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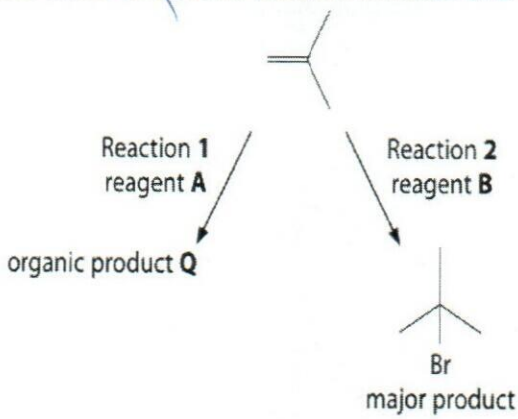
Faculty of Health Sciences
BSc. (Hons) Industrial Pharmaceutical Sciences, BSc. (Hons) Cosmetic Sciences,
BSc. (Hons) in Medical & Health Product Management
IPS 2143 /BCS 2143/MHPM 2133 Organic Chemistry
End Semester Examination- SEQ
2nd Year 1st Semester
9th Batch

Date: 2nd of July 2026
Time: 09.00 am – 12.00 noon - Three Hours

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)**

Answer the following questions based on the two reaction schemes of 2-methylpropene given below.



1.1 In Reaction 1 the reagent A is acidified potassium manganate(VII). Give the skeletal formula of organic product Q. (10 marks)
1.2 What is the name of reagent B? (10 marks)
1.3 Draw the reaction mechanism for Reaction 2. (20 marks)
1.4 Explain why 2-bromo-2-methylpropane is the major organic product in Reaction 2. (30 marks)
1.5 Analyse how does the structure of 2-methylpropene influence its likelihood to undergo SN1 mechanism compared to but -1-ene with the presence of electrophiles. (30 marks)

Question 02 **(100 marks)**

2.1. Sketch the graph of the rotational barrier in ethane (CH_3CH_3) as a function of dihedral angle. (30 marks)

2.2. Draw the **four (04)** structural isomers of C_6H_{12} with a ring of four carbon atoms. (20 marks)

2.3. Compounds A, B, C and D all have the molecular formula C_4H_8.Compound A, B and C each contain one double bond, but D does not. A and B are geometric isomers of each other.

2.3.1 Draw a possible structure for each compound. (40 marks)

2.3.2 List **two (02)** reasons why compounds A and B exist as geometric isomers. (10 marks)

Question 03 **(100 marks)**

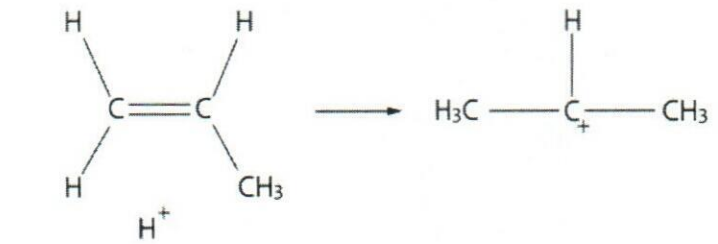
3.1 Propene reacts with bromine monochloride (BrCl) to form 1-bromo-2-chloropropane as the major product.

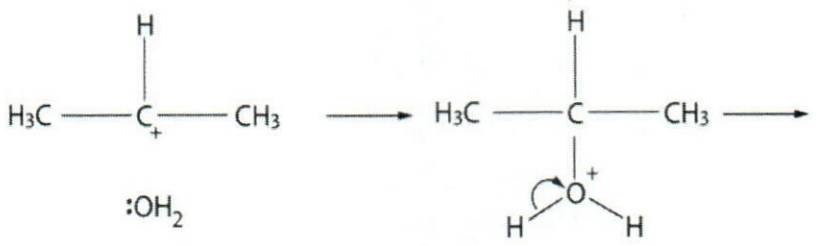
3.1.1 Complete the diagram of bromine monochloride to show the dipole. (5 marks)

Br ——— Cl

3.1.2 Draw the mechanism for the formation of 1-bromo-2-chloropropane in this reaction. Including arrows and relevant lone pairs. (20 marks)

3.2 Propene reacts with steam in the presence of an acid catalyst to form a mixture of propan-1-ol and propan-2-ol. Complete the mechanism for the formation of propan-2-ol by adding arrows and write the compound formed in the final step. (25 marks)





3.3 Using A as the only carbon source how would you bring about the following conversion? Give reagents and intermediates for the conversion. (30 marks)

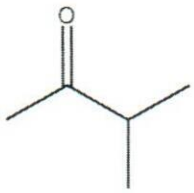


3.4 Briefly explain the reason to have high boiling points in alcohols compared to alkanes. (20 marks)

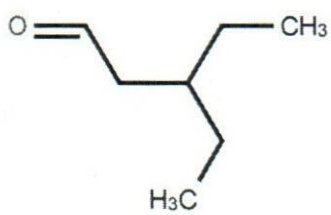
Question 04 **(100 marks)**

4.1 Write the correct IUPAC name for the following chemical structures. (40 Marks)

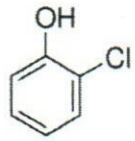
4.1.1



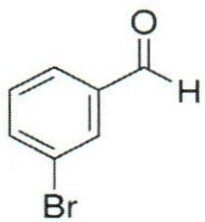
4.1.2



4.1.3

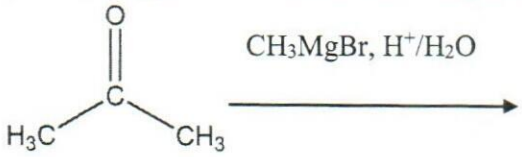


4.1.4

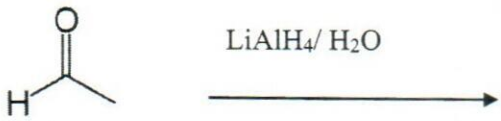


4.2 Predict the resulting product(s) of the following reactions of aldehydes and ketones. (30 marks)

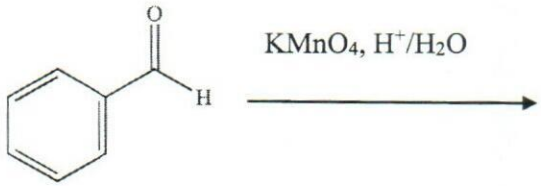
4.2.1



4.2.2



4.2.3



4.3 Draw the correct mechanism of the following reactions.

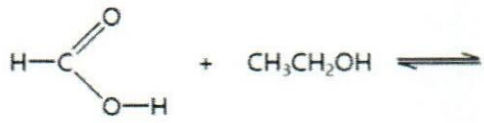
4.3.1 Reaction of 2- methylpropanal with hydrogen cyanide. (15 Marks)

4.3.2 Reaction of acetone with sodium hydroxide. (15 marks)

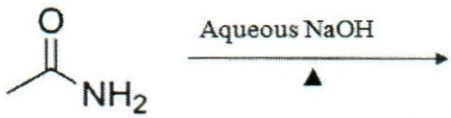
Question 05 **(100 marks)**

5.1. Predict the resulting product(s) of the following reactions of carboxylic acids and phenols. (30 marks)

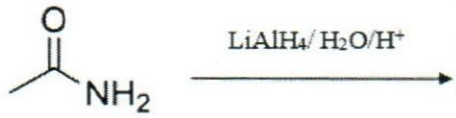
5.1.1



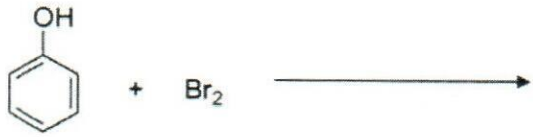
5.1.2



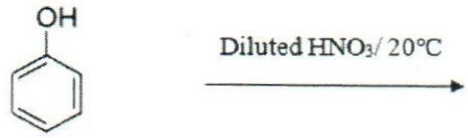
5.1.3



5.1.4

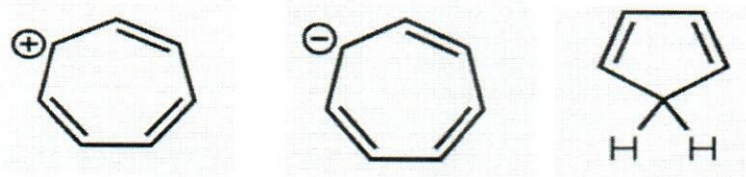


5.1.5



5.2 Explain using the resonance structures why phenol undergoes electrophilic substitution predominantly at the ortho and para positions (Represent the electrophile as E^+). (40 Marks)

5.3 Classify the given A, B and C molecules as aromatic, anti-aromatic and non-aromatic. Briefly explain the reasons for the choice. (30 marks)

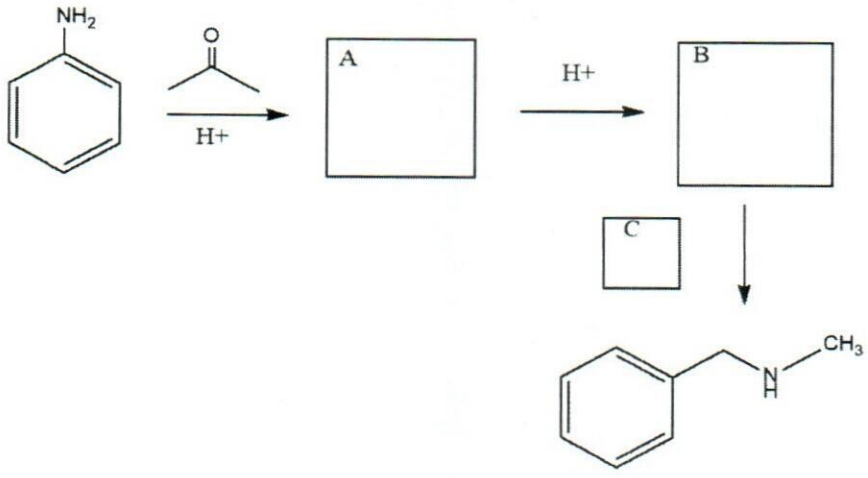


A B C

Question 06 **(100 marks)**

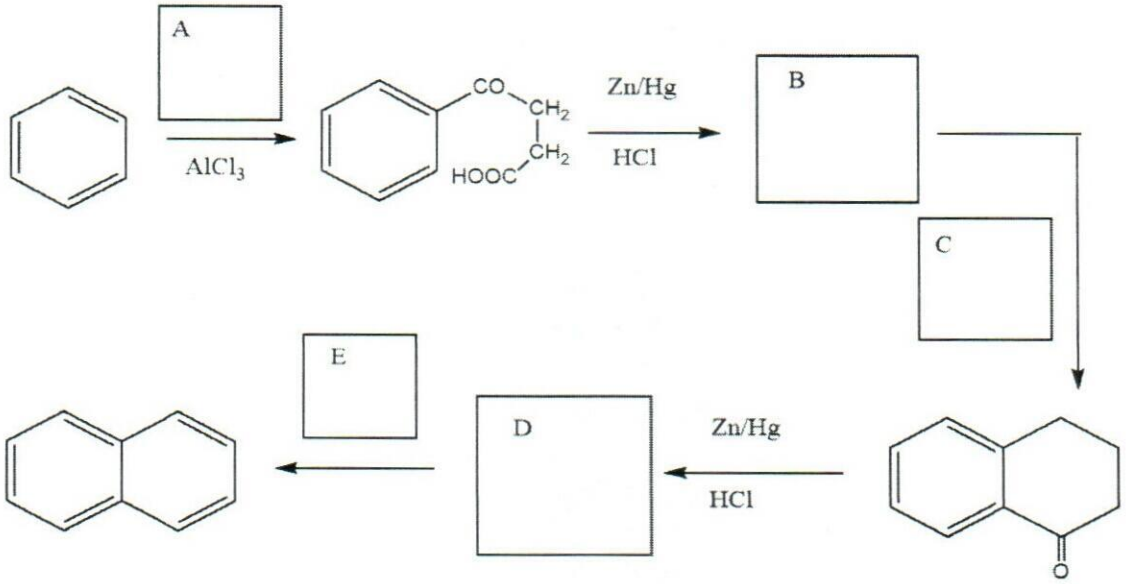
6.1 Given that the pKa value of p-nitroaniline is 1.0 and the pKa value of aniline is 4.6. Briefly explain the difference between the pKa values. (25 marks)

6.2 Identify A, B & C in the following reductive amination mechanism. (30 marks)



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

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



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Faculty of Health Sciences

Bachelor of Science Honours in Biomedical Sciences/ Bachelor of Science Honours in Industrial Pharmaceutical Sciences/ Bachelor of Science Honours in Cosmetic Science/ Bachelor of Science Honours in Medical and Health Product Management

BMS 2123 / IPS 2123 / BCS 2123/ MHPM 2123 – Biochemistry I

Batch – 09

2nd Year 1st Semester

End semester SEQ Examination

Date : **24th of June 2026**

Time : **9.00 am. – 12.00 pm (Three Hours)**

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **SIX** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink.
- You are allowed to use a scientific calculator for the examination.

QUESTION 01 **(100 marks)**

1.1. Describe the structure and function of membrane lipids in the plasma membrane. (30 marks)

1.2. Differentiate between facilitated diffusion and active transport. (20 marks)

1.3.State the role of second messengers in cell signaling. (20 marks)

1.4. Draw a flow chart to denote the signal transduction pathway of adrenaline hormone. (30 marks)

QUESTION 02 **(100 marks)**

A 40-year-old woman presents with exercise intolerance, muscle cramps, and fatigue. Laboratory investigations reveal reduced oxygen consumption and decreased ATP production. Further analysis indicates a defect in mitochondrial oxidative phosphorylation.

2.1.Draw a labelled diagram of the mitochondrial electron transport chain indicating the locations of Complexes I–IV and ATP synthase. (30 marks)

2.2. Describe how oxidative phosphorylation is coupled to ATP synthesis. (25 marks)

2.3.Discuss the metabolic consequences of impaired oxidative phosphorylation in skeletal muscle. (25 marks)

2.4.Differentiate between substrate-level phosphorylation and oxidative phosphorylation. (20 marks)

QUESTION 03 **(100 marks)**

3.1. State three (03) enzymes involved in gluconeogenesis. (15 marks)

3.2. Compare and contrast between glycogenesis and glycogenolysis. (30 marks)

3.3. Mention five (05) physiological conditions that stimulate gluconeogenesis. (15 marks)

3.4. Name three (03) hormones involved in the regulation of blood glucose concentration. (15 marks)

3.5. Discuss the role of insulin in regulating carbohydrate metabolism. (25 marks)

QUESTION 04 **(100 marks)**

4.1. Classify the following carbohydrates according to their functional groups. (15 marks)

4.1.1. Ribose

4.1.2. Fructose

4.1.3. Maltose

4.2.Discuss the regulation of glycolysis by allosteric enzymes and hormones. (30 marks)

4.3.Write a short note on biomedical importance of polysaccharides. (25 marks)

4.4.Briefly explain the significance of pentose phosphate pathway in human metabolism. (30 marks)

QUESTION 05 **(100 marks)**

5.1 Explain hormone induced fatty acid mobilization in adipocytes. (35 marks)

5.2 List followings based on beta oxidation of fatty acids in eukaryotes.

5.2.1 Location (5 marks)

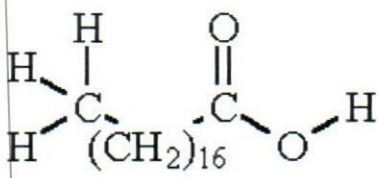
5.2.2 Substrates (5 marks)

5.2.3 Products of one cycle (5 marks)

5.3 How many ATP molecules can be maximally produced from the complete beta oxidation of a 17 carbon fatty acid? (Suppose 1 NADH = 2.5 ATP and 1 $FADH_2$ = 1.5 ATP) (50 marks)

QUESTION 06 **(100 marks)**

6.1 Draw the structure of the triglycerides made by stearic acid. The structure of stearic acid is as follows. (25 marks)



$C_{18}H_{36}O_2$

6.2 Compare and contrast delta nomenclature and omega nomenclature of fatty acids. (25 marks)

6.3 State the biochemical difference of abdominal fat and gluteal fat. (25 marks)

6.4 Mention the importance of statin drugs with the cholesterol metabolism pathway. (25 marks)

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BMS 2123 / IPS 2123 / BCS 2123/ MHPM 2123 – Biochemistry I

Batch – 09

2nd Year 1st Semester

End semester SEQ Examination

Date : **24th of June 2026**

Time : **9.00 am. – 12.00 pm (Three Hours)**

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4.4.Briefly explain the significance of pentose phosphate pathway in human metabolism. (30 marks)

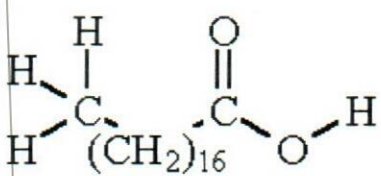
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- 5.2.2 Substrates (5 marks)
- 5.2.3 Products of one cycle (5 marks)

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$C_{18}H_{36}O_2$

6.2 Compare and contrast delta nomenclature and omega nomenclature of fatty acids. (25 marks)
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6.4 Mention the importance of statin drugs with the cholesterol metabolism pathway. (25 marks)

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Faculty of Health Sciences
Bachelor of Science Honours in Biomedical Sciences/ Industrial Pharmaceutical Science/ Cosmetic Science/ Medical & Health Product Management
BMS/ IPS/ BCS/ MHPM 2123 – Biochemistry I
Batch – 09
2nd Year 1st Semester
Mid semester MCQ/BRQ Examination

Date : **31st of March 2026**
Time : **09.00 a.m. – 10.00 a.m. (One Hour)**

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **Twenty MCQ** questions.
- Answer **ALL** questions.
- Select the **single best response** for the questions from 01 to 05.
- Mark **True 'T'** or **False 'F'** for each response from question number 06 to 20.
- You should write legibly in black or blue ink.

1. Which enzyme catalyzes the conversion of glucose-6-phosphate to glucose in the liver?
   a) Hexokinase
   b) Glucose-6-phosphatase
   c) Phosphoglucomutase
   d) Glucokinase
   e) Phosphofructokinase-1

2. Which glycogen storage disease is caused by deficiency of glucose 6 phosphatase enzyme ?
   a) Von Gierke's disease
   b) Pompe disease
   c) Cori disease
   d) Andersen disease
   e) McArdle disease

3. Which of the following is the aldose sugar?
   a) Fructose
   b) Ribulose
   c) Glucose
   d) Sucrose
   e) Mannitol

4. Which metabolic pathway is predominantly activated in the liver during fasting ?
   a) Glycolysis
   b) Gluconeogenesis
   c) Fatty acid synthesis
   d) Glycogenesis
   e) Pentose phosphate pathway

5. Which polysaccharide is primarily used for energy storage in animals?
   a) Cellulose
   b) Glycogen
   c) Starch
   d) Chitin
   e) Hyaluronic acid

Mark 'True' or 'False' for each response from question number 06 to 20.

6. "True" or "False" regarding glycolysis regulation?
   a) Phosphofructokinase-1 is the rate-limiting enzyme.
   b) High ATP levels inhibit phosphofructokinase-1.
   c) Fructose-2,6-bisphosphate inhibits phosphofructokinase-1.
   d) AMP activates phosphofructokinase-1.
   e) Citrate is an allosteric activator of phosphofructokinase-1.

7. "True" or "False" regarding the pentose phosphate pathway (PPP)?
   a) Glucose-6-phosphate is the starting substrate.
   b) NADPH is produced in the oxidative branch.
   c) Ribose-5-phosphate is used for nucleotide synthesis.
   d) It is active mainly in liver, adipose tissue, and adrenal cortex.
   e) This is the main pathway for ATP production.

