



Faculty of Health Sciences
Bachelor of Science Honours in Industrial Pharmaceutical Science
IPS 2133 – Physical Pharmacy
Batch – 08
2nd year 1st semester
End Semester SEQ Examination

Date: 01st September 2025

Time: 09.00 a.m. – 12.00 p.m. (Three hours)

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **SIX** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink.

Question – 01

(100 marks)

- 1.1 Tabulate the inter-conversion between the basic states of matter due to change in temperature. (30 marks)
- 1.2 Write the ideal gas law along with the equation. (20 marks)
- 1.3 What are the disadvantages / limitations of thermodynamics? (20 marks)
- 1.4 Mention the differences between thermodynamic reversible & irreversible processes. (30 marks)

Question – 02

(100 marks)

- 2.1 Mention **eight (08)** types of heats of reaction. (20 marks)
- 2.2 Outline the function of bomb calorimeter using a diagram. (30 marks)
- 2.3 Write Henry's Law on solubility of gases with the equation. (20 marks)
- 2.4 A solid X is added to a mixture of Benzene and water. After shaking well and allowing it to stand, 10 mL of the benzene layer was found to contain **0.13 g** of X and. If, the partition coefficient of X, found by separating funnel method, is **5.9**, find the concentration of X in 100 ml of water layer. (30 marks)

Question – 03

(100 marks)

- 3.1 Define the following terms.
 - i. Buffer (10 marks)
 - ii. Dynamic equilibrium (10 marks)
 - iii. Buffered isotonic solutions (10 marks)
 - iv. Saturated solution (10 marks)

3.2 Differentiate between molality & molarity. (30 marks)

3.3 Derive the Henderson – Hasselbalch equation. (30 marks)

Question – 04 (100 marks)

4.1 Define the term diffusion and mention its types. (20 marks)

4.2 Write the modified equation of Fick's first law of diffusion with explanation for each element. (30 marks)

4.3 State the importance of measuring the optical rotation. (20 marks)

4.4 Write a short note on dipole moment. (30 marks)

Question – 05 (100 marks)

5.1 State the **two (02)** main factors that affect the refractive index of a substance. (20 marks)

5.2 Briefly outline about one of the factors mentioned above that influences the refractive index. (30 marks)

5.3 Identify the below given **A** and **B** refractometers. (30 marks)



(A)



(B)

5.4 What is the importance of Snell's Law in the field of pharmaceuticals? (20 marks)

Question – 06 (100 marks)

6.1 List **four (04)** characteristics of the solute phase in a solution. (20 marks)

6.2 A sample of NaCl is dissolved in water. If 0.1 mol of NaCl dissociates to form 0.1 mol of Na^+ and 0.1 mol of Cl^- . Calculate the degree of dissociation, using the below equation.

$$\alpha = \frac{\text{Number of moles of ions formed during dissociation}}{\text{Initial number of moles of solute}}$$

(30 marks)

6.3 Outline the colligative properties of electrolyte solutions. (20 marks)

6.4 What is the importance of electrolyte solutions in the pharmaceutical industry? (30 marks)



Faculty of Health Sciences
BSc. (Hons) Industrial Pharmaceutical Science
IPS 2143 Organic Chemistry
Special Repeat Examination
2nd Year 1st Semester- SEQ

Date: 23rd of June 2025

Time: 09.00 am – 12.00 pm - Three Hours

Index Number -

INSTRUCTIONS TO CANDIDATES Page

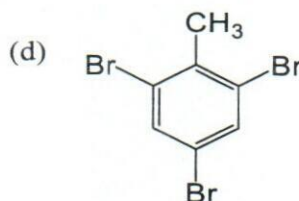
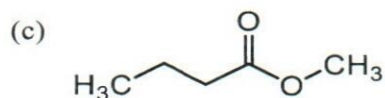
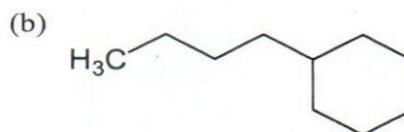
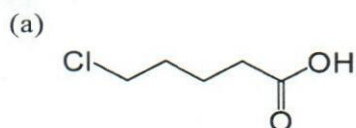
- This question paper consists of **SIX** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink.

