[KD 703]   Sub. Code : 4163

FIRST B.Pharmacy DEGREE EXAMINATION.

(Revised Regulations)

Paper III — PHARMACEUTICAL PHYSICAL
CHEMISTRY

Time : Three hours   Maximum : 90 marks

Two and a half hours   Sec. A & Sec. B : 60 marks

for Sec. A & Sec. B.   Section C : 30 marks

Answer Sections A and B in the same Answer Book.

Answer Section C in the answer sheet provided.

SECTION A — (2 × 15 = 30 marks)

Answer any TWO questions.

All questions carry equal marks.

1.   What are colligative properties? Explain the methods used to measure the lowering of vapour pressure. Determine the molecular weight from the lowering of vapour pressure.

2.   (a) Explain the principle of gas analysis.

(b) State the First Law of thermodynamics and write the mathematical expression of the law.

3.   (a) What is meant by "Phase component" Degree of freedom and Triple point.

(b) Derive the phase rule for one component system.

4.   (a) Define "ADSORPTION" with examples. What are the different types of adsorption?

(b) Derive the Langmuir Adsorption Isotherm.

SECTION B — (6 × 5 = 30 marks)

Answer any SIX questions.

All questions carry equal marks.

5.   Application of Distribution Law.

6.   Define Surface tension. Explain one method to determine surface tension.

7.   Explain Faradays Laws of electrolysis.

8.   Define Heat of neutralisation and Heat of formation. Why is the heat of neutralisation of strong acids and strong bases constant.

9.   Write a note on the buffer systems used in pharmacy and their applications.

10. What are the limitations and applications of the partition coefficient experiment?

11. Define the following :

(a) Open system

(b) Closed system

(c) Adiabatic process

(d) Isothermal process

(e) Isochotic process.

12. What are the different types of catalyst? Explain with examples.

13. What is the common ion effect? How does the common ion effect influence the solubility and solubility product?

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CHEMISTRY

Time : Three hours   Maximum : 90 marks
Two and a half hours   Sec. A & Sec. B : 60 marks
for Sec. A and Sec. B   Section C : 30 marks

Answer Sections A and B in separate Answer Books.

Answer Section C in the Answer Sheet provided.

SECTION A — (2 × 15 = 30 marks)

Answer any TWO questions.

All questions carry equal marks.

1.   (a) State and explain phase rule. Describe its
application to one component system.   (8)

     (b) What is buffer capacity? Explain the
hydrolysis of salts?   (7)

2.   (a) Describe the principle of gas analysis. Write
the different methods of gas analysis.   (9)

     (b) Explain how nitrous oxide is analysed.   (6)

3. (a) What is meant by liquefaction of gases? Briefly discuss the different methods by which liquefaction can be brought out. (9)

(b) Define optical activity. How is it measured? (6)

4. (a) Write a note on absolute ionic mobility and equivalent conductivity. (8)

(b) What are eutectic mixtures? Explain with examples. (7)

SECTION B — (6 × 5 = 30 marks)

Answer any SIX questions.

5. Define viscosity and surface tension and write the effect of temperature on it.

6. What is meant by polymorphism? Explain with examples.

7. Derive the Henry's law of solubility of a gas in a liquid.

8. Enumerate the kinetic theory of gases.

9. How will you determine the pH of strong acids and bases?

10. What are catalysts? Write their general characteristics.

11. Define osmotic pressure. How is it determined experimentally?

12. Discuss in detail the Arrhenius concept of acids and bases.

13. Define dipole moment. Compare the biological effect of D.D.T. with dipole moment.

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MARCH - 2002

[KG 703]   Sub. Code : 4163

FIRST B.Pharm. DEGREE EXAMINATION.

(Revised Regulations)

Paper III — PHARMACEUTICAL PHYSICAL
CHEMISTRY

Time : Three hours   Maximum : 90 marks
Two and a half hours   Sec. A & Sec. B : 60 marks
for Sec. A & Sec. B   Section C : 30 marks

Answer Sections A and B in same answer Books.

Answer Section C in the separate answer sheet
provided.

SECTION A — (2 × 15 = 30 marks)

Answer any TWO questions.

