Subha Singh

Code : 091202

B.Pharm 2nd Semester Exam., 2021

PHARMACEUTICAL CHEMISTRY—II

(Physical Chemistry)

Time : 3 hours *Full Marks* : 70

Instructions :

(i) The marks are indicated in the right-hand margin.

*(ii) There are **NINE** questions in this paper.*

*(iii) Attempt **FIVE** questions in all.*

*(iv) Question No. **1** is compulsory.*

1. Answer/Fill in the blanks (any *seven*) : 2×7=14

(a) What is meant by a thermochemical equation?

(b) What is a bolometer?

(c) Define black body and black body radiation.

(d) Define quantum efficiency or quantum yield.

(e) The enthalpy changes of a system is _____.

(f) State the second law of thermodynamics.

(g) Isothermal process is _____.

(h) Heat of vaporization (ΔH) of a liquid is _____.

(i) What is adiabatic process?

(j) Write Lambert's law.

2. (a) What are the causes of deviation of real gas from ideal behaviour?

(b) Explain the behaviour of real gases by van der Waals' equation at low pressure and high pressure. 7

3. (a) What is the effect of temperature on surface tension? 7

(b) Explain the term Parachor in detail. 7

4. (a) What is meant by reaction of second order? Derive an expression for rate constant of second-order reaction involving one reactant only. 8

(b) Describe some characteristics of second-order reaction. 6

5. (a) Discuss Freundlich adsorption isotherm of a gas on a solid. 7

(b) Deduce the Langmuir adsorption isotherm equation. 7

6. (a) Discuss the applications of Gibbs' adsorption equation. 7

(b) Describe some important applications of adsorptions. 7

7. Write short notes on the following (any *two*) : 7×2=14

(a) Characteristics of acid-base and enzyme catalysis

(b) Consequences of light absorption

(c) Quantum efficiency

8. (a) Discuss Langmuir's theory of adsorption in detail. 7

(b) Explain thermochemical reactions in detail. 7

9. Write short notes on the following : 7+7=14

(a) Debye-Hückel theory

(b) Third law of thermodynamics

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Code : 091201

B.Pharm 2nd Semester Exam., 2021

PHARMACEUTICS—II

Time : 3 hours *Full Marks* : 70

Instructions :

(i) The marks are indicated in the right-hand margin.

*(ii) There are **NINE** questions in this paper.*

*(iii) Attempt **FIVE** questions in all.*

*(iv) Question No. **1** is compulsory.*

1. Answer any *seven* of the following questions : 2×7=14

(a) Which of the following factors can affect solubility?

(i) Temperature

(ii) Common-ion effect

(iii) Particle size

(iv) All of the above

(b) Around _____ percent of chromium is present in all typical forms of stainless steel.

(i) 1 to 3

(ii) 12 to 30

(iii) 20 to 50

(iv) 0·1 to 0·3

(c) A refrigeration system can be used for a variety of purposes, including

(i) dehumidification

(ii) cooling

(iii) heating

(iv) All of the above

(d) What problem arises due to increased amount of sodium in glass?

(i) Leaching

(ii) Softness

(iii) Malleability

(iv) Mottling

(e) Which of the following about chromium is correct?

(i) Extremely oxidation resistant

(ii) Heaviest of refractory metals

(iii) Prone to oxidation

(iv) Brittle at high temperature

(f) Pressure drop can be achieved in the filtration process by

(i) gravity

(ii) reduced pressure

(iii) centrifugal force

(iv) All of the above

(g) Which of the following is correct formula for converting temperature from °C to °F?

(i) °F = 9/5 °C + 32

(ii) °F = 5/9 °C + 32

(iii) °F = 9/5 °C + 36

(iv) °F = 5/9 °C + 36

(h) Which one of the following is commonly used unit of density?

(i) kg/m^3

(ii) $lb\text{-}mass/ft^3$

(iii) g/cm^3

(iv) All of the above

(i) Choose the most appropriate means for transport of solids.

(i) Fans

(ii) Pumps

(iii) Conveyers

(iv) Valves

(j) Crystallization cannot be achieved by

(i) scratching

(ii) threading

(iii) cooling

(iv) heating

2. Write an exhaustive note on theory of filtration, filter aids and filter media. 14

3. Write short notes on : 5+5+4=14

   (a) Types of pumps

   (b) Psychrometric chart

   (c) Mechanism of nucleation in crystal growth

4. (a) Discuss super-saturation theory and explain its limitation. 8

   (b) Write a note on types of flow. 6

5. Write an exhaustive note on equipments for dehumidification operations. 14

6. Explain the functioning of air conditioner and its application in industrial pharmacy. 14

7. Explain the process of caking of crystals and how it can be prevented. 14

8. Write notes on : 7+7=14

   (a) Industrial dermatitis

   (b) Fire and dust hazards

9. Describe the properties and applications of glass as material of construction and also discuss its corrosive properties. 14

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Code : 091205

Siddhi Singh

B.Pharm 2nd Semester Exam., 2021

ADVANCED MATHEMATICS

Time : 3 hours | *Full Marks* : 70

Instructions :

(i) The marks are indicated in the right-hand margin.

*(ii) There are **NINE** questions in this paper.*

*(iii) Attempt **FIVE** questions in all.*

*(iv) Question No. **1** is compulsory.*

1. Answer the following questions (any *seven*) : 2×7=14

(a) Evaluate the integral $\int \frac{y^2}{y^2+a^2} dy$.

(b) What is the type of the differential equation

$$y = \sqrt{x}\frac{dy}{dx} + \frac{k}{\frac{dy}{dx}} ?$$

(c) Find the differential equation corresponding to the family of the curves $y = c(x-c)^2$, where c is an arbitrary constant.