Question 01

(100 marks)

1.1 Name the following structures in IUPAC nomenclature.

(20 marks)



- a)
- b)
- c)
- d)

2.2.2 Draw the stereoisomers of 2-bromopropane.

(20 marks)

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2.2.3 Draw the R and S configurations for the chiral carbon in 2-bromopropane.

(10 marks)

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Question 03

(100 marks)

3.1 Draw the structure of a tertiary alcohol and find the hybridization, bonding and non-bonding electrons.

(20 marks)

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3.2 Briefly describe the structural difference between allylic alcohols and vinylic alcohols.

(20 marks)

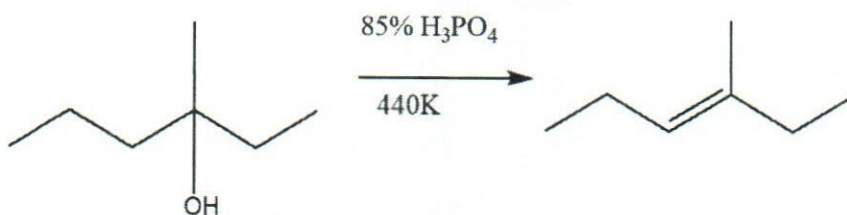
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3.3 Propose a mechanism for the following conversion. Show all the structures of the intermediates involved.

(40 marks)



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3.4 What is the reason to have high boiling points in alcohols compare to alkanes?

(20 marks)

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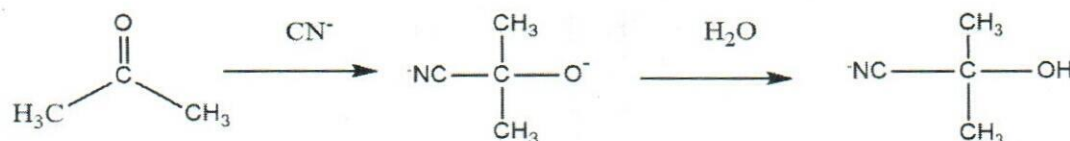
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Question 04

(100 marks)

4.1 Draw the mechanism of the nucleophilic addition reaction mechanism (given below) leading to the formation of an alcohol via an alkoxide. (30 marks)



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4.2 Propose synthetic schemes for the following conversions. Show all the reagents and the structures of the intermediates involved. (40 marks)

4.2.1



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4.2.2



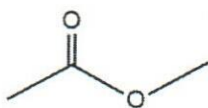
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4.3 Draw the resonance structures of the following organic molecule.

(30 marks)



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Question 05

(100 marks)

5.1. Stability of benzene and related compounds can be compared with fully saturated cyclohexane. Calculate the resonance energy of benzene, based on the heat of hydrogenations (ΔH_h) given below. (25 marks)

Heat of hydrogenation (ΔH_h) of cyclohexatriene = 360 kJ/mol

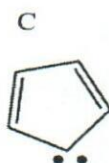
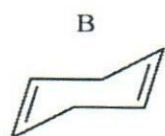
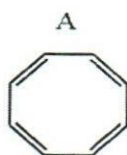
Heat of hydrogenation (ΔH_h) of benzene = 208 kJ/mol

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5.2 Classify the given A, B and C molecules as aromatic, anti-aromatic and non-aromatic. What is the reasons for the choice? (15 marks)



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5.3 Why phenols have much higher boiling point than their corresponding hydrocarbons?

(20 marks)

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5.4 Propose synthetic schemes for the following conversions. Show all the reagents and the structures of the intermediates involved.