8. "True" or "False" regarding pyruvate dehydrogenase complex (PDC)?
   a) PDC converts pyruvate to acetyl-CoA.
   b) Thiamine pyrophosphate is a required cofactor.
   c) Lipoic acid functions as a coenzyme.
   d) NAD^+ is reduced to NADH during the reaction.
   e) Coenzyme A is not required.

9. "True" or "False" regarding glycogen metabolism?
   a) Glycogen synthase forms α-1,4 bonds.
   b) Branching enzyme forms α-1,6 linkages.
   c) Glycogen phosphorylase cleaves α -1,6 bonds.
   d) Debranching enzyme has transferase and glucosidase activities.
   e) Glucose-6-phosphatase is required in liver to release free glucose.

10. True or false regarding G protein linked membrane receptors?
    a) consists of an area to bind to the substrate.
    b) progesterone hormone is able to bind to G-protein linked receptor.
    c) usually peptide hormones bind to G-protein linked receptors.
    d) G protein is activated when GTP is bound to it.
    e) is important for the hydrophobic signal transduction pathway.

11. "True" or "False" regarding pyruvate carboxylase?
    a) converts pyruvate to oxaloacetate.
    b) requires biotin as a cofactor.
    c) active in gluconeogenesis.
    d) inhibited by acetyl-CoA.
    e) found in mitochondria.

12. "True" or "False" regarding the citric acid cycle?
    a) occurs in the mitochondrial matrix.
    b) produces NADH, $FADH_2$, and GTP.
    c) succinyl-CoA is a precursor for heme synthesis.
    d) oxaloacetate condenses with acetyl-CoA to form citrate.
    e) directly generates large amounts of ATP.

13. "True" or "False" regarding NADH and $FADH_2$?
    a) produced in glycolysis and citric acid cycle.
    b) donate electrons to the electron transport chain.
    c) directly used to synthesize glycogen.
    d) oxidation of NADH and $FADH_2$ produces ATP.
    e) NADH produces more ATP per molecule than $FADH_2$.

14. "True" or "False" regarding lactate ?
    a) produced during anaerobic glycolysis.
    b) it is converted to glucose in the liver via the Cori cycle.
    c) accumulation of it causes muscle fatigue.
    d) lactate dehydrogenase catalyzes lactate conversion to pyruvate.
    e) it is produced in mitochondria.

15. Which of the following is/are true regarding membrane transport systems?
    a) Uniport transport involves movement of a single molecule.
    b) Symport systems transport two molecules in opposite directions.
    c) Primary active transport directly uses ATP hydrolysis.
    d) Facilitated diffusion requires carrier proteins.
    e) Secondary active transport depends on ion gradients.

16. Which of the following is/are true regarding ion transport across membranes?
    a) The Na^+/K^+-ATPase transports 3 Na^+ out and 2 K^+ into the cell.
    b) Ion channels always require ATP to function.
    c) Voltage-gated channels open in response to changes in membrane potential.
    d) Calcium ions are stored in the endoplasmic reticulum and released when needed.
    e) Secondary active transport can utilize sodium gradients.

17. Select true/false regarding the fluidity of the cell membrane,
    a) the concentration gradient decreases fluidity.
    b) unsaturated fatty acids tails will decrease fluidity.
    c) shorter fatty acid tails will decrease fluidity.
    d) cholesterol molecules increase fluidity.
    e) fluidity is increased by the protein composition of the membrane.

18. Select true/false regarding reducing and non-reducing sugars,
    a) Blue precipitate in Benedict's test indicates a reducing sugar.
    b) Fehling's test uses aqueous $CuSO_4$.
    c) Barfoed's test distinguishes reducing monosaccharides from polysaccharides.
    d) Sugars with a free aldehyde group are reducing sugars.
    e) Fehling's test identifies reducing sugars.

19. True or False regarding the signal transduction pathway?
    a) Adenylyl cyclase converts G protein to cycle AMP.
    b) pituitary hormone signals via the hydrophilic pathway.
    c) Oestrogen binds with the hormone receptor complex.
    d) epinephrine involves cyclic AMP for the signal transduction.
    e) calcitonin hormone binds with extracellular receptors.

20. Select true/false regarding second messengers?
    a) cAMP is synthesized from ATP.
    b) Calcium ions act as a second messenger.
    c) participate in pathways initiated by G-protein-linked receptors
    d) always membrane-bound molecules.
    e) rapidly amplify extracellular signals to coordinate complex cellular responses.

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Bachelor of Science Honours in Medical Health Product Management
BMS 2113/ IPS 2113/ BCS 2113/ MHPM 2113
Anatomy and Physiology I
2nd Year 1st Semester

Mid Semester BRQ/MCQ Examination

9th Batch

Date	**:**	**30th March 2026**
Time	**:**	**9.00 a.m. – 10.00 a.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 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:
-

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

1. Which organelle is most directly responsible for modifying and packaging proteins for secretion? **(5 marks)**

1. Mitochondria
2. Lysosome
3. Golgi apparatus
4. Nucleus
5. Smooth endoplasmic reticulum

2. **What is the epithelial type is best suited for rapid diffusion?** **(5 marks)**
   1. Stratified squamous epithelium
   2. Simple squamous epithelium
   3. Cuboidal epithelium
   4. Transitional epithelium
   5. Columnar epithelium

3. **Which chamber pumps blood into systemic circulation?** **(5 marks)**
   1. Right atrium
   2. Right ventricle
   3. Left atrium
   4. Left ventricle
   5. Coronary sinus

4. **What is the primary site of gas exchange?** **(5 marks)**
   1. Bronchi
   2. Trachea
   3. Alveoli
   4. Larynx
   5. Pharynx

5. **What is the structure preventing alveolar collapse?** **(5 marks)**
   1. Hemoglobin
   2. Surfactant
   3. Mucus
   4. Cartilage
   5. Cilia

6. **What is the type of rib lack anterior attachment to the sternum?** **(5 marks)**
   1. True ribs
   2. False ribs
   3. Floating ribs
   4. First rib
   5. Seventh rib

7. **Which valve prevents backflow into the left atrium?** **(5 marks)**
   1. Tricuspid valve
   2. Pulmonary valve
   3. Aortic valve
   4. Mitral valve
   5. Semilunar valve

8. **Which organelle is the most involved in lipid synthesis and detoxification?** **(5 marks)**
   1. Rough endoplasmic reticulum
   2. Smooth endoplasmic reticulum
   3. Lysosome
   4. Nucleolus
   5. Golgi apparatus

9. True or false regarding cell membrane? (5 marks)

1. The phospholipid bilayer arrangement inherently permits free passage of all polar molecules.
2. Integral proteins contribute directly to both transport and signal transduction.
3. Cholesterol enhances membrane rigidity at all temperatures uniformly.
4. Glycoproteins are essential for cell recognition.
5. Passive diffusion requires ATP to move substances across the membrane.

10. True or false regarding cell organelles? (5 marks)

1. The rough endoplasmic reticulum is primarily involved in lipid synthesis.
2. Mitochondria play a central role in ATP.
3. Lysosomes function optimally at neutral pH conditions.
4. The Golgi apparatus modifies and packages proteins for secretion.
5. Peroxisomes are mainly responsible for protein translation.

11. True or false regarding blood components? (5 marks)

1. Serum contains proteins such as fibrinogen.
2. Neutrophils are primarily involved in antibody production.
3. Mature erythrocytes in humans lack a nucleus.
4. Lymphocytes and monocytes are agranulocytes.
5. Neutrophils have multilobed nucleus.

12. True or false regarding body fluids? (5 marks)

1. Intracellular fluid constitutes the majority of total body fluid.
2. Extracellular fluid includes both plasma and interstitial fluid.
3. Intracellular fluid accounts for approximately two-thirds of total body water.
4. Potassium is predominantly an intracellular cation.
5. Sodium is higher in intracellular fluid than extracellular fluid.

13. True or false regarding regulation of heart valve and blood flow? (5 marks)

1. Blood flows from areas of higher pressure to lower pressure within the heart.
2. The atrioventricular valves open when ventricular pressure exceeds atrial pressure.
3. Semilunar valves open when ventricular pressure surpasses arterial pressure.
4. Pressure in the left ventricle is higher than in the right ventricle during systole.
5. Valve closure is independent of pressure differences.

14. True or false regarding heart conduction system? (5 marks)

1. Electrical impulses travel from the sinoatrial (SA) node to the atrioventricular (AV) node.
2. The SA node is located in the left ventricle.
3. The bundle of His transmits impulses directly to the atria.
4. Purkinje fibers conduct impulses more rapidly than other cardiac tissues.
5. Disruption of the conduction pathway can lead to arrhythmia.

15. True or false regarding heart wall? (5 marks)

1. The endocardium lines the inner surface of the heart chambers.
2. The myocardium is responsible for the contractile function of the heart.
3. The Pericardium forms the outermost layer of the heart wall.
4. The myocardium is thinner in the left ventricle than in the right ventricle.

5. The pericardium provides protection and reduces friction during heart movements.

16. True or false regarding major blood vessels? (5 marks)

1. The aorta carries oxygenated blood from the left ventricle to the body.
2. The pulmonary artery carries deoxygenated blood to the lungs.
3. The superior and inferior vena cava drain into the left atrium.
4. Pulmonary veins return oxygenated blood to the left atrium.
5. The anatomical arrangement of vessels supports a double circulatory system.

17. True or false regarding heart valve? (5 marks)

1. The tricuspid valve is located between the right atrium and right ventricle.
2. The mitral valve is positioned between the left atrium and left ventricle.
3. Semilunar valves are located between atria and ventricles.
4. Valve cusps are supported by chordae tendineae in atrioventricular valves.
5. Structural abnormalities in valves can lead to regurgitation.

18. True or false regarding lung alveoli? (5 marks)

1. Alveoli have thin walls to facilitate diffusion.
2. Alveoli are surrounded by a dense capillary network.
3. Type II alveolar cells produce surfactants.
4. Alveoli have thick muscular walls to generate force.
5. Large surface area of alveoli improves gas exchange efficiency.

19. True or false regarding nasal cavities? (5 marks)

1. Nasal conchae increase surface area for air conditioning.
2. Mucus helps trap dust and microorganisms.
3. Rich vascular supply aids in warming inhaled air.
4. The nasal cavity is lined with epithelium.
5. The nasal cavity has no role in filtering inhaled particles.

20. True or false regarding pleura? (5 marks)

1. The visceral pleura covers the surface of the lungs.
2. The parietal pleura lines the thoracic cavity.
3. The pleural cavity contains fluid that reduces friction.
4. The pleura prevents lung expansion during breathing.
5. Negative pressure in the pleural cavity aids lung expansion.

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Faculty of Health Sciences

Bachelor of Science Honours in Biomedical Sciences /Bachelor of Science Honours in Industrial Pharmaceutical Science / Bachelor of Science in Cosmetic Science

General/ Pharmaceutical/ Cosmeceutical Microbiology (BMS/IPS/BCS/MHPM 2153)

2nd Year 1st Semester -End Examination SEQ -Batch 08

Date : **8 th of September 2025**
Time : **9.00 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 **(Marks 100)**

1.1. Define "microscope" and name the first person who invented the microscope. (20 marks)
1.2. Define the terms "resolution and magnification "in the in microscope. (20 marks)
1.3. State the main difference between light microscopes and electron microscopes. (20 marks)
1.4. List down two types of electron microscopes with their main difference. (40 marks)

Question 02 **(Marks 100)**

A 40-year-old patient was admitted to the hospital with a sexually transmitted disease affecting genitals, rectum, throat, eyes, and joints, with yellow color genital discharge. The laboratory test identified the responsible pathogen as pink color round-shaped bacteria.

2.1 Name the responsible bacteria for the above condition. (20 marks)

2.2 Name the staining method used to identify the pink color round-shaped bacteria with the classification of the above (2.1) bacteria. (20 marks)

2.3. List down the reagents used in the above (2.2) staining method. (20 marks)

2.4. State the principle of the above (2.2) method that differentiates pink color and purple color bacteria. (40 marks)

Question 03 **(Marks 100)**

A 25-year-old patient was admitted to the hospital due to watery diarrhea with blood, vomiting, and fever. After the investigations, he was diagnosed with a bacterial infection with colon damage caused by anaerobic gram-positive spore-forming bacteria.

3.1. Name the bacteria responsible for the above patients' condition. (20 marks)

3.2. State one non-endospore forming regular non-acid-fast bacteria and one regular non-acid-fast bacteria. (20 marks)

3.3. List down the reagents used in acid fast staining. (20 marks)

3.4 state the principle of acid-fast staining. (40 marks)

Question 04 **(Marks 100)**

4.1. State the definition of" Culture media". (20 marks)
4.2. State the difference between selective media and differential media. (30 marks)
4.3. State the phases of bacterial growth curve with the key characteristics in each phase. (50 Marks)

Question 05 **(Marks 100)**

5.1. State two Common viral Infections spread through air droplets. (20 marks)
5.2. Draw a labeled diagram of a bacteriophage (30 marks)
5.3. Name the fungus responsible for following situations: (20 marks)

5.3.1. Fungus infects through a rose thorn prick:

5.3.2. Yeast, normally harmless, turns opportunistic:

5.4. State the structure, reproduction mode of fungi "Molds: and "Yeasts"? (30 marks)

Question 06 **(Marks 100)**

6.1. State the causative agent of "A person who's gone hiking and identified to have a spirochete bacterial infection with bull's-eye rash development and joint pain weeks after a tick bite. (20 Marks)

6.2. State the structural features of the above (6.1) spirochete. (30 marks)

6.3. Name the method used to eliminate or destroy all microorganisms including bacteria, fungi and bacterial spores from an object or surface. (10 marks)
6.4. List down four physical methods of the above-mentioned (6.3) method with example for each. (40 Marks)

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BSc. (Hons) Industrial Pharmaceutical Sciences, BSc. (Hons) Cosmetic Sciences,
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IPS 2143 /BCS 2143/MHPM 2133 Organic Chemistry
End Semester Examination- SEQ
2nd Year 1st Semester
8th Batch

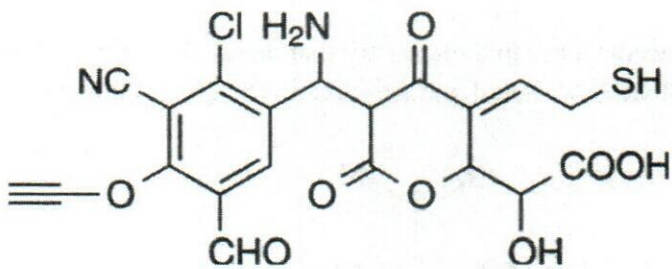
Date: 3rd of September 2025
Time: 09.00 am – 12.00 noon - Three Hours

Index Number -.....

INSTRUCTIONS TO CANDIDATES Page
- This question paper consists of **Six Structured Essay** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink.

Question 01 **(100 marks)**

1.1 Write five functional groups of the given organic compound. (20 marks)



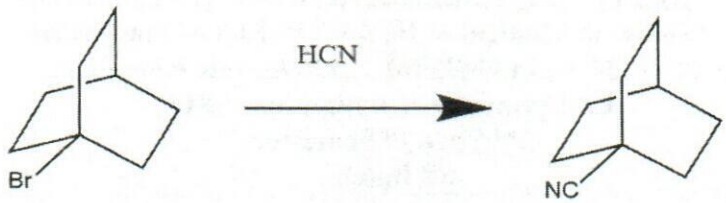
1.2 Organic reaction mechanisms explain how reactants convert into products through specific steps including the nucleophiles and electrophiles.

1.2.1 What is the organic reaction type when alkene reacts with electrophiles? (10 marks)

1.2.2 Write the reaction when but-1-ene reacts with dilute hydrobromic acid (HBr) in an acidic medium. (10 marks)

1.2.3 Propose a suitable mechanism for the above reaction. Show all the reagents and the structures of the intermediates involved. (30 marks)

1.3 SN1 and SN2 are two fundamental organic mechanisms of nucleophilic substitution reactions. Consider the following organic reaction in a polar protic solvent.



1.3.1 Propose a suitable mechanism for the above reaction. Show all the reagents and the structures of the intermediates involved. (20 marks)

1.3.2 Write the first order rate law for the mechanism. (10 marks)

Question 02 **(100 marks)**

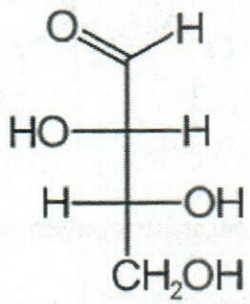
2.1. Conformation is different special arrangements of a molecule that are generated by rotation around single bonds. Consider the molecule n-butane (CH_3-CH_2-CH_2-CH_3). Draw the structures for the following conformations. (30 marks)

2.1.1 Eclipsed conformation

2.1.2 Gauche conformation

2.1.3 Antiperiplanar conformation

2.2. Chirality is a fundamental concept in organic chemistry that arises from the spatial arrangement of atoms in a molecule. Consider 2,3,4 trihydroxybutanal and the structure is given below.



2.2.1 Draw the structure of 2,3,4 trihydroxybutanal and identify the chiral carbon/ carbons present. (20 marks)

2.2.2 Find the total number of enantiomers present in 2,3,4 trihydroxybutanal. (10 marks)

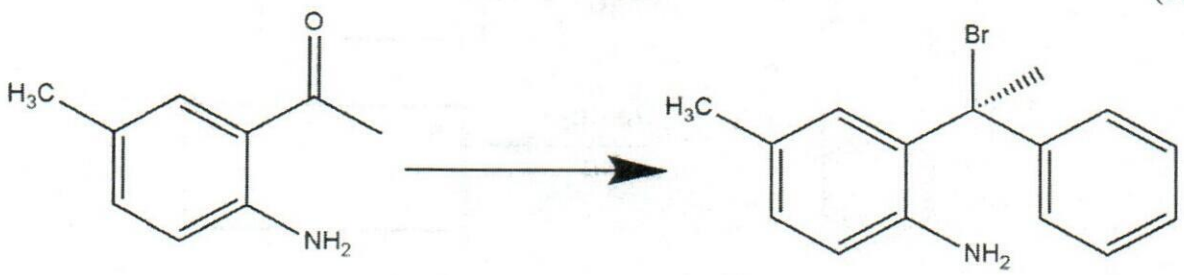
2.2.3 Draw the structures of the enantiomers in 2,3,4 trihydroxybutanal (20 marks)

2.2.4 Designate all the enantiomers based on the D and L system. (20 marks)

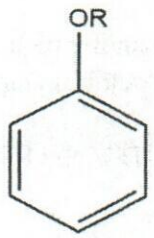
Question 03 **(100 marks)**

3.1 Describe the structural difference between allylic alcohol and vinylic alcohol. (20 marks)

3.2 How would you bring about the following conversion? Give reagents and intermediates for the conversion. (30 marks)



3.3 "The alkoxy group (-OR) attached to aromatic ring activates the ring towards electrophilic substitution and directs the incoming electrophile to ortho and para positions". Explain this statement. (20 marks)
The structure of the alkoxy group with aromatic ring is given below.



