PHARMACEUTICAL CHEMISTRY (PHYSICAL CHEMISTRY) (SEMESTER - 2)

CS/B.Pharm(O)/SEM-2/PT-203/09

1. ....
   Signature of Invigilator

2. ....
   Signature of the Officer-in-Charge

Reg. No.

Roll No. of the Candidate

CS/B.Pharm(O)/SEM-2/PT-203/09

ENGINEERING & MANAGEMENT EXAMINATIONS, JUNE – 2009

PHARMACEUTICAL CHEMISTRY (PHYSICAL CHEMISTRY) (SEMESTER - 2)

Time : 3 Hours]   [Full Marks : 70

INSTRUCTIONS TO THE CANDIDATES :

1. This Booklet is a Question-cum-Answer Booklet. The Booklet consists of **32 pages**. The questions of this concerned subject commence from Page No. 3.

2. a) In **Group – A**, Questions are of Multiple Choice type. You have to write the correct choice in the box provided **against each question**.

   b) For **Groups – B** & **C** you have to answer the questions in the space provided marked 'Answer Sheet'. Questions of **Group – B** are Short answer type. Questions of **Group – C** are Long answer type. Write on both sides of the paper.

3. **Fill in your Roll No. in the box** provided as in your Admit Card before answering the questions.

4. Read the instructions given inside carefully before answering.

5. You should not forget to write the corresponding question numbers while answering.

6. Do not write your name or put any special mark in the booklet that may disclose your identity, which will render you liable to disqualification. Any candidate found copying will be subject to Disciplinary Action under the relevant rules.

7. **Use of Mobile Phone and Programmable Calculator is totally prohibited in the examination hall.**

8. You should return the booklet to the invigilator at the end of the examination and should not take any page of this booklet with you outside the examination hall, **which will lead to disqualification**.

9. Rough work, if necessary is to be done in this booklet only and cross it through.

   No additional sheets are to be used and no loose paper will be provided

FOR OFFICE USE / EVALUATION ONLY
Marks Obtained

	Group – A										Group – B	Group – C						Total Marks	Examiner's Signature
Question Number																				
Marks Obtained																				

....
Head-Examiner/Co-Ordinator/Scrutineer

2219 (03/06) (O)

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Graph sheet is provided on Page No. 31.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$

   i) Unit of Gas constant R is

   a) degree/mole

   b) degree/cal/mole

   c) cal/degree/mole

   d) mole/cal.

   ii) Which of the following is not related to surface tension measurement ?

   a) Stalagmometer

   b) Drop weight method

   c) Ring detachment method

   d) Rotating cylinder method.

   iii) Which one of the following is non-polar ?

   a) Water

   b) Carbon dioxide

   c) Chloroform

   d) Toluene.

   iv) Unit of the rate constant for zero order kinetics is

   a) sec^{-1}

   b) $mole^{-1} \; sec^{-1}$

   c) $mole.sec^{-1}$

   d) $mole^{-1}$.

2219 (03/06) (O)

v) Which one of the following is not a colligative property ?

   a) Bioling   b) Freezing

   c) Crystallization   d) Melting.

vi) In case of murcury on glass system, contact angle

   a) $\theta = 90°$ b) $\theta < 90°$

   c) $\theta > 90°$ d) $\theta = 180°$.

vii) Open thermodynamic system means

   a) system is incapable of exchanging either energy or matter

   b) system is capable of exchanging energy only

   c) system is capable of exchanging both mass and energy

   d) none of these.

viii) Cryoscopic constant of camphor is

   a) $37·7°C$ b) $40°C$

   c) $1·85°C$ d) $37·7K$.

ix) The plot of P vs T is known as

   a) isotherm   b) isobar

   c) isometrics   d) adiabatic.

x) The upper critical solution temperature of Nicotine water system is

   a) $68·4°C$ b) $18°C$

   c) $60·8°C$ d) $208°C$.

xi)   The correct order of the following according to their wavelengths is

a)   Radiowave – *IR* – *UV* – Cosmic rays

b)   Cosmic rays – *UV* – *IR* – radiowave

c)   Cosmic rays – radiowave – *IR* – *UV*

d)   *UV* – cosmic rays – radiowave – *IR*.

xii) Duration of fluorescence is

a) 10^{-12} sec   b) 10^{-8} sec

c) 10^{-6} sec   d) 10^{-4} sec.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2.   State the kinetic theory of gas.

3.   What is Poiseuille's equation for viscosity. From this derive the equation for Ostwald viscometer.

4.   Define dipole moment. What is the difference between permanent and induced dipole moments. Explain with examples.   2 + 3

5.   Deduce Freundlich adsorption isotherm.

6.   Explain the importance of Arrhenius equation for pharmaceutical products with graphical representation.

GROUP – C

**(Long Answer Type Questions)**

Answer any *three* of the following. 3 × 15 = 45

7. a) Explain Carnot cycle. From this derive the mathematical form of Second Law of Thermodynamics. 8

   b) A sample of gas initially at 27°C is compressed from 40 lit to 4 lit adiabetically and reversibly. Calculate the final temperature (C_v = 5 cal/mole). 3

   c) Define entropy and show that $dH = Tds + Vdp$. 4

8. a) Define order of a reaction. For 1st order kinetic show that $t_{1/2} = \dfrac{0 \cdot 693}{K}$

   ($t_{1/2}$ = half life, K = rate constant)

   b) A first order reaction is 25% complete at the end of 20 min. How long will it take to complete 75% and what will be its half life ?

   c) Write Lambert's Law and Beer's Law of photochemistry. 15

9. Wrie short notes on any *five* of the following : 5 × 3 = 15

   a) Parachor

   b) Falling sphere viscometer

   c) Critical solution temperature

   d) Phase diagram

   e) Partition co-efficient

   f) Gibbs-Helmholtz equation

   g) Adsorption isotherm

   h) Arrhenius equation.

10. What are the postulates of kinetic theory of gases ? Deduce the equation $PV = \frac{1}{3} mnc^2$ with the help of this theory. Define γ for gases. Deduce for a perfect gas, $C_p - C_v = R$.
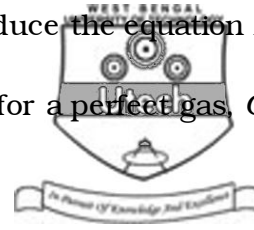
4 + 5 + 2 + 4

11. What is the difference between physical and chemical adsorptions ? Explain with examples the process of capillary condensation. Briefly describe Langmuir's adsorption isotherm. Describe Nernst Partition Law and state how molecular association or dissociation affects the partition coefficient. What is the importance of partition coefficient in *in vitro* studies of pharmaceuticals ?

3 + 1 + 4 + 2 + 2 + 3

12. What are the postulates in quantum mechanics ? Explain Joblinoski diagram in brief. What is the difference between phosphorescence and fluorescence ?

7 + 5 + 3

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END