1.   (a) State and explain Faraday's law. Define
equivalent conductance. Mention how the conductance
of a solution is measured.   (8)

       (b) Write an account on X–ray diffraction.   (7)

2.   (a) Describe a method for the determination of
molecular weight by the relative lowering in vapour
pressure of a pure solvent produced by a non volatile
solute.   (8)

       (b) State and explain Graham's law of diffusion.
                                                                      (7)

3. (a) What are catalysts? Enumerate the general characteristics of catalytic reactions. (7)

(b) What is meant by Joule–Thomson effect? Write its pharmaceutical applications. (8)

4. (a) Derive the relation between standard state free energy and the equilibrium constant of a chemical reaction at a given temperature. (8)

(b) Describe the principle of determination of refractive index. (7)

SECTION B — (6 × 5 = 30 marks)

Answer any SIX questions.

5. What is meant by solubility product? How is it determined?

6. Write a method for the determination of viscosity of a liquid.

7. Derive the Van't Hoffs equation. Mention its applications.

8. How will you calculate the molecular weight of a non–electrolytic solute from the boiling point elevation.

9. What is meant by a reference electrode? Describe the construction and working of calomel electrode.

10. Explain the phenomenon of osmosis in terms of the chemical potential of the solvent and the solution.

11. What are surface active agents?

12. List the various adsorbents used in gas analysis. Explain.

13. What is meant by eutectic point? Illustrate with example.

[KH 703]   **Sub. Code : 4163**

FIRST B.Pharm. DEGREE EXAMINATION.

(Revised Regulations)

Paper III — PHARMACEUTICAL PHYSICAL CHEMISTRY

Time : Three hours   Maximum : 90 marks

Two and a half hours   Sec. A & Sec. B : 60 marks

for Sec. A and Sec. B   Section C : 30 marks

Answer Section A and Section B in the same Answer Books.

Answer Section C in the Answer Sheet provided.

SECTION A — (2 × 15 = 30 marks)

Answer any TWO questions.

All questions carry equal marks.

1.   (a) What is steam distillation? Explain the theory of steam distillation.

(b) Explain continuous and discontinuous solubility curve with examples.

2.   How will you measure freezing point depression by Bekmann's method and Rast's camphor method?

3.   What is transport number? How will you determine the transport number?

4.   Explain the theory of catalysts and its application in pharmacy.

SECTION B — (6 × 5 = 30 marks)

All questions carry equal marks.

5.   KOHLRAUSCH's Law and its applications.

6.   Define partition coefficient. Explain how it is determined.

7.   Reference electrode – Explain with examples.

8.   Explain aicd–base indicator thoery – Ostwald's theory.

9.   Define order of reaction. Classify it with one eg. for each order.

10.   How will you determine half life of reaction? Calculate half life for first order reaction.

11.   Abnormal molecular weights.

12.   Optical Activity.

13.   Difference between physical adsorption and chemisorption.

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[KI 703]

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FIRST B.Pharm. DEGREE EXAMINATION.

(Revised Regulations)

Paper III — PHARMACEUTICAL PHYSICAL CHEMISTRY

Time : Three hours   Maximum : 90 marks

Two and a half hours   Sec. A & Sec. B : 60 marks

for Sec. A and Sec. B   Section C : 30 marks

Answer Sections A and B in the **SAME** Answer Book.

Answer Section C in the Answer Sheet provided.

SECTION A — $(2 \times 15 = 30$ marks)

Answer any TWO questions.

All questions carry equal marks.

1. (a) Classify crystal forms and lattices with appropriate illustrations.   (11)

   (b) Explain and derive Bragg's law.   (4)

2. (a) What are colligative properties? Explain with illustration and appropriate equation how depression of freezing point can be determined.   (11)

   (b) A solution containing 10.0 g of sucrose dissolved in 100 g of water has a boiling point of 100.150°C. Calculate the molecular weight of sucrose. [The molal elevation constant for water, $k_v = 0.50$]   (4)

3. (a) Explain the working and significance of standard hydrogen electrode with illustration.   (11)

   (b) What is single electrode potential? Give Nernst equation and explain its significance.   (4)

4. (a) Explain elaborately phase rule, with phase diagram of water.   (11)

   (b) Write short notes on any TWO :   (4)

   (i) Hess Law

   (ii) Henry's Law

   (iii) Steam Distillation.

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SECTION B — (6 × 5 = 30 marks)

Answer any SIX questions.

All questions carry equal marks.