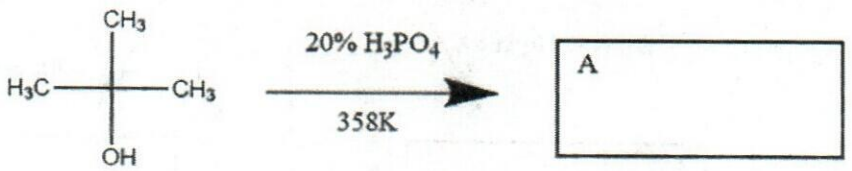
3.4 Explain the reason why boiling point of propanal is lower than pentanal. (10 marks)

3.5 Explain why amides are less reactive than acyl chlorides. (20 marks)

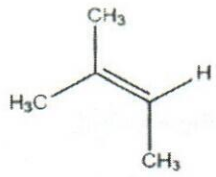
Question 04 **(100 marks)**

4.1 Give the product/s for the following reactions. (30 marks)

4.1.1

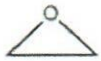


4.1.2



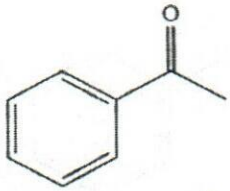
O_3 / $(CH_3)_2S$ → B | C

4.1.3



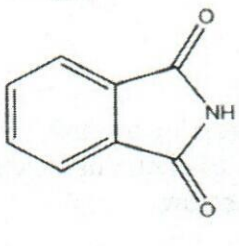
CH_3MgX / H^+/H_2O → D

4.1.4

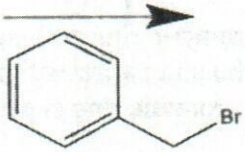


H_2NNH_2 / KOH → E

4.1.5

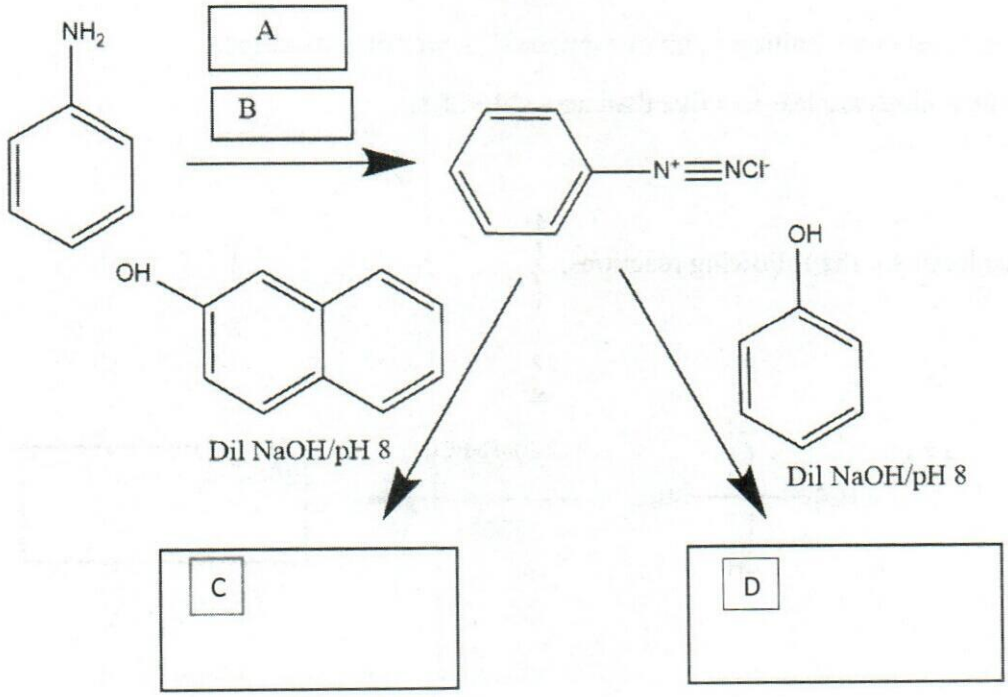


KOH → F

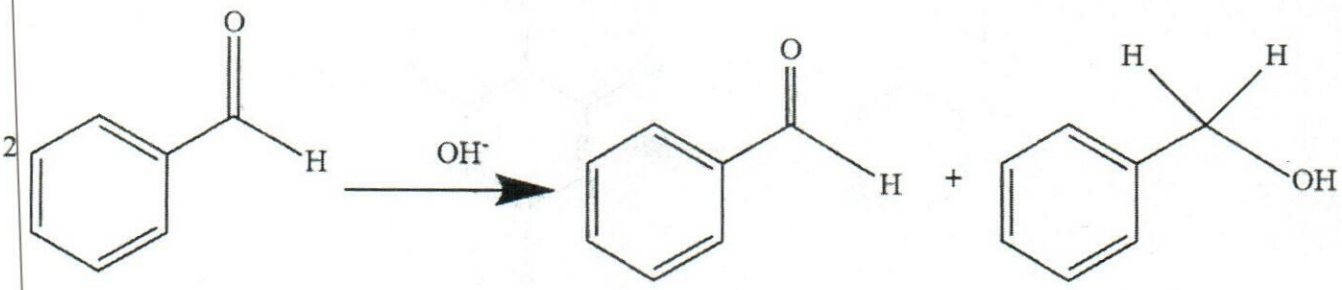


4.2 Explain why the pKa value of Aniline is lower than the pKa value of Cyclohexylamine. Given that the pKa value of aniline is 4.6 and the pka value of Cyclohexylamine is 10.68 (20 marks)

4.3 Draw the structures of intermediates/ reagents, A-D in the following scheme which shows the synthesis of azo dye. (20 marks)



4.4. Propose a suitable mechanism for the following reaction. Show all the reagents and the structures of the intermediates involved. (30 marks)

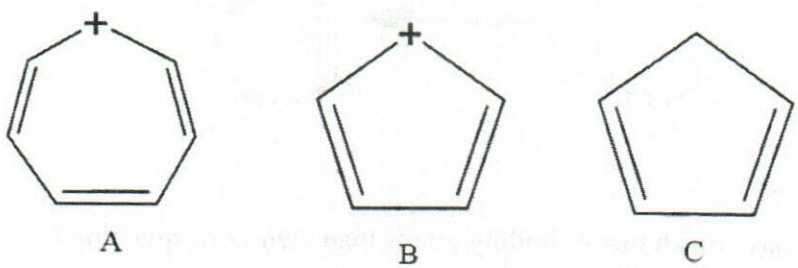


Question 05 **(100 marks)**

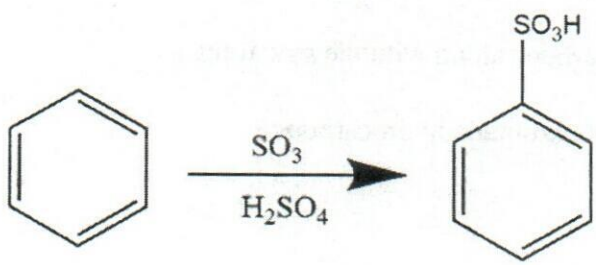
5.1. Stability of benzene and related compounds can be compared with fully saturated cyclohexane. Calculate the resonance energy of benzene, based on the heat of hydrogenations (ΔH_h) given below. (20 marks)

Heat of hydrogenation (ΔH_h) of cyclohexatriene = 360 kJ/mol
Heat of hydrogenation (ΔH_h) of benzene = 208 kJ/mol

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

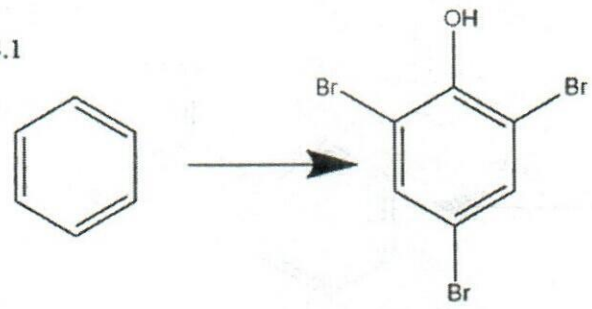


5.3 Propose a suitable mechanism for the following reaction. Show all the reagents and the structures of the intermediates involved. (20 marks)

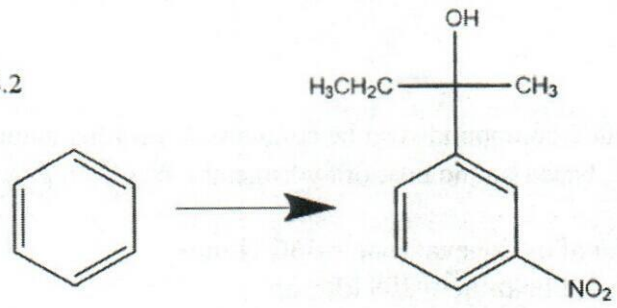


5.4 Propose synthetic schemes for the following conversions. Show all the reagents and the structures of the intermediates involved. (30 marks)

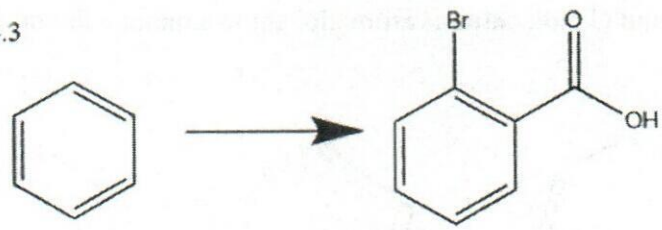
5.4.1



5.4.2



5.4.3



5.5 Explain why phenols have much higher boiling points than their corresponding hydrocarbons. (15 marks)

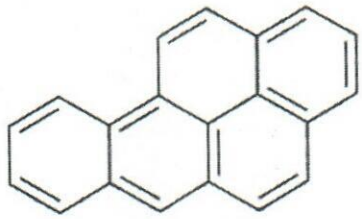
Question 06 **(100 marks)**

6.1 State two sources of poly aromatic hydrocarbons (20 marks)

6.2 State two poly aromatic hydrocarbons along with the structures. (20 marks)

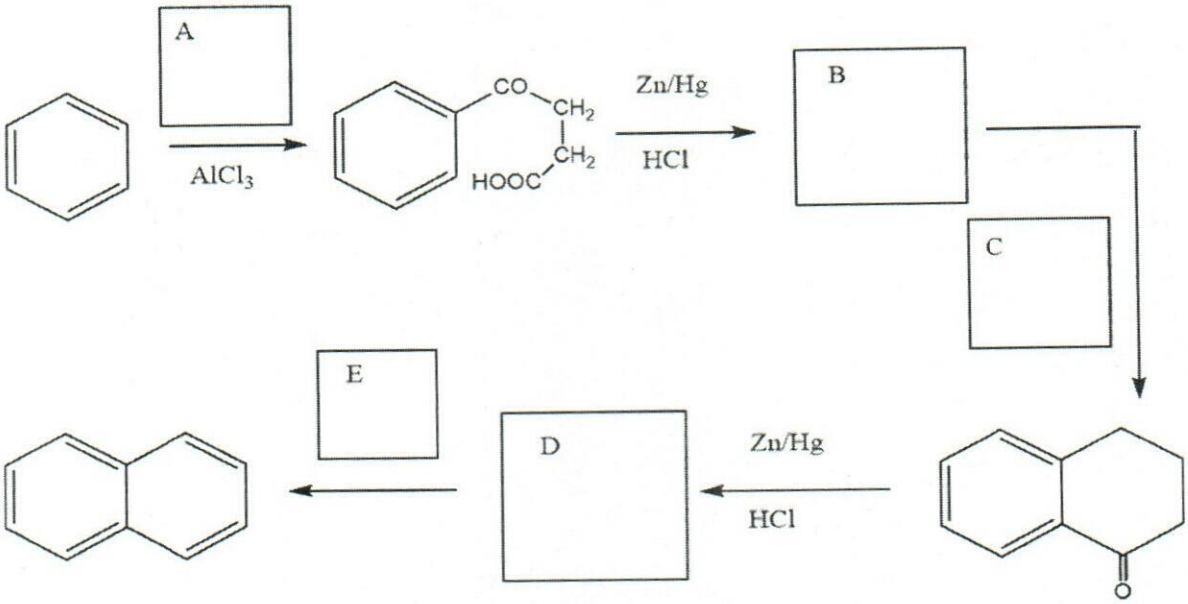
6.3 Write two adverse effects of poly aromatic hydrocarbons. (20 marks)

6.4 Explain how benzo[a] pyrene can cause adverse effects for aquatic and terrestrial organisms. The structure of the benzo[a] pyrene is given below. (15 marks)



benzo[a] pyrene

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



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IPS 2143 /BCS 2143/MHPM 2133 Organic Chemistry
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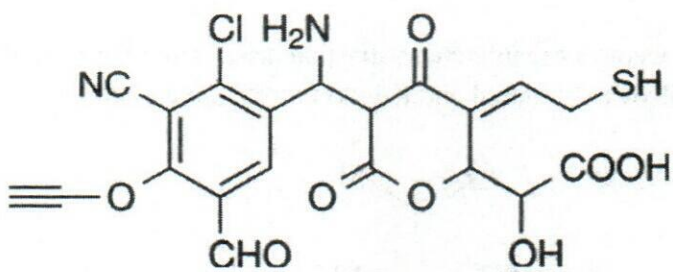
Date: 3rd of September 2025
Time: 09.00 am – 12.00 noon - Three Hours

Index Number -.....

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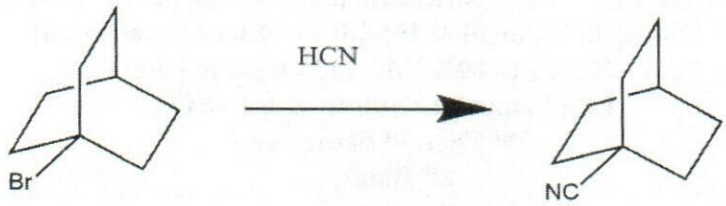
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Question 02 **(100 marks)**

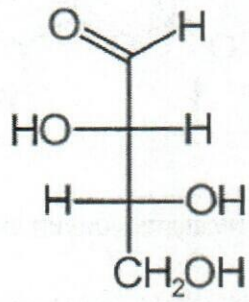
2.1. Conformation is different special arrangements of a molecule that are generated by rotation around single bonds. Consider the molecule n-butane (CH_3-CH_2-CH_2-CH_3). Draw the structures for the following conformations. (30 marks)

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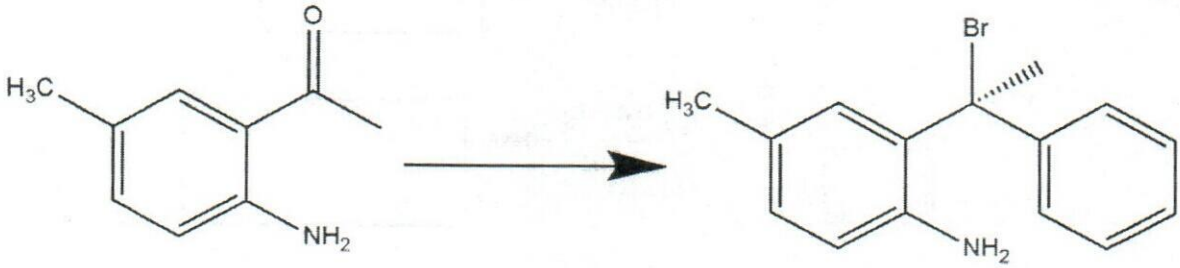
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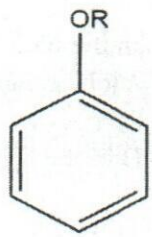
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3.3 "The alkoxy group (-OR) attached to aromatic ring activates the ring towards electrophilic substitution and directs the incoming electrophile to ortho and para positions". Explain this statement. (20 marks)
The structure of the alkoxy group with aromatic ring is given below.



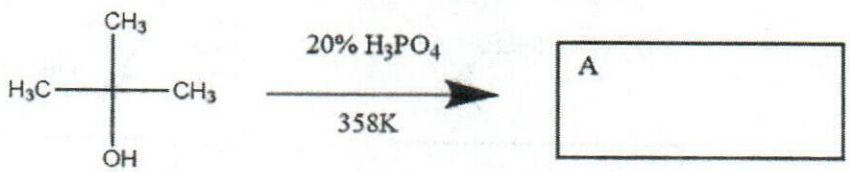
3.4 Explain the reason why boiling point of propanal is lower than pentanal. (10 marks)

3.5 Explain why amides are less reactive than acyl chlorides. (20 marks)

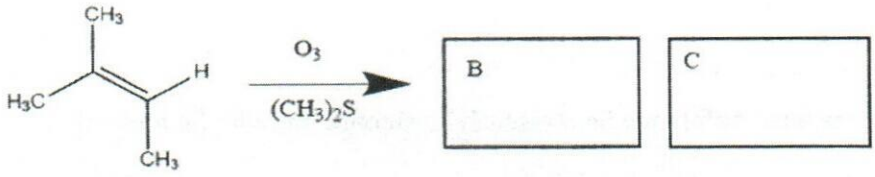
Question 04 **(100 marks)**

4.1 Give the product/s for the following reactions. (30 marks)

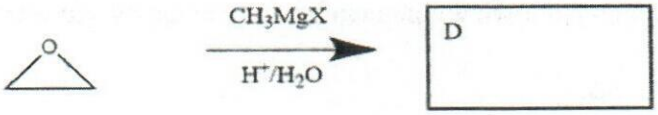
4.1.1



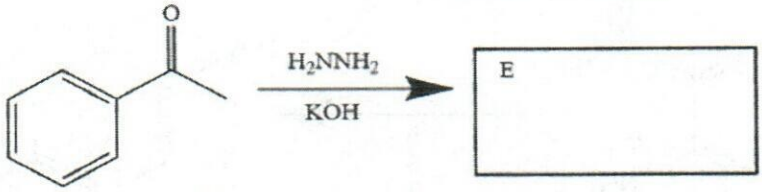
4.1.2



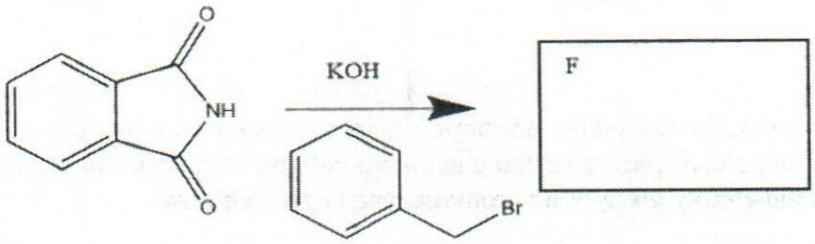
4.1.3



4.1.4

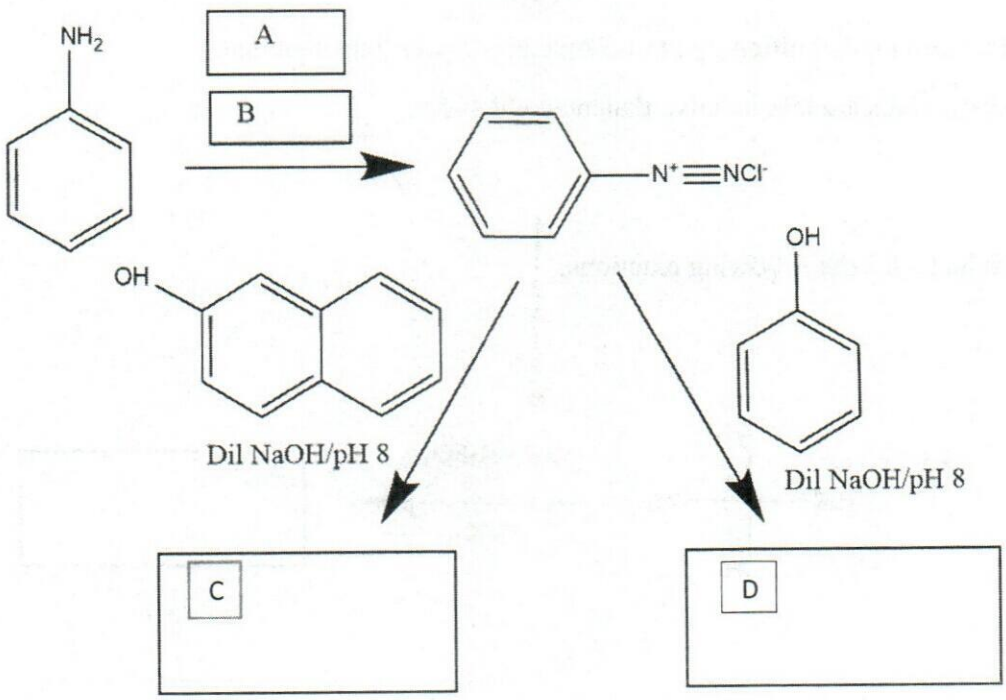


4.1.5

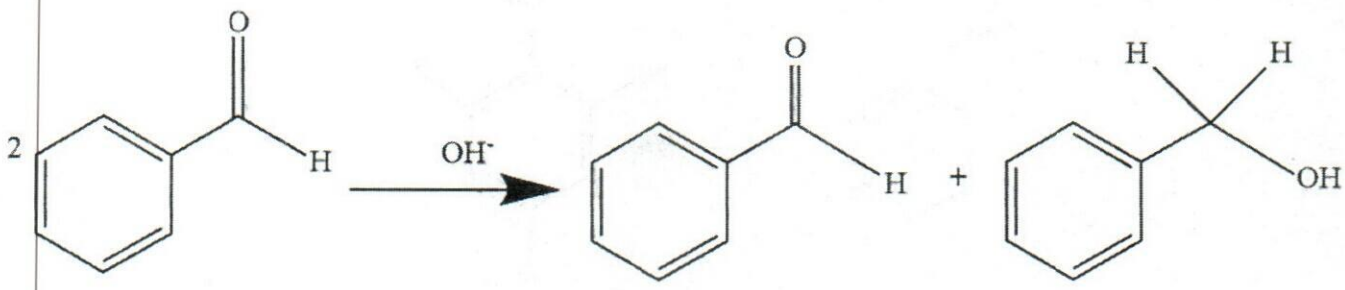


4.2 Explain why the pKa value of Aniline is lower than the pKa value of Cyclohexylamine. Given that the pKa value of aniline is 4.6 and the pka value of Cyclohexylamine is 10.68 (20 marks)