(40 marks)



Question 06

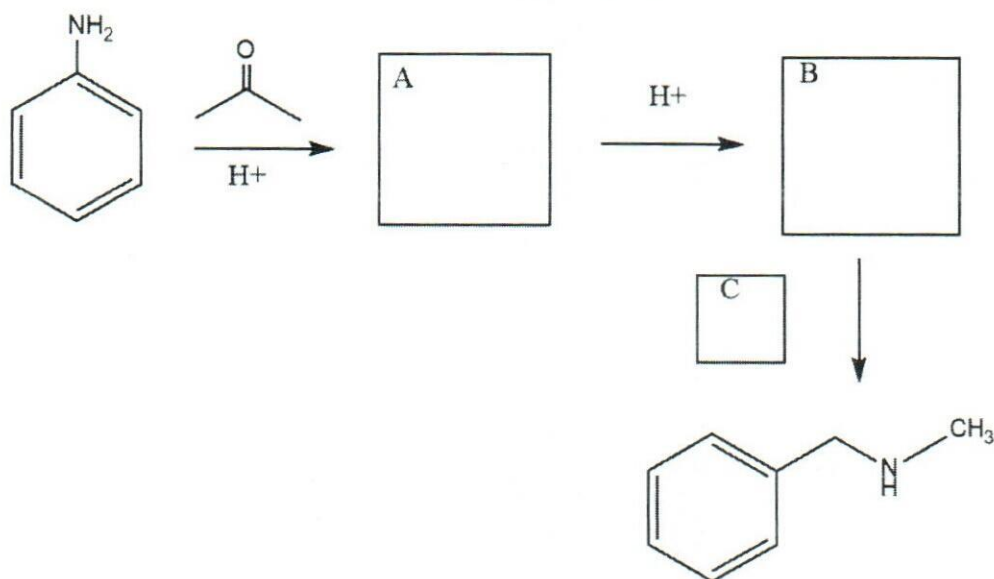
(100 marks)

6.1 Given that the pKa value of p-nitroaniline is 1.0 and the pKa value of aniline is 4.6. What is the difference between the pKa values?

(25 marks)

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6.2 Identify the missing intermediates and the final product of the reductive amination mechanism. (30 marks)

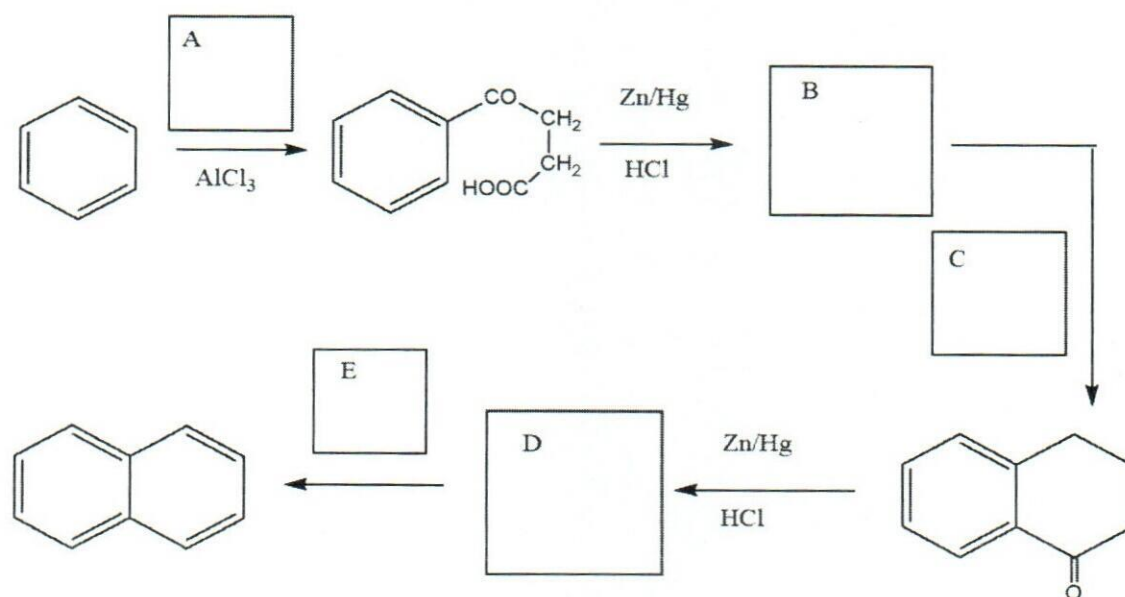


6.3 State two sources of poly aromatic hydrocarbons. (20 marks)

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6.4 Draw the structures of intermediates/ reagents, A-E in the following scheme which shows the Haworth Synthesis of naphthalene. (25 marks)