(d) Find an equation of the family orthogonal to the family $y = cx$.

(e) Find the Laplace transform of t^a, where $a > 0$.

(f) Find the inverse Laplace transform of $\frac{1}{s-a}$.

(g) Find the inverse Laplace transform of $\int_0^t f(\tau)\,d\tau$.

(h) State the definitions of mean and variance of a random variable from memory.

(i) What is the chance that a leap year selected at random will contain 53 Sundays?

(j) If

$P(A \cap B) = \frac{1}{2}$, $P(\bar{A} \cap \bar{B}) = \frac{1}{3}$ and $P(A) = P(B) = p$, then find the value of p.

2. (a) Solve $\frac{dy}{dx} = \frac{x+2y-3}{2x+y-3}$. 7

(b) Solve $(1-x^2)\frac{dy}{dx} + xy = xy^2$. 7

(Continued)

3. Show that the differential equation of a general parabola is

$$\frac{d^2}{dx^2}\left[\left(\frac{d^2y}{dx^2}\right)^{-2/3}\right]=0$$

Also, solve the differential equation

$$(1+e^{x/y})dx+e^{x/y}\left(1-\frac{x}{y}\right)dy=0$$ 14

4. Define the exact differential equation and integrating factor of it and solve the differential equation

$$(y^2+yz)dx+(z^2+xz)dy+(y^2-yx)dz=0$$ 14

5. Find the differential equation of all circles of radius r and also, find the inverse Laplace transform of

$$\frac{5s+3}{(s-1)(s^2+2s+5)}$$ 14

6. Solve the initial value problem

$$y''+ay'+by=r(t),\ y(0)=K_0,\ y'(0)=K_1$$

using the Laplace transforms. 14

7. Prove that for any discrete distribution, standard deviation is not less than mean deviation from mean. 14

8. The odds that a person X speaks the truth are 3 : 2 and the odds that a person Y speaks the truth are 5 : 3. In what percentage of cases are they likely to contradict each other on an identical point?

14

9. Calculate the standard deviation and mean deviation from mean if the frequency function $f(x)$ has the form

$$f(x)=\begin{cases}\dfrac{3+2x}{18}, & \text{for } 2\le x\le 4\\ 0, & \text{otherwise}\end{cases}$$

14

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Code : 091203

B.Pharm 2nd Semester Exam., 2021

PHARMACEUTICAL CHEMISTRY—III

(Organic Chemistry)

Time : 3 hours *Full Marks* : 70

Instructions :

(i) *The marks are indicated in the right-hand margin.*

(ii) *There are* ***NINE*** *questions in this paper.*

(iii) *Attempt* ***FIVE*** *questions in all.*

(iv) *Question No.* ***1*** *is compulsory.*

1. Answer any *seven* of the following questions : 2×7=14

(a) Give wave equation.

(b) Give the name of atomic orbitals.

(c) What is bond dissociation energy?

(d) What are conjugated acids?

(e) Define geometrical isomers.

(f) What is Markovnikov rule?

(g) Why is chloroacetic acid more acidic than acetic acid?

(h) Why benzene does not give addition reactions?

(i) Why methoxide ion is more stable than ethoxide ion?

2. Discuss molecular orbital theory. Explain it with suitable examples. 14

3. Give the synthesis and chemical reactions of dienes. 14

4. Classify stereoisomerism. Explain enantiomer, diastereomer and mesomer. 14

5. Give the mechanism of substitution and elimination reactions in alchol. Discuss chemical reactions of alcohols. 14

6. Discuss electrophillic substition reactions in aromatic compounds. Explain nitration and alkylation in benzene. 14

7. (a) Discuss factors affecting acidity of carboxylic acids.

(b) Give synthesis of aldehydes and ketone. 7+7=14

8. Give synthesis and chemical reactions of aliphatic amines. 14

9. Write notes on any *two* of the following : 7×2=14

(a) Hybridization

(b) Configurational isomerism

(c) Stability of reaction intermediates

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Code : 091204

B.Pharm 2nd Semester Exam., 2021

ANATOMY, PHYSIOLOGY AND HEALTH EDUCATION—I

Time : 3 hours *Full Marks* : 70

Instructions :

(i) The marks are indicated in the right-hand margin.

*(ii) There are **NINE** questions in this paper.*

*(iii) Attempt **FIVE** questions in all.*

*(iv) Question No. **1** is compulsory.*

1. Write short notes on the following with one example each (any *seven*) : 2×7=14

(a) Haematopoiesis

(b) Reverse osmosis

(c) Pacemaker

(d) Visceral muscle

(e) Osteoporosis

(f) Fasciles

(g) Types of lymphocytes

(h) Sarcomere

(i) Acromion

(j) Portal circulation

2. Write short notes on the following : 7×2=14

(a) Mechanism of coagulation

(b) Connective tissue

3. Enumerate the following : 7×2=14

(a) Classification of WBC and their physiology

(b) Structure and composition of bone

4. Explain in detail the structure, composition and functions of skeleton system. 14

5. Write notes on the following : 7×2=14

(a) Disorder of joints

(b) Physiology of muscle contraction

6. Discuss the following : 3½×4=14

(a) Composition of blood

(b) Electrocardiogram

(c) Functions of plasma membrane

(d) Meiosis

7. Explain the following : 7×2=14

(a) Cardiac arrhythmia

(b) Arthritis

(Continued)

8. Write short notes on the following : 7×2=14

(a) Nervous tissue

(b) Skeletal muscle disorder

9. Write notes on the following : 7×2=14

(a) Basic anatomy and physiology of heart

(b) Structure of cell

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