4.3 Draw the structures of intermediates/ reagents, A-D in the following scheme which shows the synthesis of azo dye. (20 marks)



4.4. Propose a suitable mechanism for the following reaction. Show all the reagents and the structures of the intermediates involved. (30 marks)

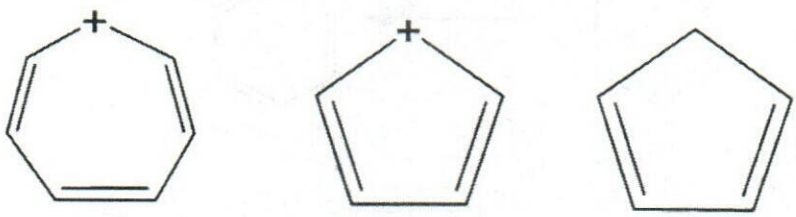


Question 05 **(100 marks)**

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. (20 marks)

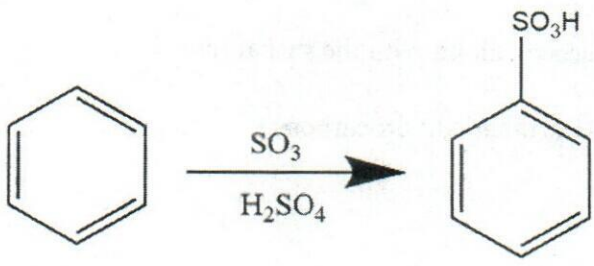
Heat of hydrogenation (ΔH_h) of cyclohexatriene = 360 kJ/mol
Heat of hydrogenation (ΔH_h) of benzene = 208 kJ/mol

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



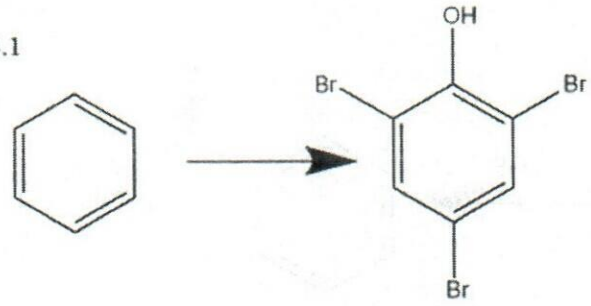
A B C

5.3 Propose a suitable mechanism for the following reaction. Show all the reagents and the structures of the intermediates involved. (20 marks)

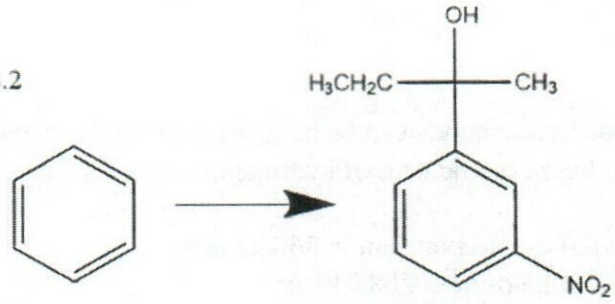


5.4 Propose synthetic schemes for the following conversions. Show all the reagents and the structures of the intermediates involved. (30 marks)

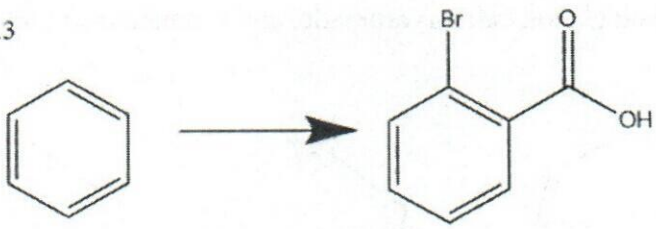
5.4.1



5.4.2



5.4.3



5.5 Explain why phenols have much higher boiling points than their corresponding hydrocarbons. (15 marks)

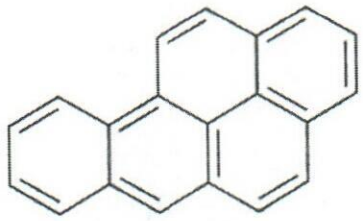
Question 06 **(100 marks)**

6.1 State two sources of poly aromatic hydrocarbons (20 marks)

6.2 State two poly aromatic hydrocarbons along with the structures. (20 marks)

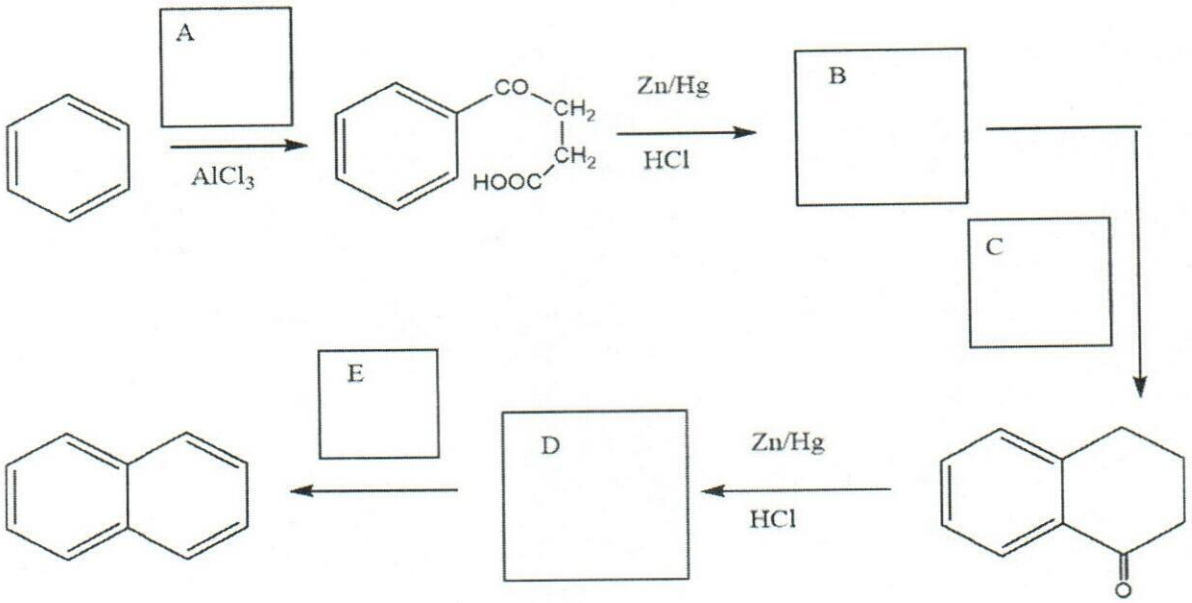
6.3 Write two adverse effects of poly aromatic hydrocarbons. (20 marks)

6.4 Explain how benzo[a] pyrene can cause adverse effects for aquatic and terrestrial organisms. The structure of the benzo[a] pyrene is given below. (15 marks)



benzo[a] pyrene

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



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IPS 2113/ BMS 2113/ BCS 2113/MHPM 2113
Anatomy and Physiology I
2nd Year 1st Semester
End Semester SEQ Examination
8th Batch

Date : **25th August 2025**
Time : **9.00 a.m. – 11.00 a.m. (Two Hour)**

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 Compare and contrast the intracellular fluid (ICF) and extracellular fluid (ECF). (30 marks)

1.2 Name main routes by which the body loses water daily. (20 marks)

1.3 Write two examples for each of the following items which contain in the superior mediastinum.

1.3.1 Great vessels (10 marks)

1.3.2 Nerves (10 marks)

1.3.3 Organs (10 marks)

1.4 Compare and contrast true ribs and false ribs. (20 marks)

Question 2 **(100 marks)**

2.1 Briefly describe the three phases of the cardiac cycle. (30 marks)

2.2 List 05 factors affecting cardiac output. (20 marks)

2.3 Compare pericardium and myocardium. (25 marks)

2.4 Briefly describe the interphase of human cell cycle. (25 marks)

Question 3 **(100 marks)**

3.1 List out three adaptations you can identify in the following organs in GI tract separately.

3.1.1 Stomach (10 marks)

3.1.2 Small Intestine (10 marks)

3.1.3 Colon (10 marks)

3.2 Briefly discuss why liver is considered as a vital human organ. (20 marks)

3.3 Illustrate structure of a hepatic lobe. (25 marks)

3.4 Write a short note on structure of biliary duct system. (25 marks)

Question 4 **(100 marks)**

4.1 Write a short note on axillary artery. (25 marks)

4.2 Compare and contrast left bronchus and right bronchus. (25 marks)

4.3 Define these terms related to lung volume and capacity.

4.3.1 Tidal Volume (TV) (05 marks)

4.3.2 Vital capacity (VC) (05 marks)

4.3.3 Residual volume (RV) (05 marks)

4.3.4 Respiratory dead space (05 marks)

4.4 Briefly describe the mechanism of inspiration and expiration. (30 marks)

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IPS 2113/ BMS 2113/ BCS 2113/MHPM 2113
Anatomy and Physiology I
2nd Year 1st Semester
End Semester SEQ Examination
8th Batch

Date : **25th August 2025**
Time : **9.00 a.m. – 11.00 a.m. (Two Hour)**

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **FOUR** questions.
- Answer **ALL** questions.
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Question 1 **(100 marks)**

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4.3.3 Residual volume (RV) (05 marks)

4.3.4 Respiratory dead space (05 marks)

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BMS 2113/ IPS 2113/ BCS 2113/ MHPM 2113
Anatomy and Physiology I
2nd Year 1st Semester

End Semester BRQ/MCQ Examination

8th Batch

Date	:	**25th August 2025**
Time	:	**11.30 a.m. – 12.30 a.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 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:
-

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

1. Which muscle is the most superficial?
1. Levator scapulae
2. Rhomboid major
3. Rhomboid minor
4. Trapezius
5. Deltoid muscle

2. What is the gastric cell which produces pepsinogen?
1. Surface mucosal cell
2. Mucous neck cell

3. Parietal cell
4. Chief cell
5. G cell

3. What is the substance in bile which gives yellow colour?

1. Sodium taurocholate
2. Sodium glycocholate
3. Bilirubin diglucuronide
4. Cholesterol
5. Lecithin

4. Which brush boarder enzyme can convert trypsinogen into its active form?

1. Trypsin
2. Enterokinase
3. Dipeptidase
4. Lactase
5. Maltase

5. Which cartilage is not associated with larynx?

1. Thyroid cartilage
2. Cricoid Cartilage
3. Arytenoid cartilages
4. Epiglottis
5. Pubic symphysis

6. What is the factor which increases heart contraction force?

1. Hypoxia
2. Hypercapnia
3. Acidosis
4. Vagal stimulation
5. Glucagon hormone

7. What is the mitosis phase in which chromosomes line up across center of the cells?

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

8. Peritoneum fold mainly associated with stomach,

1. Mesocolon
2. Mesentery
3. Omentum
4. Falciform ligament
5. Coronary ligament

9. True or false regarding mediastinum?

1. The superior mediastinum is posteriorly bordered by C5- T2 vertebrae.
2. Middle mediastinum is the smallest subdivision of the mediastinum.
3. Middle mediastinum contains pericardium.

4. Superior mediastinum contains thoracic duct.
5. Superior mediastinum continuous with the inferior mediastinum at the level of the sternal angle.

10. True or false muscles in the thoracic region?

1. Pectoralis is the largest muscle in the pectoral region.
2. Subclavius the superficial muscle in the pectoral region.
3. There are 12 pairs of intercostal muscles.
4. External intercostal muscles are involved in inspiration.
5. Internal intercostal muscles extend downwards and backwards.

11. True or false regarding diaphragm?

1. It is supplied by phrenic nerves.
2. When it contracts, pressure decreases in the thoracic cavity.
3. When the diaphragm is relaxed, the central tendon is at the level of the 10^{th} thoracic vertebra.
4. The diaphragm is a dome-shaped muscular structure.
5. The oesophageal hiatus is at 8^{th} thoracic vertebral level.

12. True or false regarding upper limb?

1. Intrinsic muscles in forearm control "Power grip".
2. Extrinsic muscles in the hand, move fingers.
3. Anatomical snuffbox is an important clinical region.
4. Muscles in the posterior compartment of the forearm occur as superficial and deep layers.
5. Triceps brachii muscle is in the anterior compartment of arm.

13. True or false regarding stomach functions?

1. Gastric peristalsis is important to make chyme.
2. Gastric juice contains intrinsic factor.
3. Alcohol is absorbed at the stomach.
4. Gastric juice secretion is only done by hormonal control.
5. Secretin stimulates gastric juice secretion.

14. True or false regarding absorption processes?

1. Galactose utilizes Sodium-glucose co-transporter.
2. Fructose utilizes the Sodium-amino acid co-transporter.
3. Micelles of fatty acids and glycerol diffuse into the enterocytes.
4. Long chain fatty acids and glycerol are taken up by the smooth endoplasmic reticulum to form new triglycerides.
5. Iron is absorbed in ferric form.

15. True or false regarding abdomen?

1. Rectus abdominis is an anterolateral muscle.
2. Parietal peritoneum is sensitive to pain and temperature.
3. As visceral peritoneum is loosely attached, it can be easily stripped.
4. Epigastric region is the middle central region among nine regions in the abdomen.
5. Internal oblique is flat muscle.

16. True or false regarding upper respiratory tract?

1. Nasal conchae projects medially from the lateral wall of the nasal cavity.
2. Paranasal sinuses are lined with mucous membrane.
3. Respiratory epithelium is a pseudostratified squamous, ciliated epithelium.
4. Conchae provides larger surface area for humidification of air.
5. Pharynx is wider at its upper end.

17. True or false regarding phases of action potential in ventricular myocyte?

1. Rapid depolarization occurs due to rapid K^+ influx.
2. Voltage-gated Na+ channels are inactivated at the rapid repolarization stage.
3. Ca^{2+} influx occurs in the plateau state.
4. Ca^{2+} channels are opened at slow repolarization stage.
5. Slow repolarization will allow the cardiac muscle to return to resting membrane potential.

18. True or false regarding heart activity?

1. Cardiac output depends on heart rate.
2. After load is the force that stretches the cardiac muscle prior to contraction.
3. Inotropic state is the strength of myocardial muscle contraction.
4. Ventricular filling occurs at atrial diastole.
5. Sinoatrial node is a natural pacemaker in heart.

19. True or false regarding body composition?

1. Intracellular fluids make 1/3 of total body fluids in the body.
2. "Average" body fluid variations depend only on gender.
3. When the Na^+ concentration of interstitial fluid decreases, its osmolality also decreases.
4. Potassium ions are the main cation in the extracellular fluid.
5. Chloride ions are the main cation in the extracellular fluid.

20. True or false regarding lungs?

1. Right lung is larger than left lung.
2. Right lung has two fissures.
3. Apexes of lungs are below the level of clavicle.
4. Costal surfaces of each lung are concave.
5. Medial surface contains hilum.

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BMS 2123 / IPS 2123 / BCS 2123/ MHPM 2123 – Biochemistry I

Batch – 08

2nd Year 1st Semester

End semester SEQ Examination

Date : **27th of August 2025**

Time : **9.00 am. – 12.00 pm (Three Hours)**

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **SIX** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink.
- You are allowed to use a scientific calculator for the examination.

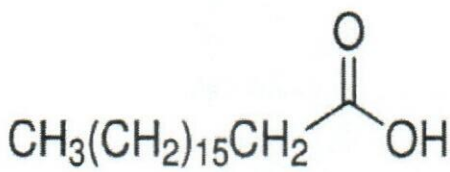
QUESTION 01 **(100 marks)**

1.1. What does the shorthand notation 18:2($\Delta^{9,12}$) indicate about a fatty acid? (25 marks)

1.2. What is the significance of cis and trans configuration in unsaturated fatty acids? (25 marks)

1.3. Compare and contrast delta and omega nomenclature of fatty acids. (25 marks)

1.4. Illustrate the formation of triglyceride from stearic acid. (25 marks)



Stearic acid structure

QUESTION 02 **(100 marks)**

2.1. Describe the fluid mosaic model of plasma membrane. (30 marks)

2.2. Differentiate between peripheral and integral proteins. (20 marks)

2.3.State the role of G-protein receptors in cell signaling. (20 marks)

2.4. Draw a flow chart to denote the signal transduction pathway of glucagon hormone. (30 marks)

QUESTION 03 **(100 marks)**

3.1. Classify the following carbohydrates based on the number of carbon atoms. (15 marks)

3.1.1. Ribose

3.1.2. Glucose

3.1.3. Dihydroxyacetone

3.2. Write a short note on biomedical importance of monosaccharides. (25 marks)

3.3.Briefly explain the role of glycolysis in energy production and intermediary metabolism. (30 marks)

3.4.Discuss the metabolic fates of pyruvate under both aerobic and anaerobic conditions. (30 marks)

QUESTION 04 **(100 marks)**

4. A 55-year-old patient presents with progressive muscle weakness and fatigue. Laboratory tests reveal elevated blood lactate levels and decreased ATP production in muscle biopsy samples. Genetic analysis identifies a mutation in a gene encoding a component of Complex I in the mitochondrial electron transport chain.