-THE END-



Faculty of Health Sciences
Bachelor of Science Honours in Industrial Pharmaceutical Science

IPS 2113 Anatomy and Physiology I
2nd year 1st semester
Special Repeat Assignment Examination
4th Batch

Date	: 19th June 2025
Time	: 1.30 p.m. – 2.30 p.m. (One hour)

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **TWO** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink.

Question 1

(100 marks)

- 1.1 Discuss the importance of thoracic cage in breathing. (25 marks)
- 1.2 “Myocardium in ventricles are thicker than the wall of atria”. What is the reason for that? (25 marks)
- 1.3 Describe features of mediastinum. (25 marks)
- 1.4 Write a short note on heart murmur (25 marks)

Question 2

(100 marks)

- 2.1 Describe the general characters of epithelial tissues. (25 marks)
- 2.2 Explain the importance of respiratory epithelium related to its function. (25 marks)
- 2.3 Write a short note on passive transport systems (25 marks)
- 2.4 Briefly describe the conduction system of the heart. (25 marks)



Faculty of Health Sciences
Bachelor of Science Honours in Industrial Pharmaceutical Science
Special Repeat Examination- 2nd year 1st semester
Anatomy and Physiology I
IPS 2113
SEQ Examination
4th Batch

Date : 19th June 2025
Time : 9.00 a.m. – 11.00 a.m. (Two Hours)

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **FOUR** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink.

Question 1

(100 marks)

1.1 Write one function of each of the following cell organelle.

1.1.1 Smooth endoplasmic reticulum

(10 marks)

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1.1.2 Ribosome

(10 marks)

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1.1.3 Golgi apparatus

(10 marks)

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1.1.4 Lysosome

(10 marks)

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1.1.5 Mitochondria

(10 marks)

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1.2 Compare antiport and symport transport.

(15 marks)

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1.3 Write two (02) differences between endocytosis and exocytosis. (20 marks)

1.4 Define the term oedema. (15 marks)

Question 2 (100 marks)

2.1 Compare the following.

2.1.1 Mechanical and Chemical digestion (25 marks)

2.1.2 Pericardium and Myocardium (25 marks)

2.1.3 Right bronchus and Left bronchus (25 marks)

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2.1.4 Right lung and Left lung

(25 marks)

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Question 3

(100 marks)

3.1 List the constituents in gastric juice.

(25 marks)

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3.2 Illustrate the structure of a hepatic lobe.

(25 marks)

3.3 Outline the functions of liver.

(25 marks)

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3.4 State the structural diversity of animal cells, based on their functions, by giving 2 examples. (25 marks)

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Question 4

(100 marks)

4.1 Define following terms.

4.1.1 True Ribs

(20 marks)

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4.1.2 False Ribs

(20 marks)

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4.2 Names all bones in upper limbs.

(20 marks)

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4.3 "Myocardium in left ventricle is thicker than the wall of right ventricle". What is the reason for that? (20 marks)

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4.4 Write a short note on the exocrine pancreas.

(20 marks)

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Faculty of Health Sciences
Bachelor of Science Honours in Industrial Pharmaceutical Science
Special Repeat Examination- 2nd year 1st semester
Anatomy and Physiology I
IPS 2113
MCQ/BRQ Examination
4th Batch

Date : 19th June 2025
Time : 11.00 a.m. – 12.00 p.m. (One Hour)

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **Twenty** questions.
- Answer **ALL** questions.
- **Question No. 01- 08 contains a single answer** and selects the most appropriate answer among give five statements.

