × 5 = 40)

Answer any EIGHT questions.

Each question carries 5 marks.

1. State and explain Hess's law of constant heat summation.

2. Describe Ebullioscopic method of determining molecular weight of a non-volatile solute.

3. State and explain Ostwald's dilution law. What are its limitations?

4. Experimental determination of Transport number.

5. Write a note on law of Mass action and Le Chatelier's principle.

6. State and explain distribution law. Mention its limitations. Explain the practical application of distribution law.

7. Derive an expression for hydrolysis constant and degree of hydrolysis in the case of salt of weak acid and strong base.

8. What is meant by coefficient of Viscosity? How is it determined?

9. State and explain Henry's law for solubility of a gas in liquid.

10. Define pH and ionic product of water. How is pH determined.

11. Write a note on Hydrogen electrode.

12. Define heat of neutralisation. Explain why heat of neutralisation of strong acid and strong base is a constant.

February-2008

[KS 703]

Sub. Code : 4163

(Candidates admitted up to 2003-04 onwards)

FIRST B. Pharm. DEGREE EXAMINATION.

(Revised Regulations)

Paper III — PHARMACEUTICAL PHYSICAL
CHEMISTRY

Q.P. Code : 564163

Time : Three hours

Maximum : 90 marks

Theory : Two hours and
forty minutes

Theory : 70 marks

M.C.Q. : Twenty minutes

M.C.Q. : 20 marks

I. Long Essay :

Answer any TWO questions.

Each question carries 15 marks.

(2 × 15 = 30)

1. What do you mean by azeotropic and zeotropic mixture and Explain about theory of fractional distillation.

2. (a) Define surface tension and interfacial tension. Describe a method to determine surface tension. (3 +6)

(b) Discuss the applications of distribution law. (6)

3. Define the term colligative properties with example. Discuss the methods of determination of osmotic pressure.

4. (a) Discuss the depression of freezing point method for the determination of molecular weight of a non-volatile solute. (9)

(b) State and explain Beer's law. (6)

II. Short notes on : (8 × 5 = 40)

Answer any EIGHT questions.

Each question carries 5 marks.

1. Define optical activity and explain its measurement. (2 +3)

2. What is Parachor? Mention its applications. (2 +3)

3. Write a note on

(a) Law of mass action (2½)

(b) Le-Chatelier's principle. (2½)

4. Discuss the principle and procedure for the analysis of oxygen.

5. Discuss in brief about Raoult's law of relative lowering of vapour pressure. (5)

6. State and explain Henry's law of solubility of a gas in a liquid. (5)

7. What is adsorption? Discuss briefly Langmuir's theory of adsorption and its applications. (2 +3)

8. Define the terms specific conductance and cell constant. (2½ + 2½)

9. Write a note on Calomel electrode. (5)

10. Explain the following terms with examples.

(a) Eutectic mixture (2½)

(b) Efflorescence. (2½)

August 2008

[KT 703]

Sub. Code : 4163

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FIRST B.Pharm. DEGREE EXAMINATION.

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**Paper III — PHARMACEUTICAL PHYSICAL
CHEMISTRY**

Q.P. Code : 564163

Time : Three hours

Maximum : 90 marks

SECTION A — (2 × 20 = 40 marks)

I. Long Essay :

Answer any TWO out of Three.

1. (a) Define Osmosis and Osmotic pressure.
Explain the determination of Molecular weight by using
osmotic pressure and vapor pressure. (15)

(b) Explain Raoult's Law, and Ostwald dilution
Law. (5)

2. (a) Explain Solubility product and Common ion effect with suitable examples. (10)

(b) Briefly explain heat of reaction, heat of solution and heat of formation with relevant examples. (10)

3. (a) Enumerate Faraday's Law of electrolysis conductivity of electrolyte. How will you determine conductivity? (10)

(b) Explain solubility curve and super saturation. (10)

SECTION B — (8 × 5 = 40 marks)

Answer any EIGHT out of Ten.

II. Write short notes on :

1. Theory of Catalysts.
2. Theory of Adsorption.
3. Hess Law of summation with example.
4. Determination of freezing point depression.
5. Determination of hydrogen ion concentration.
6. Application of catalysts in Pharmacy.

7. Theory and Apparatus for steam distillation.

8. Factors affecting chemical equilibrium.

9. Define phase rule and Triple point.

10. Partition coefficient, determination of its applications.

SECTION C — (5 × 2 = 10 marks)

Answer any FIVE out of Seven.

III. Short Answers :

1. Optical Activity and significance.
2. Distribution Law.
3. Difference between hygroscopicity and deliquescence.
4. Types of crystal forms.
5. Surface tension and Parachor – Definition.
6. Kohlrausch Law and Transport number.
7. Reference Electrode and Indicator Electrodes.