4.1. Draw a detailed diagram showing the electron transport chain complexes and their electron carriers. (25 marks)

4.2. Justify the statement. "A defect in Complex I can lead to impaired ATP synthesis". (25 marks)

4.3. Discuss the reasons for the elevated lactate levels in this patient. (25 marks)

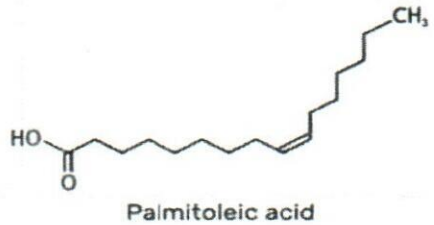
4.4. Describe how does the ATP yield varies between aerobic and anerobic respiration. (25 marks)

QUESTION 05 **(100 marks)**

5.1. Outline the main steps of one cycle of β-oxidation. (25 marks)

5.2. Mention the products generated by one cycle of β-oxidation. (25 marks)

5.3. Calculate the total ATP yield from complete β-oxidation of palmitoleic acid. (Consider 1 NADH = 3 ATP and 1 FADH2= 2 ATP). (25 marks)



Palmitoleic acid

5.4. Write a short note on biochemical basis of fatty liver. (25 marks)

QUESTION 06 **(100 marks)**

6.1. State three (03) enzymes involved in gluconeogenesis. (10 marks)

6.2. Compare and contrast between glycolysis and glycogenolysis. (30 marks)

6.3. Mention five (05) metabolic pathways that are activated during the fasting state. (15 marks)

6.4. List three (03) glycogen storage disorders. (15 marks)

6.5. Describe the role of glucagon in regulating glycogen metabolism. (30 marks)

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BMS/ IPS/ BCS/ MHPM 2123 – Biochemistry I
Batch – 08
2nd Year 1st Semester
Mid semester MCQ/BRQ Examination

Date : **18th of June 2025**
Time : **09.00 a.m. – 10.00 a.m. (One Hour)**

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **Twenty MCQ** questions.
- Answer **ALL** questions.
- Select the **single best response** for the questions from 01 to 05.
- Mark **True 'T'** or **False 'F'** for each response from question number 06 to 20.
- You should write legibly in black or blue ink.

Select the best response for the questions from 01 to 05.

1. Which enzyme is unique to gluconeogenesis and not present in glycolysis?
   a) Phosphohexose isomerase
   b) Enolase
   c) Fructose-1,6-bisphosphatase
   d) Glyceraldehyde-3-phosphate dehydrogenase
   e) Aldolase

2. Which enzyme deficiency is associated with Von Gierke's disease (Type I glycogen storage disease)?
   a) Glucose-6-phosphatase
   b) Glycogen synthase
   c) Glycogen phosphorylase
   d) Debranching enzyme
   e) Glucokinase

3. What is the metabolic process stimulated when insulin concentration is high?
   a) Gluconeogenesis
   b) Glycogenolysis
   c) Ketogenesis
   d) Glycolysis
   e) Lipolysis

4. Which of the following is a ketose sugar?
   a) Galactose
   b) Glucose
   c) Mannose
   d) Fructose
   e) Ribose

5. Which of the following is a homopolysaccharide?
   a) Heparin
   b) Chondroitin sulfate
   c) Cellulose
   d) Hyaluronic acid
   e) Keratan sulfate

Mark 'True' or 'False' for each response from question number 06 to 20.

6. "True" or "False" regarding Gluconeogenesis?
   a) Gluconeogenesis occurs primarily in the cytosol.
   b) Glycerol, lactate, and amino acids can be precursors.
   c) It helps maintain blood glucose during fasting.
   d) Phosphoenolpyruvate carboxykinase is involved in the pathway.
   e) It is stimulated by insulin and inhibited by glucagon.

7. "True" or "False" for the following statements regarding the Citric Acid Cycle?
   a) $FADH_2$ is generated during the conversion of α-ketoglutarate to succinyl-CoA.
   b) Citrate synthase catalyzes the first step of the cycle.
   c) The Citric Acid Cycle occurs in the mitochondrial matrix.
   d) NADH produced in the cycle is used in oxidative phosphorylation.
   e) The cycle begins with the condensation of acetyl-CoA and oxaloacetate to form citrate.

8. Which of the following is/are "True" regarding Active Transport Systems?
   a) Primary active transport directly uses ATP to move molecules across membranes.
   b) Symport systems move two substances in the same direction across the membrane.
   c) Secondary active transport relies on ion gradients created by primary active transport.
   d) The sodium-potassium pump is an example of a symport transporter.
   e) Uniport systems always use energy from ATP hydrolysis.

9. "True" or "False" regarding Dihydrolipoyl Transacetylase?
   a) It is a component of the pyruvate dehydrogenase complex.
   b) Coenzyme A is a necessary cofactor for its function.
   c) It carries out its reaction before dihydrolipoyl dehydrogenase.
   d) This enzyme links glycolysis to the Citric Acid Cycle.
   e) Thiamine pyrophosphate is the direct cofactor for this enzyme.

10. "True" or "False" regarding Glycogenolysis?
    a) Glycogen phosphorylase cleaves α-1,4 glycosidic bonds.
    b) Debranching enzyme has both transferase and glucosidase activity.
    c) Glucose-6-phosphatase is required to release free glucose in the liver.
    d) Insulin stimulates glycogenolysis.
    e) Glycogenolysis occurs during the fed state.

11. Which of the following is/are "True" regarding disorders of carbohydrate metabolism?
    a) Cori disease affects glycogen metabolism in all organs.
    b) McArdle disease affects skeletal muscle glycogen metabolism.
    c) Cori disease is due to a debranching enzyme deficiency.
    d) Galactosemia is caused by defects in glycogen degradation.
    e) Pompe disease involves lysosomal acid α-glucosidase deficiency.

12. "True" or "False" regarding regulation of metabolic pathways?
    a) ATP inhibits phosphofructokinase-1 in glycolysis.
    b) Fructose-2,6-bisphosphate inhibits fructose-1,6-bisphosphatase.
    c) Acetyl-CoA activates pyruvate carboxylase.
    d) NADH inhibits several enzymes in the citric acid cycle.
    e) Glucagon promotes glycogenesis.

13. "True" or "False" regarding aerobic and anaerobic respiration?
    a) Anaerobic respiration produces less ATP than aerobic respiration.
    b) Oxygen is the final electron acceptor in aerobic respiration.
    c) Lactate is a product of anaerobic glycolysis in muscle.
    d) Mitochondria are involved in anaerobic respiration.
    e) Pyruvate is a key intermediate in both pathways.

14. "True" or "False" regarding glycolysis and gluconeogenesis?
    a) Gluconeogenesis is stimulated during fasting.
    b) Glycolysis involves the enzyme pyruvate carboxylase.
    c) PEP carboxykinase enzyme is unique to gluconeogenesis.
    d) Glycolysis and gluconeogenesis share some reversible steps.
    e) Gluconeogenesis requires more energy input than glycolysis.

15. "True" or "False" regarding cell membrane fluidity?
    a) Cholesterol increases fluidity at low temperatures.
    b) Longer fatty acid chains increase membrane fluidity.
    c) The presence of unsaturated fatty acids increases fluidity.
    d) Integral proteins influence membrane fluidity.
    e) Temperature changes can affect membrane fluidity.

16. "True" or "False" regarding reducing and non-reducing sugars?
    a) Glucose is a reducing sugar.
    b) Sucrose is a non-reducing sugar.
    c) Benedict's test can identify reducing sugars.
    d) A blue solution in Benedict's test indicates a reducing sugar.
    e) Reducing sugars have a free aldehyde or ketone group.

17. "True" or "False" regarding the hexose monophosphate shunt?
    a) It provides NADPH for biosynthetic reactions.
    b) The pathway occurs mainly in the liver, adipose tissue, and adrenal glands.
    c) Glucose-6-phosphate dehydrogenase is the rate-limiting enzyme.
    d) It produces ribose-5-phosphate for nucleotide synthesis.
    e) It is primarily active under fasting conditions.

18. "True" or "False" regarding signal transduction pathways?
    a) Steroid hormones bind intracellular receptors.
    b) G-protein-coupled receptors activate adenylyl cyclase.
    c) Cyclic AMP is a second messenger in many hormonal pathways.
    d) Hydrophilic hormones typically use intracellular receptors.
    e) Protein kinases are commonly involved in phosphorylation cascades.

19. "True" or "False" regarding membrane transport?
    a) Facilitated diffusion requires carrier proteins.
    b) Primary active transport moves substances down their concentration gradient.
    c) Ionophores increase membrane permeability to specific ions.
    d) Sodium-potassium pump helps maintain resting membrane potential.
    e) Exocytosis is used to release substances outside the cell.

20. "True" or "False" regarding G-protein linked membrane receptors?
    a) They span the membrane seven times.
    b) Activation leads to GDP being replaced by GTP on the G-protein.
    c) Steroid hormones commonly use G-protein linked receptors.
    d) The activated G-protein can stimulate or inhibit adenylyl cyclase.
    e) They are primarily used for hydrophilic signal molecules.

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Examination Department
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CINEC CAMPUS
Beyond A Graduate

Faculty of Health Sciences

B.Sc. (Hons) Biomedical Sciences/ B.Sc. (Hons) Industrial Pharmaceutical Sciences/ B.Sc (Hons) Cosmetic Sciences/ B.Sc. (Hons) Medical & Health Product Management
7th Batch
BSM 1243/ BSM 1223 – Foundation of Chemistry
End-Semester Examination
1st Year 2nd Semester – SEQ-Repeat

Date: 1st of April 2025
Time: 9.00 am– 12.00 pm - 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)**

Iodine and oxygen form a complex series of ions. Among them are IO_4^- and IO_5^{-3}.

1.1 Draw acceptable Lewis structures for these two molecules. (30 marks)

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1.2 Draw resonance structures for these molecules. (30 marks)

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1.3 Write the shape of these molecules. (20 marks)

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1.4 Indicate the hybridization around the central atom in each molecule. (10 marks)

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1.5 Are these molecules polar or non-polar? (10 marks)

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QUESTION 02 **(100 marks)**

2.1 Define the term "Electronegativity". What factors affect the electronegativity of an atom? (20 marks)

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2.2 What is the electronegativity of N in NO^{+}_{2} molecule. 2 (20 marks)

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2.3 Draw the molecular orbital energy level diagram of the diatomic molecule F_2. Assuming, σ 2Px molecular orbitals are lower in energy than π 2Py and π 2Pz. (40 marks)

2.4 Determine the bond order of F_2. (20 marks)

QUESTION 03 **(100 marks)**

Consider the reaction for the synthesis of ammonia, a key process in the Haber process.

$$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$$

3.1 Explain Le Chatelier's principle. How does it predict the direction of shift in equilibrium when changes in pressure occur. (20 marks)

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3.2 At equilibrium, the concentrations of the gases are as follows.

$[N_2] = 0.40$ mol/L $[H_2] = 0.60$ mol/L $[NH_3] = 0.80$ mol/L

3.2.1 Calculate the equilibrium constant, Kc for the reaction at 300 K. (20 marks)

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3.2.2 What would happen if the volume of the container is decreased, and which direction will the equilibrium shift, and why? (20 marks)

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3.3 Consider the following reaction in an electrochemical cell.

$$Zn(s) + Cu^{2+} \rightleftharpoons Zn^{2+}(aq) + Cu(s)$$

3.3.1 Write the half-reactions that occur at the anode and the cathode. (20 marks)

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3.3.2 Calculate the standard cell potential E^0_{cell} for this electrochemical reaction and state whether the reaction is spontaneous or not. (20 marks)

$E^0_{Zn2+/Zn} = -0.76$ V $\quad E^0_{Cu2+/Cu} = +0.34$ V

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QUESTION 04 **(100 marks)**

4.1 What general trend in electronegativity occur in the periodic table. (20 marks)

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4.2 Arrange the following elements in the order of increasing electronegativity. (20 marks)

Li, Br, K, B, C, Pb

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4.3 Explain that although BCl_3 is an electron deficient compound, it is stable. (20 marks)

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4.4 Explain why the color of MnO_4^- is different from that to MnO_4^{-2} (20 marks)

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4.5 Explain the melting point of beryllium (Be) is higher than that of magnesium (Mg). (20 marks)

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QUESTION 05 **(100 marks)**

5.1 What is the difference between an alkane, alkene, and alkyne in terms of their bonding and general formula. (20 marks)

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5.2 What is the difference between a primary, secondary, and tertiary carbon atom. (20 marks)

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5.3 How does the presence of a polar functional group, such as a hydroxyl group (-OH), affect the solubility and reactivity of an organic compound. (20 marks)

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5.4 Explain the difference between homolytic cleavage and heterolytic cleavage. (20 marks)

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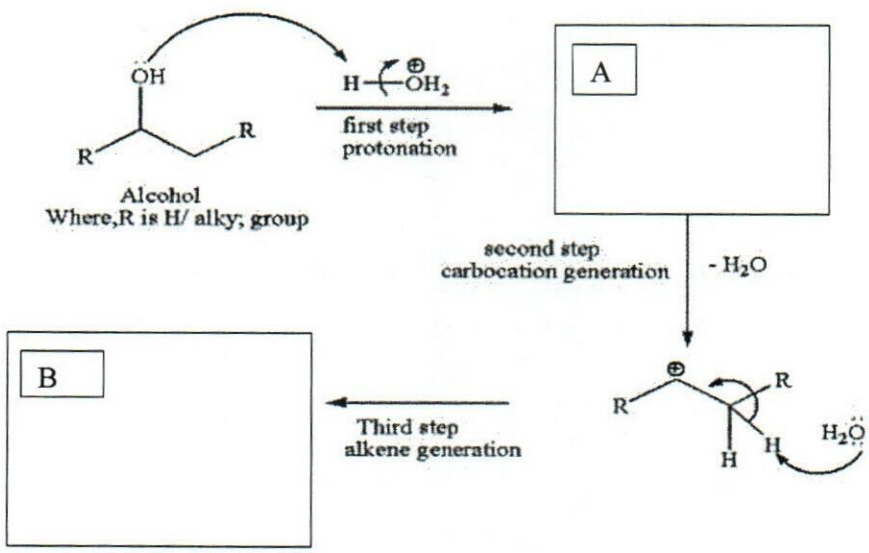
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5.5 Draw the structures of A and B in following mechanism. (20 marks)



QUESTION 06 **(100 marks)**

6.1 Write the key reactions involved in the contact process used in the production of sulfuric acid. (40 marks)

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6.2 Why is vanadium(V) oxide (V_2O_5) used as a catalyst in the Contact Process for sulfuric acid production? (20 marks)

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6.3 What is the role of air in the Contact Process for sulfuric acid production, and how does the amount of oxygen influence the reaction kinetics. (20 marks)

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6.4 What is the significance of controlling temperature in the Contact Process. Why is a lower temperature not always ideal for the conversion of sulfur dioxide to sulfur trioxide? (20 marks)

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-THE END-

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Faculty of Health Sciences

Bachelor of Science Honours in Biomedical Sciences /Bachelor of Science Honours in Industrial Pharmaceutical Science / Bachelor of Science in Cosmetic Science

General/ Pharmaceutical/ Cosmeceutical Microbiology (BMS/IPS/BCS/MHPM 2153)

2nd Year 1st Semester -End Examination SEQ -Batch 07

Date : **10th of December 2024**
Time : **9.00 a.m. – 12.00 p.m. (Three Hours)**

Index no:

INSTRUCTIONS TO CANDIDATES

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

Question 01 **(Marks 100)**

1.1 What is meant by the term "Magnification"? (10 Marks)

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1.2 State the main difference between a Scanning Electron Microscope (SEM) and a Transmission Electron Microscope (TEM). (20 Marks)

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1.3 List down the primary stain and counter stain of endospore staining. (20 Marks)

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1.4 Briefly explain the principle behind the gram staining technique distinguishing Gram-positive and Gram-negative bacteria." (50 Marks)

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Question 02 **(Marks 100)**

A 30-year-old man presents with a sore throat, difficulty swallowing, and fever. A physical examination reveals a thick grayish membrane in the throat. After examination, the patient was diagnosed with **diphtheria**.

2.1 Name the bacteria responsible for the above condition. (10 Marks)

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2.2 State two general characteristics of the bacteria mentioned in 2.1. (20 Marks)

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2.3. State the reagents used in acid-fast staining. (30 Marks)

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2.3. State why the bacteria are classified as acid-fast and non-acid-fast with the significance of this property in its diagnosis. (40 Marks)

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Question 03 **(Marks 100)**

A 28-year-old man presents to the emergency department after stepping on a nail while gardening. After taking him to the hospital the wound was cleaned to remove dirt, debris, and dead tissue. Also, tetanus immunoglobulin (TIG) was injected.

3.1. Identify the bacteria prevented by Tetanus Immunoglobulin injection (TIG). (20 marks)

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3.2. What is the neurotoxin produced by bacteria mentioned in 3.1? (20 marks)

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3.3. Name **two** other species that belong to the same group of bacteria. (20 marks)

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3.4 List four general characteristics of the bacteria mentioned in 3.1 and 3.4. (40 marks)

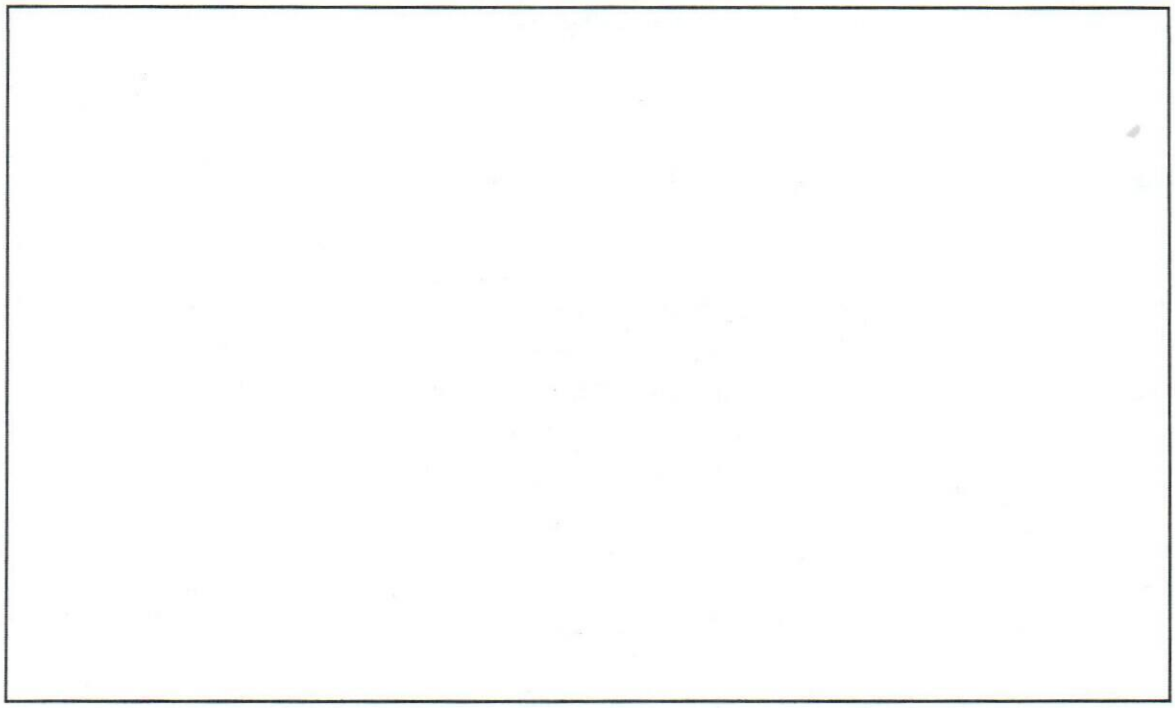
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Question 04 **(Marks 100)**

4.1.State the **two** types of genetic material present in bacteria. (20 Marks)

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4.2.Draw a labeled diagram of different phases of the bacterial growth curve. (30 Marks)



4.3.State the key characteristics of each phase in the bacterial growth curve. (50 Marks)

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Question 05 **(Marks 100)**

5.1. State **One** distinctive feature of spirochetes. (20 Marks)

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5.3. Name **two** Spirochete bacteria. (20 Marks)

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5.2. What are "hyphae" in fungal structure? (30 Marks)