Ex:

1	2	3	4	5
		X		

- **Question No. 09- 20, consist of Five statements** and you need to select and mark either **True (T)** or **False (F)** in each statement.

Ex:

X	T	X	X	T
F	X	F	F	X

- You should write legibly in black or blue ink.
- You are not allowed to take out the examination papers.

1. Which blood vessel wall contains only endothelium?

1. Artery
2. Arteriole
3. Capillary
4. Venule
5. Vein

2. Which component in the conducting system involves for ventricle contraction?

1. SA node
2. AV node
3. Internodal pathway
4. AV bundle
5. Purkinje fibers

3. Cell organelle important in lipid metabolism,

1. Lysosome
2. Smooth endoplasmic reticulum
3. Mitochondria
4. Rough endoplasmic reticulum
5. Ribosome

4. In which mitosis phase chromosomes line up across center of the cells?

1. Interphase
2. Prophase
3. Metaphase
4. Anaphase
5. Telophase

5. Which vertebrae is having a heart shaped vertebral body?

1. Atlas
2. Axis
3. Cervical
4. Lumbar
5. Thoracic

6. What is the thickest layer of heart wall?

1. Fibrous pericardium
2. Parietal layer of the serous pericardium
3. Visceral layer of the serous pericardium
4. Myocardium
5. Endocardium

7. A cardiac valve with two flaps,

1. Mitral valve
2. Tricuspid valve
3. Aortic valve
4. Semilunar valve
5. Pulmonary valve

8. What is the best transport mechanism for glucose transportation?

1. Facilitated diffusion
2. Simple diffusion
3. Cotransport system
4. Exocytosis
5. Endocytosis

9. True or false?

1. Radius is the longest bone.
2. Arm consists of one long bones.
3. There are 30 bones in both upper limbs.
4. The size of the axilla region varies with arm abduction.
5. There are eight carpal bones.

10. Regarding the transport systems through the cell membrane,

1. Facilitated diffusion follows a concentration gradient.
2. Osmosis is the passive movement of water across a semi-permeable membrane.
3. Active transport follows a concentration gradient.
4. Oxygen can be transported by simple diffusion.
5. Facilitated diffusion is a active process.

11. The trachea,

1. Contains hyaline cartilages.
2. lies posterior to the oesophagus.
3. lies posterior to the thyroid gland.
4. consists of stratified ciliated columnar epithelium.
5. is made by trachealis muscle in the anterior side.

12. True or false regarding body fluids?

1. It constitutes 55% of female total body weight.
2. Extra cellular body fluids can be increased with age.
3. Infants contain a greater amount of extracellular fluid than intracellular fluid.
4. Body water important for thermoregulation.
5. Intracellular fluids contain more protein.

13. In nasal cavity,

1. nasal conchae project laterally from the medial wall.
2. there are two meatus.
3. olfactory mucosa contains receptors for smell.
4. mucosa contains pseudostratified columnar ciliated epithelium.
5. conchae provide large surface area for humidification of air.

14. Regarding the atrioventricular (AV) node in heart,

1. It serves as the pacemaker for the heart.
2. It directs the cardiac impulse from the atria to the ventricles.
3. From the AV node, the action potential enters the bundle of his.
4. It delays the transmission of the cardiac impulse.
5. AV node can directly contract the ventricles in the heart.

15. True or false regarding secretions present in the digestive tract?

1. Pancreatic juice is an acidic secretion.
2. Gastric juice activates pepsinogen.
3. Fats are emulsified by bile.
4. Saliva secretions are slightly acidic.
5. Chief cells secrete HCl.

16. Compare to the plasma, serum,

1. does not contain clotting factors.
2. needs anticoagulants for separation.
3. has less volume.
4. is acquired from the process of spinning before clotting.
5. consumes more time to separate.