5. Write notes on surface tension and its applications. (5)

6. Define distribution law and its applications in pharmacy. (5)

7. Explain Kohlrausch law and transport number. (2 + 3)

8. Define and classify salt hydrolysis. Derive an expression for determination of pH for a salt of strong acid and weak base. (2 + 3)

9. Explain the theory of indicators and how indicators are chosen for neutralisation titration. $(2\frac{1}{2} + 2\frac{1}{2})$

10. Explain the polarisation of light, optical activity and its applications. (2 + 2 + 1)

11. Define law of mass action and Le Chatlier's principle. Explain the effect of temperature and pressure on chemical equilibrium. (2 + 3)

12. Explain theory of steam distillation with illustrations. (5)

13. Explain energy of activation with potential energy curve and the following terms — Activated state, exothermic and endothermic reaction. (5)

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FIRST B.Pharm. DEGREE EXAMINATION.

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Paper III — PHARMACEUTICAL PHYSICAL
CHEMISTRY

Time : Three hours   Maximum : 90 marks

Sec. A & B : Two hours and   Sec. A & B : 70 marks

forty minutes

M.C.Q. : Twenty minutes   M.C.Q. : 20 marks

Answer Sections A and B in the **SAME** Answer Book.

Answer M.C.Q. in the Answer Sheet provided.

SECTION A

Answer any TWO questions : $(2 \times 15 = 30)$

All questions carry equal marks.

1.   (a) Define reference and indicator electrodes with illustration explain the working of glass electrodes and its applications.   (11)

(b) Define and explain with suitable examples Faradays laws of electrolysis and ionic mobility. $(2 + 2)$

2. (a) Define Raoult's law. Derive an expression for relative vapour pressure lowering. Explain how vapour pressure of solutions are determined with illustrations.

$(2 + 4 + 5)$

(b) Calculate the relative vapour pressure lowering at 20°C for a solution containing 171 g of sucrose in 1000 g of water. The molecular weight of sucrose is 342 and molecular weight of water is 18 g/mole.

(4)

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

(11)

(b) Write short notes on any TWO : $(2 + 2)$

    (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)

SECTION B

Answer any EIGHT questions : $(8 \times 5 = 40)$

All questions carry equal marks.

5. Give Nernst equation and explain its significance.

(5)

6. Construct standard hydrogen electrode and explain its significance.

(5)

7. Classify crystal forms and lattices.

(5)

8. Write short notes on absorption and emission spectra.

(5)

9. Define buffers and buffer capacity. Enumerate the applications of buffers.

$(3\frac{1}{2} + 1\frac{1}{2})$

10. Explain energy of activation with potential energy curve and associated terms such as transition state, exothermic and endothermic reaction.

$(2 + 1 + 1 + 1)$

11. Explain the following terms sublimation, efflorescence, deliquescence.

$(3 + 1 + 1)$

12. Define the following :

Heat of solution, Hess law, Law of mass action.

$(1\frac{1}{2} + 1\frac{1}{2} + 2)$

13. Write briefly the theory of catalysts and its applications in pharmacy.

(5)

14. Explain theory of steam distillation with illustrations.

(5)

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FIRST B.Pharm. DEGREE EXAMINATION.

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Paper III — PHARMACEUTICAL PHYSICAL
CHEMISTRY

Time : Three hours   Maximum : 90 marks

Sec. A & B : Two hours and   Sec. A & B : 70 marks
         forty minutes

MCQ : Twenty minutes   MCQ : 20 marks

Answer Sections A and B in the **SAME** Answer Book.

SECTION A — (2 × 15 = 30 marks)

Answer any TWO questions.

1.   State the modern theories of acids and bases. (15)

2.   (a)   Write the principle of gas analysis.   (5)

      (b)   Explain the different methods of gas
analysis.   (10)

3. (a) Write the pharmaceutical application of amorphous solids. (8)

   (b) Enumerate the Faraday's Laws of Electrolysis. (7)

4. Give an account of

   (a) Parachor and its application (8)

   (b) Polymorphism (7)

   SECTION B —(8 × 5 =40 marks)

   Answer any EIGHT questions.

5. State and explain Henry's Law.

6. How will you determine pH of acidic buffers?

7. Write any one method for preparation of liquid oxygen.

8. Explain how dipole moment is related to biological activity.

9. What are condensed systems? Explain with examples.

10. Suggest a method for the measurement of Vapour Pressure of solutions.

11. Derive the fundamental kinetic gas equation.

12. What is solubility product? Explain with examples.

13. Enumerate the general characteristics of catalytic reactions.

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