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5.3. What is "mycelium" in fungal structure? (30 Marks)

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Question 06 **(Marks 100)**

6.1. State the main difference between sterilization and disinfection (10 Marks)

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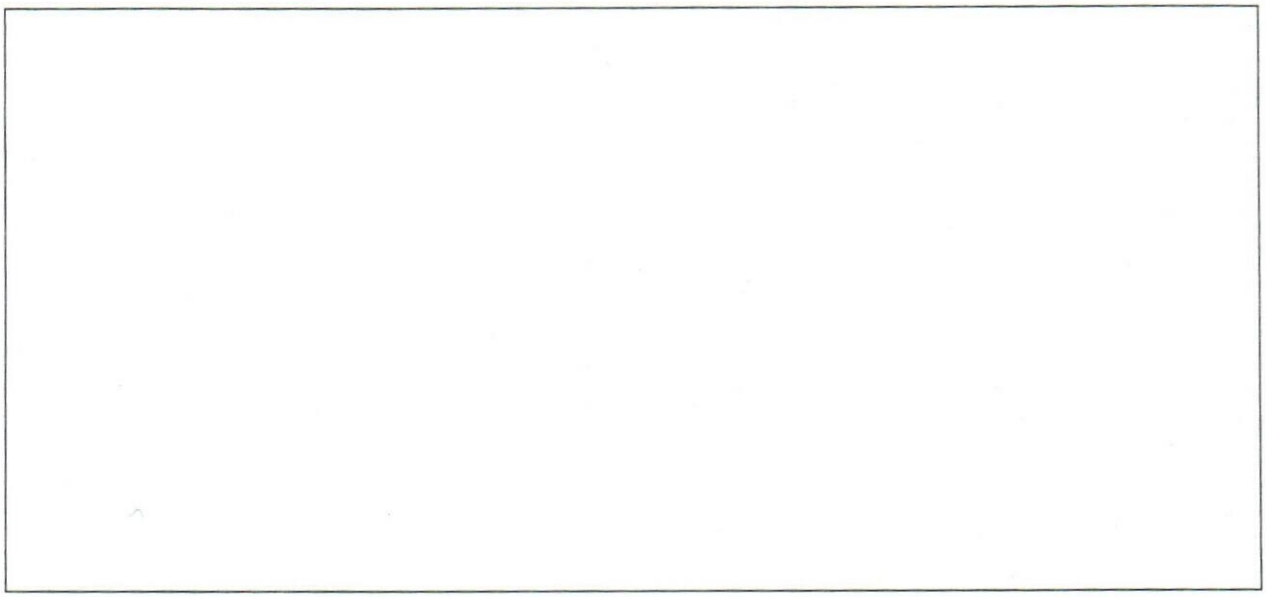
6.2. List down **four** physical methods of sterilization. (20 Marks)

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6.3. State the **three** main modes of viral transmission from an infected person to a susceptible host. (30 Marks)

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6.4. Draw and label the lytic cycle of the virus. (40 Marks)



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Faculty of Health Sciences
B.Sc. Honours in Industrial Pharmaceutical Science/ B.Sc. Honours in Biomedical Science/ B.Sc. Honours in Cosmetic Science

IPS 2113/ BMS 2113/ BCS 2113
Anatomy and Physiology I
2nd Year 1st Semester
End Semester Assignment Repeat Examination

Date : **9th December 2024**
Time : **2.30 p.m. – 3.30 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 A smoker develops damage to several alveoli that then can no longer function. How does this affect gas exchange? (50 marks)

1.2 How different teeth are helpfull for ingestion? (50 marks)

Question 2 **(100 marks)**

2.1 Discuss the importance of unidirectional valve in heart. (50 marks)

2.2 Explain the importance of peritoneal folds in the stomach. (50 marks)

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IPS 2113/ BMS 2113/ BCS 2113/MHPM 2113
Anatomy and Physiology I
2nd Year 1st Semester
End Semester SEQ Examination
7th Batch

Index No: .....

Date	:	**9th December 2024**
Time	:	**10.00 a.m. – 12.00 p.m. (Two Hour)**

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 **three (03)** differences between endocytosis and exocytosis. (15 marks)

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1.2 Compare antiport and symport transport. (15 marks)

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1.3 Write main functions of following organelles.

1.3.1 Mitochondria (10 marks)

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1.3.2 Smooth Endoplasmic Reticulum (SER) (10 marks)

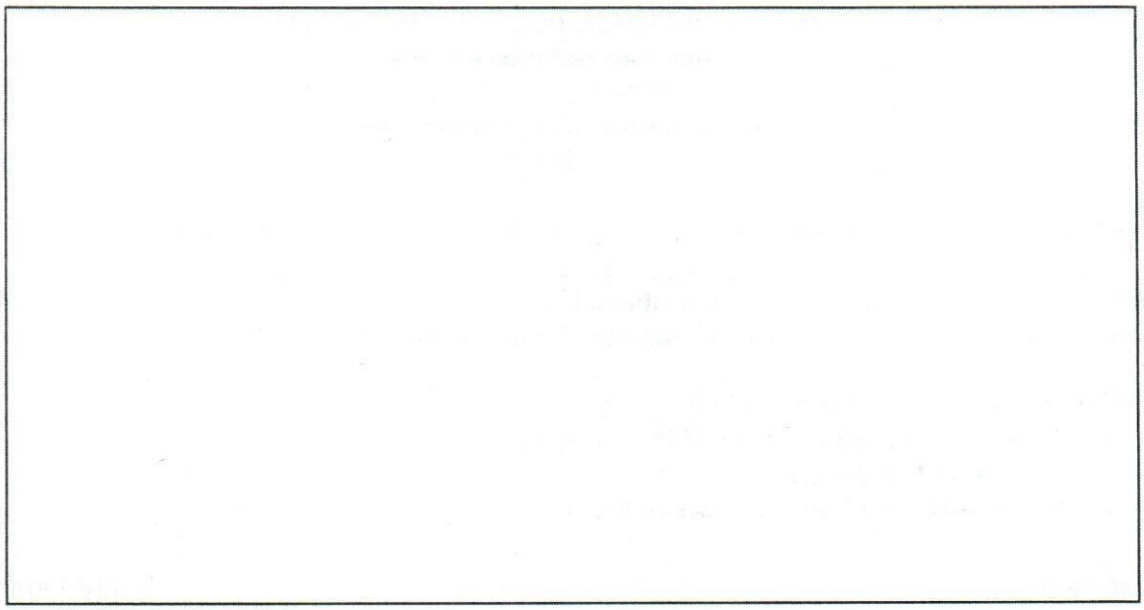
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1.3.3 Golgi apparatus (10 marks)

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1.4 Illustrate the negative feedback in hypothermia condition using a flow chart. (20 marks)



1.5 Define the term oedema. (10 marks)

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1.6 List **two (02)** main causes of oedema. (10 marks)

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Question 2 **(100 marks)**

2.1 Compare the following.

2.1.1 Pericardium and Myocardium (25 marks)

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2.1.2 Right lung and Left lung (25 marks)

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2.1.3 Right bronchus and Left bronchus (25 marks)

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2.1.4 Mechanical and Chemical digestion (25 marks)

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Question 3 **(100 marks)**

3.1 Briefly describe main mechanisms of action potential generation in making heartbeat. (25 marks)

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3.2 Define following terms.

3.2.1 Hypoxic Hypoxia (5 marks)

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3.2.2 Anaemic Hypoxia (5 marks)

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3.2.3 Stagnant Hypoxia (5 marks)

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3.2.4 Histotoxic Hypoxia (5 marks)

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3.3 Define following terms.

3.3.1 True Ribs (10 marks)

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3.3.2 False Ribs (10 marks)

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3.3.3 Floating Ribs (10 marks)

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3.4 Write a short note on respiratory epithelium. (25 marks)

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Question 4 **(100 marks)**

4.1 Outline the root components involve in making of there trunks in brachial plexus. (15 marks)

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4.2 List **three (03)** main functions of saliva. (15 marks)

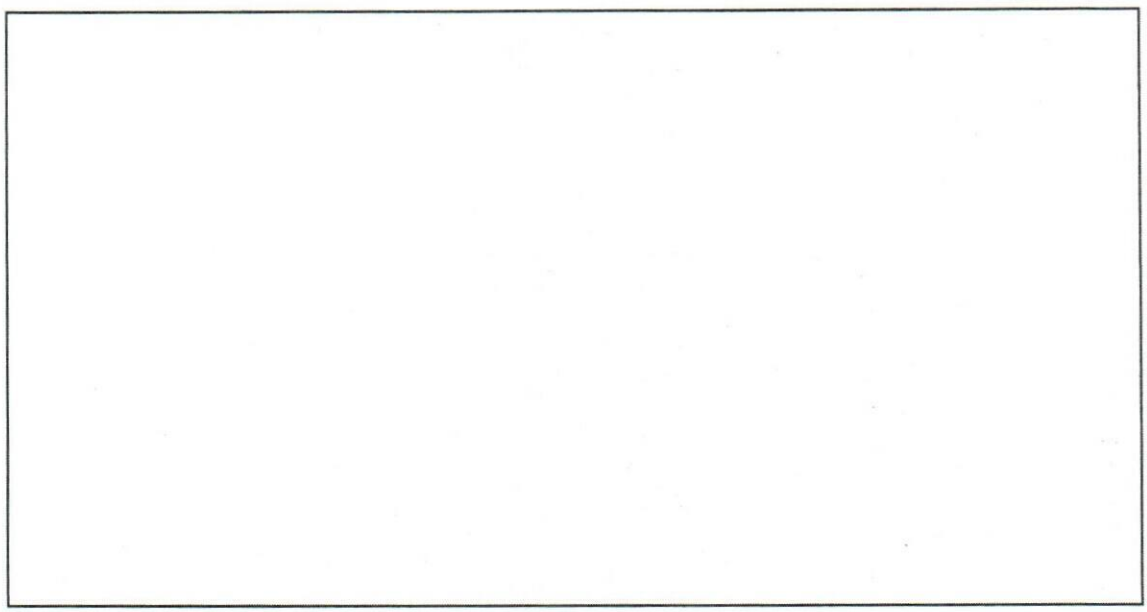
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4.3 Briefly describe three phases in deglutition. (25 marks)

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4.4 Illustrate the structure of a hepatic lobe. (25 marks)



4.5 State the structural diversity of animal cells, based on their functions, by giving 2 examples. (20 marks)

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Faculty of Health Sciences

Bachelor of Science Honours in Biomedical Sciences /Bachelor of Science Honours in Industrial Pharmaceutical Science / Bachelor of Science in Cosmetic Science

General/ Pharmaceutical/ Cosmeceutical Microbiology

(BMS/IPS/BCS/MHPM 2153)

2nd Year 1st Semester -End Examination SEQ -Special Repeat

Date	**: 18th of June 2024**
Time	**: 9.00 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 **(Marks 100)**

1.1 What is culture media in microbiology? (30 Marks)

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1.2 Define semi-solid media, solid media and liquid media (30 marks)

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1.3 State the Antibiotic Sensitivity Test (ABST) method (40 Marks)

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Question 02 **(Marks 100)**

A 50-year-old man presents with a cough lasting more than 3 weeks, low-grade fever, night sweats, and weight loss. He also reports coughing up blood-streaked sputum. He recently moved from a country where tuberculosis. A chest X-ray shows a cavity in the upper part of his lungs and special stain performed on his sputum sample shows acid-fast bacilli.

2.1 Name the bacteria responsible for the above condition. (25 Marks)

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2.2. State the reagents used in acid-fast staining. (30 Marks)

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2.3. State why the bacteria are classified as acid-fast and non-acid-fast with the significance of this property in its diagnosis. (45 Marks)

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Question 03 **(Marks 100)**

A 28-year-old man presents to the emergency department after stepping on a nail while gardening. After taking him to the hospital the wound was cleaned to remove dirt, debris, and dead tissue. Also, tetanus immunoglobulin (TIG) was injected.

3.1. Identify the bacteria prevented by Tetanus Immunoglobulin injection (TIG). (20 marks)

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3.2. What is the neurotoxin produced by above bacteria? (20 marks)

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3.3. Name **two** other species that belong to the same group of bacteria. (20 marks)

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3.4 List four general characteristics of the bacteria mentioned in 3.1 and 3.4. (40 marks)

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Question 04 **(Marks 100)**

4.1.Define the gram-positive bacteria with their anatomical difference from gram-negative bacteria (25 Marks)

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4.2.List down two gram-positive and two gram-negative bacteria (35 Marks)

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4.3. States the steps of staining used to differentiate above (4.1) mentioned bacterial types

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Question 05 **(Marks 100)**

5.1. Define "hyphae" in fungal structure? (30 Marks)

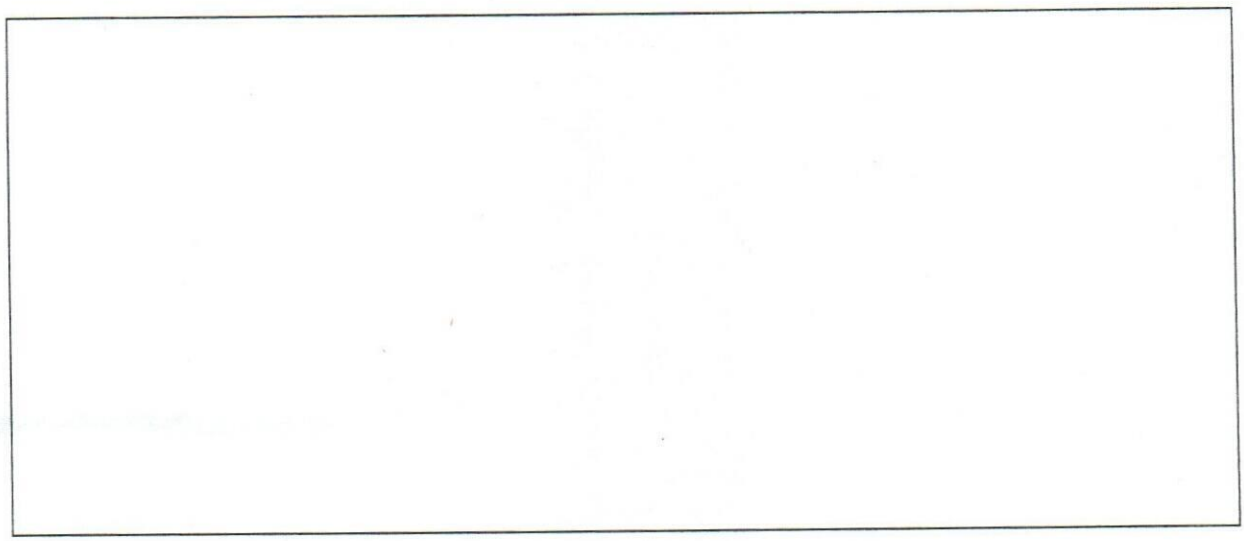
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5.2. State the viral lytic cycle in brief (40 Marks)

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5.3. Draw a label diagram of bacteriophage (40 Marks)



Question 06 **(Marks 100)**

6.1. State the name of the scientist who applied germ theory for surgery for the first time in history. (10 Marks)

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6.2. Write the difference between sterilization and disinfection. (20 Marks)

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6.3. Write a note on dry heat sterilization with examples. (30 Marks)

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6.4. List down four conditions we should consider when selecting a appropriate sterilization or disinfection methods. (40 Marks)

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BMS 2123 / IPS 2123 / BCS 2123 / MHPM 2123– Biochemistry I
Batch – 04
2nd Year 1st Semester
End semester Special Repeat SEQ Examination

INDEX NUMBER : .....

Date : 17th of June 2025
Time : 9.00 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.
- You are allowed to use a scientific calculator for the examination.

QUESTION 01 **(100 marks)**

1.1. List **four (04)** factors that affect the permeability of the plasma membrane. (10 marks)

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1.2. Compare and contrast between different types of ATP driven pumps. (30 marks)

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1.3. Outline the role of secondary active transport in nutrient absorption. (30 marks)

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1.4. Draw a flow chart to show the signaling pathway of glucagon hormone. (30 marks)

QUESTION 02 **(100 marks)**

2.1. Classify the following carbohydrates based on their functional groups. (15 marks)

2.1.1.Fructose

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2.1.2.Ribose

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2.1.3. Galactose

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2.2. Briefly describe the significance of glycogenolysis. (30 marks)

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2.3. Write a short note on the significance of carbohydrates. (25 marks)

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2.4. Outline the pathways through which pyruvate can be metabolized after glycolysis. (30 marks)

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QUESTION 03 **(100 marks)**

3.1. Name **two (02)** enzymes involved in the HMP shunt. (10 marks)

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3.2. Differentiate gluconeogenesis and glycolysis. (30 marks)

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5.3. List **three (03)** hormones that regulate blood glucose levels. (15 marks)

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3.4. Name **three (03)** metabolic disorders related to carbohydrate metabolism. (15 marks)

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3.5. State the importance of glucagon in regulating glucose metabolism. (30 marks)

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QUESTION 04 **(100 marks)**

4.1. Draw a flow chart summarizing the stages of the electron transport chain and ATP synthesis. (25 marks)

4.2. Justify how NADH produces more ATP than $FADH_2$ in oxidative phosphorylation. (25 marks)

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4.3. State the role of cytochrome C in the electron transport chain. (25 marks)

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4.4. How does pentose phosphate pathway help in managing oxidative stress in the body? (25 marks)

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QUESTION 05 **(100 marks)**

5.1 Illustrate the structure of triglyceride made by following fatty acid. (20 marks)

$CH_3(CH_2)_{16}$-COOH

5.2 List **four (04)** main functions of lipids. (20 marks)

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5.3 Compare followings.

5.3.1 Simple lipids and Compound lipids (20 marks)

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5.3.2 Omega nomenclature and Delta nomenclature of fatty acids (20 marks)

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5.3.3 Cis and Trans fatty acids (20 marks)

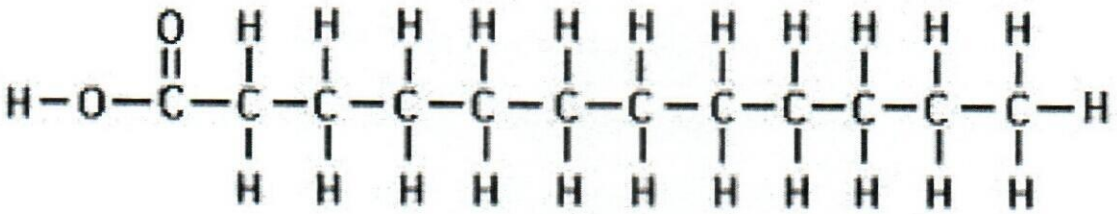
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QUESTION 06 **(100 marks)**

6.1 Write a short note on "Carnitine Shuttle". (25 marks)

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6.2 Calculate the total energy (ATP) yield from the beta oxidation of lauric acid. (25 marks)



Lauric acid structure

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6.3 Briefly describe hormone-induced fatty acid mobilization in adipocytes. (25 marks)

6.4 Define following terms. (12.5 marks X 2= 25 marks)

6.4.1 Ketone bodies

6.4.2 Atherosclerosis

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Bachelor of Science Honours in Cosmetic Science
BMS 2123 / IPS 2123 / BCS 2123 – Biochemistry I

Batch – 04

2nd Year 1st Semester

End semester Special Repeat Assignment Examination

Date : **17th of June 2025**
Time : **01.30 p.m. – 02.30 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.
- You are allowed to use a scientific calculator for the examination.