17. True or false regarding breathing?

1. Diaphragm flattens in inspiration.
2. Contraction of external intercostal muscles lift the ribs.
3. Normal expiration is an active process.
4. The size of the thoracic cavity decreases in inspiration.
5. Intercostal muscles relax in inspiration.

18. In cell division,

1. spindle fibres start to disappear in telophase.
2. chromosomes line up across the center of the cell.
3. cytoplasm starts to divide into metaphase.
4. chromosomes travel to opposite ends of cells in prophase.
5. mitosis makes four identical cells.

19. True or false regarding human lungs?

1. The right lung is smaller than the left lung.
2. The left lung contains two fissures.
3. Inferior lobe of right lung contains lingula.
4. Medial surface contains a hilum.
5. Apex rises into the root of the neck.

20. True or false regarding cell death?

1. Necrosis is a process of programmed cell death.
2. Apoptosis is an essential event in development.
3. Cells are killed by external events in necrosis.
4. Blebbing of cell membrane can be seen in apoptosis.
5. Apoptosis is important for cellular homeostasis.



Faculty of Health Sciences
Bachelor of Science Honours in Industrial Pharmaceutical Science
Special Repeat Examination- 2nd year 1st semester
Anatomy and Physiology I
IPS 2113
MCQ/BRQ Examination
4th Batch

Index No:

Date : 19th June 2025
 Time : 11.00 a.m. – 12.00 p.m. (One Hour)

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **Twenty** questions.
- Answer **ALL** questions.
- **Question No. 01- 08 contains a single answer** and select most appropriate answer among give five statements.

Ex:

1	2	~~3~~	4	5
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- **Question No. 09- 20, consist of Five statements** and you need to select and mark either **True (T)** or **False (F)** in each statement.

Ex:

~~T~~	T	~~T~~	~~T~~	T
F	~~F~~	F	F	~~F~~

- You should write legibly in black or blue ink.
- You are not allowed to take out the examination papers

Select the best response for the questions from 01 to 08.

1.

1	2	3	4	5
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2.

1	2	3	4	5
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3.

1	2	3	4	5
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4.

1	2	3	4	5
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5.

1	2	3	4	5
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6.

1	2	3	4	5
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7.

1	2	3	4	5
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8.

1	2	3	4	5
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Mark True 'T' or False 'F' for each response from question number 09 to 20.

9.

T	T	T	T	T
F	F	F	F	F

10.

T	T	T	T	T
F	F	F	F	F

11.

T	T	T	T	T
F	F	F	F	F

12.

T	T	T	T	T
F	F	F	F	F

13.

T	T	T	T	T
F	F	F	F	F

14.

T	T	T	T	T
F	F	F	F	F

15.

T	T	T	T	T
F	F	F	F	F

16.

T	T	T	T	T
F	F	F	F	F

17.

T	T	T	T	T
F	F	F	F	F

18.

T	T	T	T	T
F	F	F	F	F

19.

T	T	T	T	T
F	F	F	F	F

20.

T	T	T	T	T
F	F	F	F	F

Faculty of Health Sciences
Bachelor of Science Honors in Industrial Pharmaceutical Science
IPS 2133 - Physical Pharmacy
Batch 04
2nd Year 1st Semester
End Semester (Special Resit) Examination - SEQ

INDEX NUMBER:

Date : 20th of June 2025

Time : 9.00 a.m. – 11.00 a.m. (Two hours)

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **FOUR** questions.
- Answer **ALL** the questions on this paper itself.
- Final answers should be given legibly in black or blue ink.
- You are allowed to use non-programmable calculators.

Question 01

(100 marks)

1.1 List **four (04)** characteristics of solutes in a solution.

(20 marks)

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1.2 State the Nernst distribution law.

(20 marks)

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1.3 How does the common ion effect influence the solubility of solutes in liquids?