QUESTION 01 **(100 marks)**

1.1. Describe the allosteric regulation of key enzymes in glycolysis and gluconeogenesis. (60 marks)

1.2. Briefly describe the role of insulin in the carbohydrate metabolism. (40 marks)

QUESTION 02 **(100 marks)**

2.1. Discuss the different methods of cell communication using diagrams. (50 marks)

2.2. Write a short note on the importance of HMP shunt. (50 marks)

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Bachelor of Science Honours in Medical Health Product Management
BMS 2113/ IPS 2113/ BCS 2113/ MHPM 2113
Anatomy and Physiology I
2nd Year 1st Semester

Mid Semester BRQ/MCQ Examination

8th Batch

Date	:	**16th June 2025**
Time	:	**9.00 a.m. – 10.00 a.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
		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 component in the conducting system involves for ventricle contraction?
1. SA node
2. AV node
3. Internodal pathway
4. AV bundle
5. Purkinje fibers

2. A cardiac valve with two flaps is,
1. Mitral valve
2. Tricuspid valve

3. Aortic valve
4. Semilunar valve
5. Pulmonary valve

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

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

4. What is the organelle which is not found in the cytosol of eukaryotic cells?

1. Mitochondria
2. Smooth Endoplasmic Reticulum
3. 70 S Ribosome
4. Nucleus
5. Golgi apparatus

5. What is the cell organelle made by actin protein?

1. Microfilaments
2. Centrioles
3. Cilia
4. Intermediate filaments
5. Microtubules

6. Which part of a bronchial tree involves for gas exchange?

1. Trachea
2. Primary bronchi
3. Lobar bronchi
4. Bronchioles
5. Alveolar sacs

7. What type of cell transport process need energy?

1. Endocytosis
2. Osmosis
3. Ion channels
4. Diffusion
5. Filtration

8. Which blood vessel wall contains only an endothelium?

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

9. True or false regarding plasma membrane?

1. All lipids in plasma membrane present as phospholipid form.
2. Proteins make mosaic nature of plasma membrane.

3. It contains receptor proteins.
4. Most membrane carbohydrates are bound to protein molecules.
5. It is a semi permeable membrane.

10. **True or false regarding cardiac cycle?**
    1. Systole is the relaxation phase.
    2. Blood flows actively from the atria to ventricles.
    3. The cardiac cycle is the period between two heart beats.
    4. The contraction and relaxation phases are identical in both halves of the heart.
    5. Pressure in the heart is low in atrial diastole.

11. **True or false regarding heart wall?**
    1. Myocardium is the thickest layer of heart.
    2. Pericardium contains cardiac muscle cells.
    3. Serous pericardium secretes pericardial fluid.
    4. Epicardium is a part of serous pericardium.
    5. Fibrous pericardium is continuous with the tunica adventitia of the great blood vessels.

12. **Regarding the blood vessels,**
    1. All veins are absent with valves.
    2. Arteries allow the flow of blood towards the heart.
    3. All arterial vessels are arising from the aorta.
    4. All arteries carry oxygenated blood.
    5. Blood inside the arteries is under low pressure.

13. **True or false regarding heart?**
    1. "Lub" sound makes by closure of the atrioventricular valves.
    2. Sinoatrial node (SA node) is the heart's natural pacemaker.
    3. During diastole all four chambers are contracted.
    4. Purkinjie fibers are part of heart conduction system.
    5. Bundle of His transmits the impulse from the atrioventricular (AV) node to the ventricles.

14. **True or false regarding human respiratory system?**
    1. Respiratory epithelium is a pseudostratified columnar ciliated epithelium.
    2. Bifurcation of trachea is presented at 7^{th} Thoracic vertebrae
    3. Trachea contains elastic cartilage.
    4. Right bronchus is wider than left bronchus.
    5. Alveoli are lined by simple squamous epithelium.

15. **True or false regarding human cell?**
    1. Phospholipids are the major lipids in the plasma membrane.
    2. Centrioles are non-membranous organelles.
    3. Mitochondria are "Power House" of the cells.
    4. Smooth endoplasmic reticulum synthesizes proteins.
    5. Lysosomes are suicidal bags of cells.

16. **True or false regarding lungs?**
    1. Left lung is larger than right lung.
    2. Left lung has two fissures.
    3. Apexes of lungs are above the level of clavicle.
    4. Costal surfaces of each lungs are convex.
    5. Medial surface contains hilum.

17. **True or false regarding human cell nucleus?**
    1. Nucleolus is a double-membrane structure.
    2. Heterochromatin has less condensed organization.
    3. The nucleolus disappears when a cell undergoes division.
    4. Nuclear pores are the sites for the exchange of large molecules.
    5. Nucleoplasm supports the nucleus by helping to maintain its shape.

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

19. **True or false?**
    1. Osmolarity is the total number of solute particles in 1 L of solution.
    2. When sodium ion concentration decreases, osmolality will fall in intestitial fluid.
    3. Homeostasis is a physiological process to keep the internal environment in steady state.
    4. Body fluid amount is dependent on age.
    5. Oedema is caused by an imbalance in fluid distribution.

20. **True or false regarding cell cycle?**
    1. The cell makes copies of its chromosomes in "S phase".
    2. Chromosomes line up across center of the cell in metaphase.
    3. In anaphase chromosomes travel to opposite ends of cellular spindle.
    4. Mitosis is important to produce gametes.
    5. New proteins and organelles are produced in "G1 phase".

Examination Department
16 JUN 2025
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BMS 2113/ IPS 2113/ BCS 2113/ MHPM 2113
Anatomy and Physiology I
2nd Year 1st Semester

Mid Semester BRQ/MCQ Examination- 8th Batch

Index No: .....

Date : 16th June 2025
Time : 9.00 a.m. – 10.00 a.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

- **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

2.

1	2	3	4	5

3.

1	2	3	4	5

4.

1	2	3	4	5

5.

1	2	3	4	5

6.

1	2	3	4	5

7.

1	2	3	4	5

8.

1	2	3	4	5

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

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PAST PAPERS

Faculty	*Department / Section/Division*
Not Applicable	*Learning Resource Centre*

Past Papers

Faculty of Health Sciences

General Papers

(Year 2 – Semester 1)

Document Control & Approving Authority	*Senior Director – Quality Management & Administration*

1st Issue Date: 2017.011.30	*Revision No.00*	*Revision Date: 18.09.2024*	*Validated by: Librarian*

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Faculty of Health Sciences

BSC. (HONS) INDUSTRIAL PHARMACUETICAL SCIENCES BSC. (HONS) COSMETIC SCIENCES

BCS 2143 Organic Chemistry
End Semester Examination SEQ
2nd Year 1st Semester
6th Batch

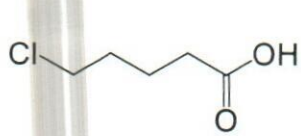
Date: 1st of March 2024
Time: 09.00 am – 12.00 pm - Three Hours

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

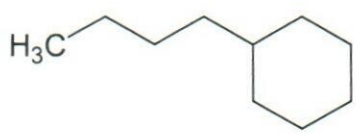
Question 01 **(100 marks)**

1.1 Name the following structures in IUPAC nomenclature. (20 marks)

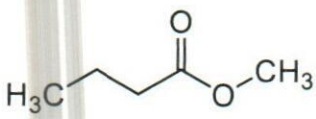
(a)



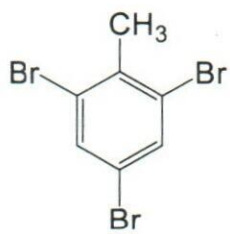
(b)



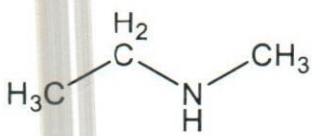
(c)



(d)



(e)



1.2 Draw the structures corresponding to the following IUPAC names. (20 marks)

(a) 3-(N-methylamino) butanoic acid

(b) 3-methyl-2-phenyloctane

(c) 2,4,6-Trinitrotoluene

(d) 3-hydroxyprop-2-enal

(e) 2-methylheptan-3-one

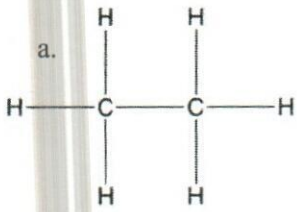
1.3 Identify the alkene obtained on dehydration of following alcohols. (You may draw the structure of the product in your answer sheet) (20 marks)

a. 3-ethyl-3-pentanol

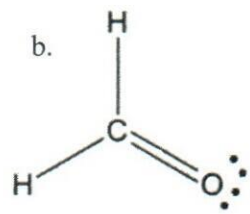
b. 2-propanol

1.4 Comment on the polarity of the molecules given below and briefly indicate the reason for your answer for each molecule. (40 marks)

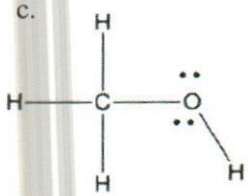
a.



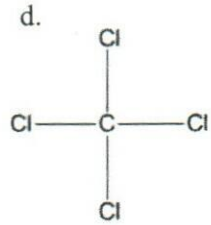
b.



c.



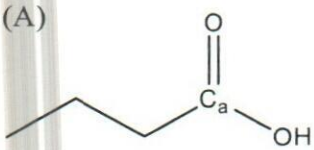
d.



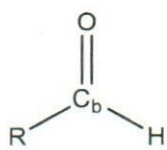
Question 02 **(100 marks)**

2.1. Determine the oxidation states on the carbon atoms (C_a, C_b, C_c, C_d) of following organic molecules. (10 marks)

(A)



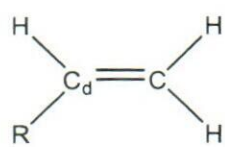
(B)



(C)



(D)



2.2. Classify each of the following reactions as an addition, elimination, substitution, or rearrangement.

(20 marks)

(a) $C_6H_6 + CH_3Cl \longrightarrow C_6H_5CH_3 + HCl$

(b) $CH_3CH_2OH \longrightarrow H_2C{=}CH_2 + H_2O$

(c) $C_6H_6 + Br_2 + FeBr_3 \longrightarrow C_6H_5Br + HBr + FeBr_3$

(d) $C_2H_6 + Cl_2 \longrightarrow C_2H_5Cl + HCl$

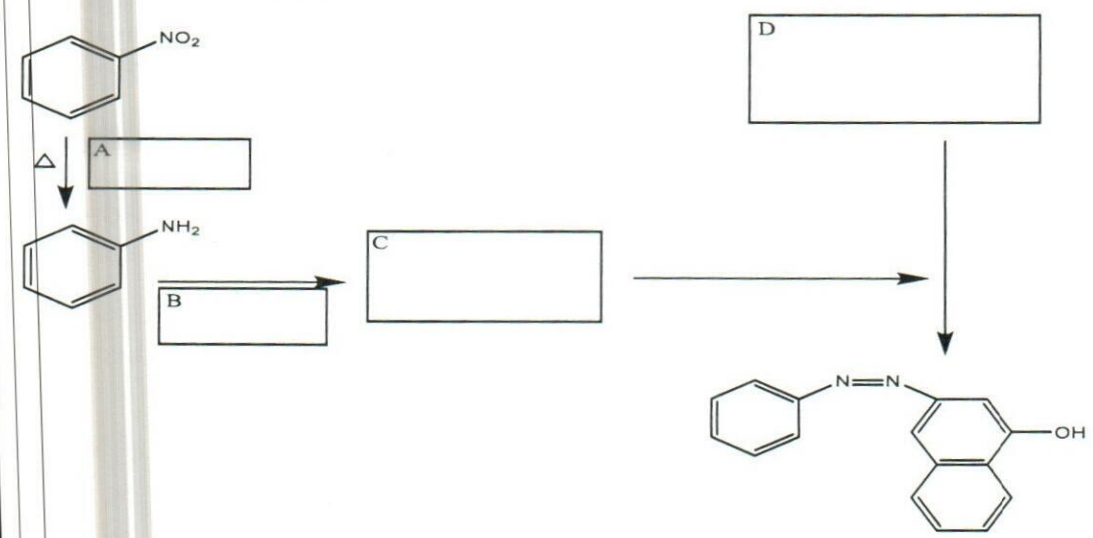
(e) $CH_3CH_2OH + HCl \longrightarrow CH_3CH_2Cl + H_2O$

2.3. Consider the reaction between 2-bromopropane and NaOH. Write down products that you would obtain in following conditions. (30 marks)

a. Ethanol as reaction medium and high temperature.

b. Water as reaction medium when concentration of NaOH is low.

2.4 Predict the structure of (A), (B), (C) and (D) (40 marks)



Question 03 **(100 marks)**

3.1 Draw the Newman projection of staggered and eclipsed conformations of the following molecules.

(20 marks)

a. Cl-CH_2-CH_2-Cl

b. OH-CH_2-CH_2-CH_3

3.2 Consider the molecule CH_3-CH_3 (ethane). Sketch the graph of the rotational barrier in ethane as a function of dihedral angle. (20 marks)

3.3 Draw compounds that contain the following. (20 marks)

a. A primary alcohol
b. A tertiary amine
c. Both primary and secondary alcohol
d. Quaternary carbon

3.4 Describe the following by giving examples. (30 marks)

a. Constitutional isomers
b. Stereoisomers

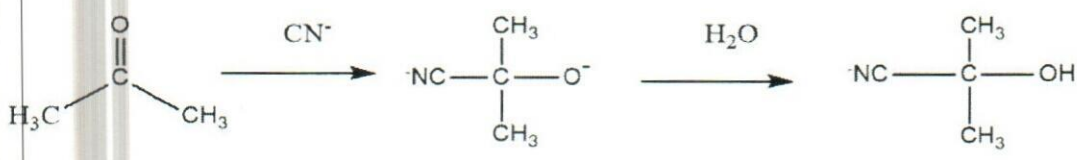
3.5 Draw the structure that make following description. (10 marks)

a. Three isomers with the formula C_8H_{18}
b. Two isomers with the formula $C_4H_8O_2$

Question 04 **(100 marks)**

4.1 Together with its structure define a tertiary alcohol in terms of its valency, charge, bonding and non-bonding electrons. (10 marks)

4.2 Give the mechanism of the nucleophilic addition reaction mechanism (given below) leading to the formation of an alcohol via an alkoxide. (20 marks)



4.3 Propose synthetic schemes for the following conversions. Show all the reagents and the structures of the intermediates involved. (30 marks)

i)

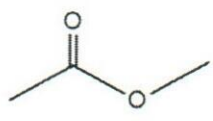


ii)



4.4 Write **four** electronic factors which influence the organic reactions. (20 marks)

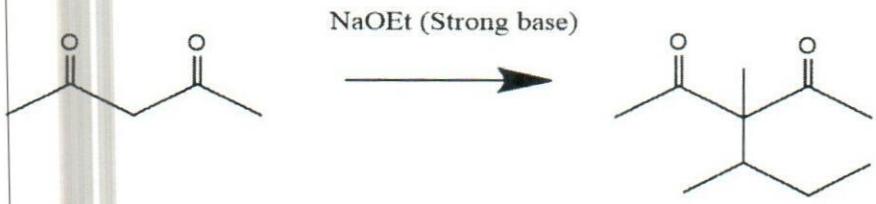
4.5 Draw the resonance structures of the following organic molecule. (20 marks)



Question 05 **(100 marks)**

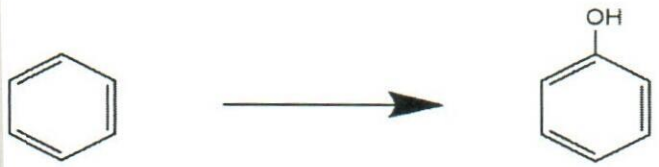
5.1. Using resonance structures explain why phenol is "π-excessive" (excessive π electron density) compared to benzene. (15 marks)

5.2 Propose a suitable mechanism for the following reaction. Show all the reagents and the structures of the intermediates involved. (25 marks)



5.3 Propose synthetic schemes for the following conversions. Show all the reagents and the structures of the intermediates involved. (30 marks)

i)



ii)



iii)



5.4 Briefly explain why phenols have much higher boiling point than there corresponding hydrocarbons. (15 marks)

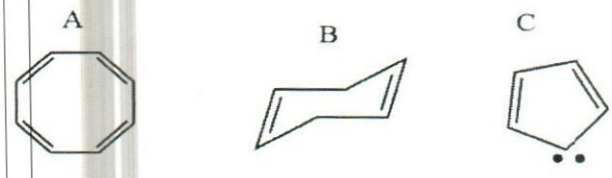
5.5 State three tests which can distinguished between phenols and alcohols. (15 marks)

Question 06 **(100 marks)**

6.1. 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. (20 marks)

Heat of hydrogenation (ΔH_h) of cyclohexatriene = 360 kJ/mol
Heat of hydrogenation (ΔH_h) of benzene = 208 kJ/mol

6.2 Classify the given A, B and C molecules as aromatic, antiaromatic and non-aromatic. Briefly explain the reason for the choice. (30 marks)

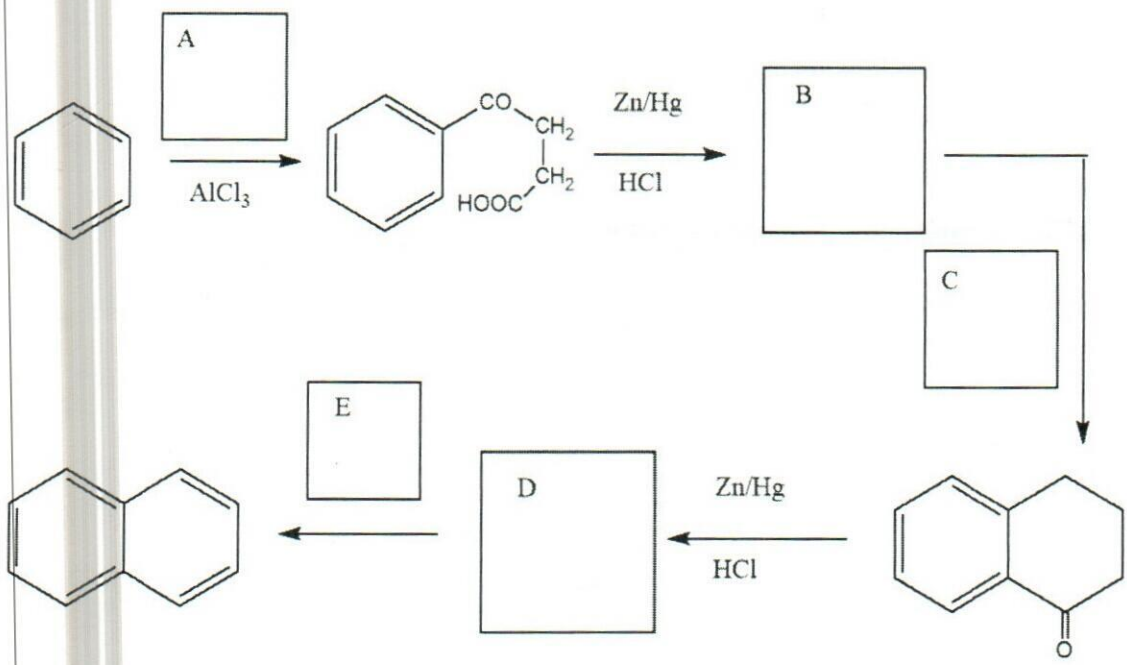


6.3 Based on the following structural information draw the correct structure of naphthalene. (15 marks)

2 - hydroxy
6 - methyl
8 – nitro

6.4 State two sources of poly aromatic hydrocarbons. (10 marks)

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



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BMS 2152-General Microbiology
IPS 2153-Pharmacutical Microbiology
BCS 2153- Cosmeceutical Microbiology
2nd year 1st Semester-BMS/IPS Batch 06, BCS Batch 04
End semester SEQ Examination

Date : **26th February 2024**
Time : **9.00 am. – 12.00 pm (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. Define the microbial culture media types indicated below.
1.1.1. Enrichment media
1.1.2. Selective media
1.1.3. Differential media
1.1.4. Chromogenic media (40 Marks)

1.2. State the uses of following culture media types used in microbiology
1.2.1. Semi-solid media
1.2.2. Broth media
(30 marks)

1.3. Briefly describe the reason for observing the Acid-Fast bacterial cells in red color after Ziehl–Neelsen staining. (15 marks)

1.4. Mention the stains used for following bacterial staining methods.
1.4.1. Endospore staining
1.4.2. Flagella staining
1.4.3. Grams staining (15 marks)

QUESTION 02 **(100 marks)**

2.1. Draw the microbial growth curve and mention different phases of the curve. (40 marks)

2.2. Explain the key facts on each phase of the bacterial growth curve that you mentioned in 2.1. (60 marks)

QUESTION 03 **(100 marks)**

37 year male patient presented with swelling and redness in the penis and had pus like discharge from penis. Meanwhile he had dysuria. On history, patient has had sexually exposed with unstable partners. Urethral swab was done and gram staining found oval shaped Gram negative diplococci which are capsulated. Culture plate showed colorless raised colonies with 1- mm diameter on chocolate agar.