(25 marks)

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1.4 Classify different polymers based on their connectivity, with examples. (35 marks)

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Question 02 (100 marks)

2.1 What is electrolysis? (15 marks)

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2.2 Why does the conductivity of an electrolytic solution increase with the temperature? (20 marks)

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2.3 Boiling point elevation is a colligative property of solutions.

2.3.1 A solution is prepared by dissolving 0.5 moles of sodium chloride in 500 g of water. The boiling point of pure water at the given atmospheric pressure is 100 °C. Calculate the boiling point elevation of the water. (Ebullioscopic constant of water = 0.512 K kg/mol) (25 marks)

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2.3.2 Write **two (02)** assumptions you made during the calculation. (10 marks)

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2.4 "Dielectric constant is important in assessing packaging materials, which can impact the stability of formulations." Justify this statement. (30 marks)

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Question 03 (100 marks)

3.1 List **three (03)** types of refractometers. (15 marks)

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3.2 Outline the applications of refractive index in pharmaceuticals. (20 marks)

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3.3 What is sodium chloride equivalent method of tonicity adjustment? (25 marks)

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3.4 A specific buffer solution contains an equal concentration of A^- and AX . The K_b for A^- is 10^{-10} .
What is the pH of the buffer solution? (40 marks)

Question 04

(100 marks)

4.1 State the second law of thermodynamics. (15 marks)

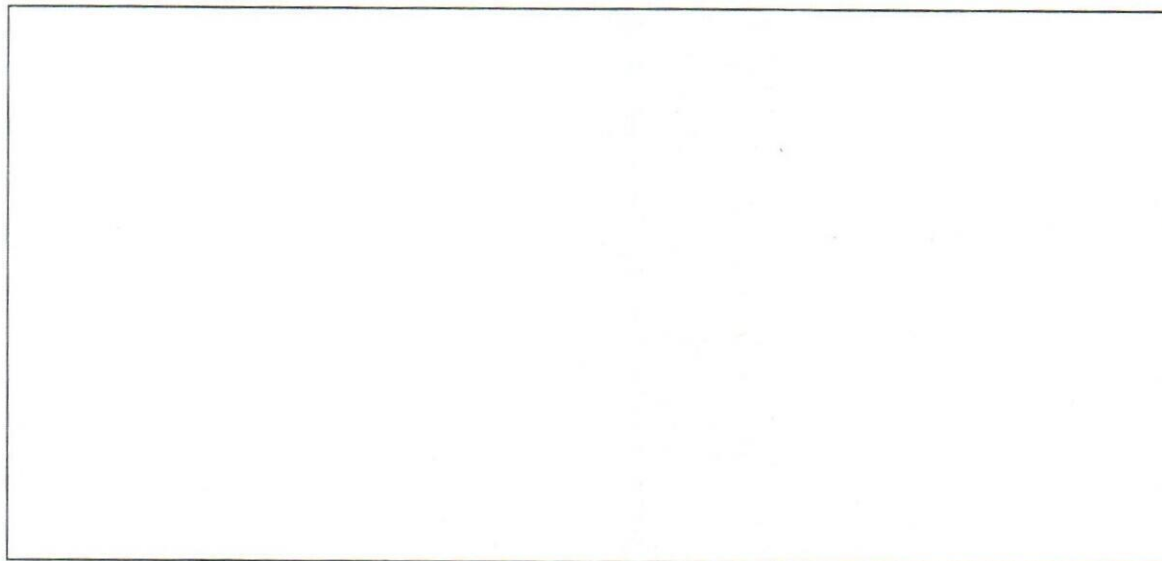
4.2 Differentiate endothermic and exothermic reactions. (20 marks)

4.3 Why polymorphs are important in pharmaceutical industry? (30 marks)

4.4 A phase diagram is a graphical representation of the physical states of a substance under different conditions of temperature and pressure.

4.4.1 Illustrate the phase diagram of water in the given space.

(15 marks)



4.4.2 Clearly mark following on the diagram you illustrated above.

(4 x 5 marks)

- A. Triple point
- B. Critical point
- C. A point where condensation happens
- D. A point where freezing happens