3.1. What is the possible diagnosis of this patient? (20 marks)
3.2. What is the suspected microorganism? (20 marks)
3.3. State the virulence factors of microorganism mentioned in 3.2. (25 marks)
3.4. Mention the disease caused by each organism
3.4.1. *Corynebacterium diptheriae*
3.4.2. *Neisseria meningitidis*
3.4.3. *Bacillus anthracis*
3.4.4. *Mycoplasma pneumoniae*
3.4.5. *Chlostridium tetani*
3.4.6. *Treponima pallidum*
3.4.7. *Mycobacterium tuberculosis* (35 marks)

QUESTION 04 **(100 marks)**

A 40-year-old female patient was admitted to the medical ward with symptoms of dyspnea, pleuritic chest pain, fever with chills, cough, rusty sputum. Sputum culture had resulted gram positive diplococci with short chains and the colonies appear in narrow zone with alpha hemolysis on blood agar plate. Further the organism is susceptible to the Optochin sensitivity.

4.1. Identify the suspected micro-organism. (20 marks)

4.2. Differentiate the types of hemolysis on blood agar plate. (20 marks)

4.3. Briefly explain the virulence factors of above-mentioned organism. (25 marks)

4.4. Explain the usage of Bacitracin and Optochin test for the differentiation of micro-organisms. (35 marks)

QUESTION 05

5.1. Mention the two types of genetic materials present in the bacteria. (10 marks)

5.2. Classify the plasmids by their ability to be transferred to other bacteria. (20 marks)

5.3. Compare the horizontal and vertical gene transfer methods in bacteria. (30 marks)

5.4. Explain the one method of horizontal gene transfer with an example. (40 marks)

QUESTION 06 **(100 marks)**

6.1 State the difference between fungi and bacteria. (10 marks)

6.2 State the transmission methods of the virus. (10 marks)

6.3 Briefly explain the structure of the fungus. (20 marks)

6.4 Explain the life cycle of a virus along with an illustration (30 marks)

6.5 Write the short notes of the following,

6.5.1 Yeast (10 marks)

6.5.2 Molds (10 marks)

6.5.3 *Candida albicans* (10 marks)

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Bachelor of Science Honours in Cosmetic Science
BMS 2123 / IPS 2123 / BCS 2123 – Biochemistry I
Batch – 06
2nd Year 1st Semester
End semester SEQ Examination

Date : **21st of February 2024**
Time : **01.30 p.m. – 02.30 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.
- You are allowed to use a scientific calculator for the examination.

QUESTION 01 **(100 marks)**

1.1. Differentiate Phosphofructokinase-1 and Fructose 1,6-bisphosphatase. (25 marks)
1.2. State what is meant by Cori cycle. (15 marks)
1.3. Write short notes on following topics.
1.3.1. Glycogen branching enzyme (30 marks)
1.3.2. UDP glucose (30 marks)

QUESTION 02 **(100 marks)**

2.1. State what is meant by a receptor. (15 marks)
2.2. Discuss the different methods of cell communication using diagrams. (50 marks)
2.3. Write a short note on the importance of HMP shunt. (35 marks)

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BMS 2123 / IPS 2123 / BCS 2123 – Biochemistry I
Batch – 06
2nd Year 1st Semester
End semester SEQ Examination

Date : **21st of February 2024**
Time : **9.00 am. – 12.00 pm (Three Hours)**

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **SIX** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink.
- You are allowed to use a scientific calculator for the examination.

QUESTION 01 **(100 marks)**

1.1. State four (04) factors which aid to maintain the fluidity of the plasma membrane. (10 marks)
1.2. Compare and contrast between the different types of ATP driven pumps. (30 marks)
1.3. Write a short note on secondary active transport systems. (30 marks)
1.4. Draw a flow chart to denote the signal transduction pathway of oestragon hormone. (30 marks)

QUESTION 02 **(100 marks)**

2.1. Classify the following carbohydrates based on the functional group. (15 marks)
2.1.1. Fructose
2.1.2. Sedoheptulose
2.1.3. Erythrose
2.2. Write a short note on significance of carbohydrates. (25 marks)
2.3. Describe the importance of gluconeogenesis. (30 marks)
2.4. Discuss the metabolic fates of glucose-6-phosphate. (30 marks)

QUESTION 03 **(100 marks)**

3.1. State the enzymes involved in glycogenesis. (10 marks)
3.2. Differentiate between glycogenesis and glycogenolysis. (30 marks)
3.3. Mention five (05) metabolic pathways that are activated during the well fed state. (15 marks)
3.4. List three (03) glycogen storage disorders. (15 marks)
3.5. Describe the role of insulin in regulating glycogen metabolism. (30 marks)

QUESTION 04 **(100 marks)**

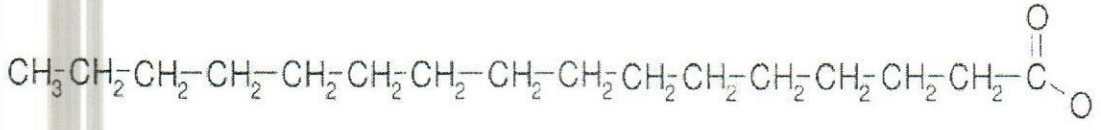
4.1. Draw a flow chart to denote the reactions of TCA cycle. (25 marks)
4.2. Discuss the role of pentose phosphate pathway in controlling oxidative stress. (25 marks)
4.3. It is observed that $FADH_2$ produces less ATP than NADH through electron transport chain. Justify this statement. (25 marks)
4.4. Describe the role of ubiquinone in electron transport chain. (25 marks)

QUESTION 05 **(100 marks)**

5.1 Describe main functions of lipids. (35 marks)
5.2 Draw the structure of following fatty acid. (25 marks)
18:1 omega 9
5.3 Explain the formation of triglyceride by using stearic acid ($CH_3(CH2)_{16}COOH$) as the fatty acid. (25 marks)
5.4 List four (04) chemical reactions of lipids. (15 marks)

QUESTION 06 **(100 marks)**

6.1 Define following terms.
6.1.1 Saturated fatty acids (10 marks)
6.1.2 Polyunsaturated fatty acids (10 marks)
6.2 Write a short note on beta oxidation. (25 marks)
6.3 Calculate the total energy (ATP) yield from the beta oxidation of Palmitic acid. (35 marks)



Palmitic acid structure

6.4 List four (04) examples for lipolytic hormones. (20 marks)

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IPS 2113/ BMS 2113/ BCS 2113 Anatomy and Physiology I
2nd year 1st semester

End Semester MCQ/BRQ Examination

6th Batch

Date	:	**19th February 2024**
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
		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. **What is the division of the mediastinum that contains pericardium?**
   1. Superior mediastinum
   2. Anterior mediastinum
   3. Middle mediastinum
   4. Posterior mediastinum
   5. Inferior mediastinum

2. **What is the cell organelle important in lipid metabolism?**
   1. Mitochondria
   2. Ribosome
   3. Smooth endoplasmic reticulum
   4. Rough endoplasmic reticulum
   5. lysosome

3. **Which of the following represent the largest portion of extracellular fluids?**
   1. Lymph
   2. Interstitial fluid
   3. Plasma
   4. Synovial fluid
   5. Cerebrospinal fluid

4. **What is the part of the brain that contains pneumotaxic centre?**
   1. Cerebral cortex
   2. Cerebral medulla
   3. Pons
   4. Medulla Oblongata
   5. Hypothalamus

5. **Peritoneum fold mainly associated with stomach by,**
   1. Coronary ligament
   2. Mesocolon
   3. Mesentery
   4. Falciform ligament
   5. Omentum

6. **What is the red blood cell indices that represent the coefficient of variation of the red blood cell volume distribution?**
   1. Mean corpuscular volume
   2. Mean corpuscular hemoglobin
   3. Mean corpuscular hemoglobin concentration
   4. Red cell distribution width
   5. Hematocrit

7. **What is the volume of air that remains in the lungs after a maximal expiration?**
   1. tidal volume
   2. minute ventilation
   3. inspiratory reserve volume
   4. tidal volume
   5. residual volume

8. Which of the following upper limb bone/s lie in the upper arm region?

1. Humerus
2. Radius
3. Ulnar
4. Carpels
5. Metacarpals

9. True or false regarding typical human cell?

1. The glycocalyx rich with carbohydrates.
2. Gap junctions are important for intercellular communication.
3. Inclusions can be seen in all types of cells.
4. Centrioles consist nine microtubule triplets.
5. Ribosomes are membranous organelles.

10. True or false regarding thoracic region?

1. Pectoralis major is the largest muscle.
2. Pectoralis major is the deepest muscle.
3. External intercostal muscles are directed downward and backward.
4. There are nine true ribs.
5. Diaphragm is innervated by phrenic nerve.

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

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

12. True or false regarding hypoxia?

1. There is oxygen deficiency at tissue or cellular level in hypoxia.
2. At high altitude, hypoxic hypoxia can occur.
3. Congestive heart failure can cause histotoxic hypoxia.
4. Brain cells are extremely sensitive to hypoxia.
5. Anaerobic glycolysis may occur in hypoxia.

13. Regarding blood supply of upper limb,

1. The axillary artery supplies the walls of the axilla.
2. Brachial artery is the major artery of the forearm.
3. Ulnar artery supplies lateral side of the forearm to the wrist.
4. Radial artery supplies medial side of the forearm to the wrist.
5. Brachial artery beginning as a continuation of the axillary artery.

14. Regarding human cell,

1. All plasma proteins are presented at peripherally.
2. Tight junctions allow ions to pass for intercellular communication.
3. Cristae are infoldings of outer membrane of mitochondria.
4. Ribosomes are sites of lipid synthesis.
5. Microtubules are made of tubulin proteins.

15. **Regarding heart anatomy,**
    1. Apex is at the left side of the heart.
    2. Anterior surface is mainly formed by right ventricle.
    3. Endocardium is the thickest layer.
    4. Myocardium consists cardiac muscles.
    5. Coronary sulcus is an external sulcus.

16. **In nasal cavity,**
    1. nasal conchae project laterally from the medial wall.
    2. there are three meatus.
    3. olfactory mucosa contains receptors for smell.
    4. mucosa contains stratified columnar ciliated epithelium.
    5. conchae provide large surface area for humidification of air.

17. **In cell division,**
    1. spindle fibres start to appear in telophase.
    2. chromosomes line up across center of the cell.
    3. cytoplasm starts to divide in telophase.
    4. chromosomes travel to opposite ends of cells in prophase.
    5. meiosis makes four identical cells.

18. **True or false?**
    1. The sternum is a part of thoracic cage.
    2. The eighth rib is a false rib.
    3. Anterior mediastinum is the largest subdivision of the mediastinum.
    4. The arch of aorta presents in the superior mediastinum.
    5. Middle mediastinum contains thymus.

19. **Regarding a plasma membrane,**
    1. Most integral proteins are transmembrane proteins.
    2. It contains only carrier transporters.
    3. It consists only of non-polar molecules.
    4. It is a semipermeable membrane.
    5. It contains recognition sites for antibodies.

20. **True or false regarding the functions of gastrointestinal system?**
    1. Carbohydrate digestion starts from the duodenum.
    2. Liver is involved in fatty acids oxidation.
    3. Absorbed fatty acids are moved through the lymphatic system.
    4. Fat is emulsified by pepsin in stomach.
    5. Cholecystokinin stimulates the ejection of bile from the gallbladder.

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IPS 2113/ BMS 2113/ BCS 2113 Anatomy and Physiology I

2nd year 1st semester

End Semester SEQ Examination

6th Batch

Date : **19th February 2024**
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 short notes on followings.
- 1.1.1 Interphase of cell cycle (25 marks)
- 1.1.2 Cytoskeleton (25 marks)

1.2 Describe main functions of Golgi apparatus. (25 marks)

1.3 Describe main functions of lymph. (25 marks)

Question 2 **(100 marks)**

2.1 List major components in thoracic wall. (20 marks)

2.2 Describe identification characters of thoracic vertebrae. (30 marks)

2.3 List four differences between right and left bronchi. (20 marks)

2.4 Define the lung volumes given below.
- 2.4.1 Tidal volume (10 marks)
- 2.4.2 Inspiratory reserve volume (10 marks)
- 2.4.3 Expiratory reserve volume (10 marks)

Question 3 **(100 marks)**

3.1 Describe the structure of pericardium. (35 marks)

3.2 List three (03) differences between blood plasma and serum. (15 marks)

3.3 Name the type of respiratory epithelium. (10 marks)

3.4 Write one main function of the following.

3.4.1 Neutrophils (10 marks)
3.4.2 Eosinophils (10 marks)
3.4.3 Basophils (10 marks)
3.4.4 B-Lymphocytes (10 marks)

Question 4 **(100 marks)**

4.1 List five (05) functions of small intestine. (20 marks)
4.2 Describe the deglutition (Swallowing) process. (30 marks)
4.3 List the major branches of three segments of axillary artery defined by the pectoralis minor muscle. (20 marks)
4.4 Describe the anatomical features of human liver. (30 marks)

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BMS 2113/ IPS 2113/ BCS 2113 Anatomy and Physiology I
2nd Year 1st Semester

Mid Semester MCQ Examination

6h Batch

Date : **1st December 2023**
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
		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 component in the conducting system involve for ventricle contraction?**
   1. SA node
   2. AV node
   3. Internodal pathway
   4. AV bundle
   5. Purkinje fibers

2. **A cardiac valve with two flaps,**
   1. Mitral valve
   2. Tricuspid valve
   3. Aortic valve
   4. Semilunar valve
   5. Pulmonary valve

3. **In which mitosis phase chromosomes line up across center of the cells?**
   1. Interphase
   2. Prophase
   3. Metaphase
   4. Anaphase
   5. Telophase

4. **Cell organelle contains oxidase enzymes,**
   1. Peroxisomes.
   2. Lysosomes.
   3. Ribosomes.
   4. Secretory vesicles of Golgi apparatus.
   5. Vacuoles.

5. **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

6. **Which of the following cell organelles does the 'autolysis?**
   1. Nucleus
   2. Lysosomes
   3. Peroxisome
   4. Mitochondria
   5. Centrioles

7. **Which is the most suitable name for body fluid compartment that contains cerebrospinal fluid?**
   1. Intracellular fluids
   2. Extracellular fluids
   3. Interstitial fluids
   4. Transcellular fluids
   5. Plasma

8. **Which vertebrae is having a heart shaped vertebral body?**
   1. Cervical
   2. Lumbar
   3. Thoracic
   4. Atlas
   5. Axis

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9. **In the cell cycle,**
   1. Chromosomes travel to opposite ends of cells in anaphase.
   2. Organelles are duplicated in the G_2 phase.
   3. spindle fibres start to disappear in telophase.
   4. G_2 phase is the shortest part of the interphase.
   5. meiosis makes four identical cells.

10. **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.

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

12. **Regarding the thoracic vertebrae,**
    1. there are seven thoracic vertebrae.
    2. sixth thoracic vertebra is one of the atypical thoracic vertebrae.
    3. spinous process contains facets for tubercles of ribs.
    4. body contains facets for heads of ribs.
    5. body is kidney shape.

13. **Regarding white blood cells,**
    1. basophils release heparin.
    2. T cells mainly works against to bacteria.
    3. monocytes are the first white blood cells which respond to infections.
    4. macrophages show phagocytosis.
    5. eosinophils can increase in allergic reaction.

14. **Regarding the atrioventricular (AV) node in heart,**
    1. it directs the cardiac impulse from the atria to the ventricles.
    2. it serves as the pacemaker for the heart.
    3. it delays the transmission of the cardiac impulse.
    4. from the AV node, the action potential enters the bundle of his.
    5. AV node can directly contract the ventricles in the heart.

15. True or false?

1. Pectoralis major is the most superficial muscle in the pectoral region.
2. Eighth rib is a false rib.
3. Anterior mediastinum is the largest subdivision of the mediastinum.
4. Arch of aorta presents in the superior mediastinum.
5. Middle mediastinum contains pericardium.

16. Regarding human cell,

1. all plasma proteins are presented at peripherally.
2. tight junctions allow ions to pass for intercellular communication.
3. cristae are infoldings of inner membrane of mitochondria.
4. ribosomes are sites of protein synthesis.
5. microtubules are made of tubulin proteins.

17. Regarding heart anatomy,

1. anterior surface is mainly formed by left ventricle.
2. fibrous pericardium is elastic structure.
3. epicardium is a part of myocardium.
4. endocardium consists of simple cuboidal epithelium.
5. coronary sulcus separates right ventricle from left ventricle.

18. Regarding the nucleus,

1. nuclear envelop is a single layered membrane.
2. it is important in regulating the actions of the cells.
3. euchromatin are less condensed DNA.
4. heterochromatin are mostly located adjacent to the nuclear membrane.
5. outer layer is connected to the smooth endoplasmic reticulum.

19. Regarding the transport systems through the cell membrane,

1. facilitated diffusion follows a concentration gradient.
2. active transport follows a concentration gradient.
3. facilitated diffusion is an active process.
4. oxygen can be transported by simple diffusion.
5. osmosis is the passive movement of water across a semipermeable membrane.

20. True or False?

1. Polycythemia shows increasement in red blood cell.
2. There is a reduction of hemoglobin in anaemia.
3. Red cell indices only give detaols on cell number.
4. Red blood cells produce in bone marrows.
5. Life span of red blood cells in 120 days.

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Batch – 06
2nd Year 1st Semester
Mid semester MCQ/BRQ Examination

Date : **01st of December 2023**
Time : **9.00 a.m. – 10.00 p.m. (One Hour)**

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **Twenty MCQ** questions.
- Answer **ALL** questions.
- Select the **single best response** for the questions from 01 to 05.
- Mark **True 'T'** or **False 'F'** for each response from question number 06 to 20.
- You should write legibly in black or blue ink.

Select the best response for the questions from 01 to 05.

1. A monosaccharide which contains a ketose functional group is,
   a) ribose
   b) ribulose
   c) xylose
   d) erythrose
   e) glucoheptose

2. What is the metabolite which is responsible for the coordinated regulation of glucose and glycogen metabolism ?
   a) NADH
   b) Acetyl CoA
   c) NAD+
   d) Fructose 1,6-bisphosphate
   e) Fructose 2,6-bisphosphate

3. Select the peripheral protein from the following membrane proteins.
   a) helical bundle
   b) α- helix
   c) carrier protein
   d) β barrel
   e) channel protein

4. What is the metabolic process which occurs when the insulin concentration is high?
   a) stimulates glycogenolysis
   b) stimulates gluconeogenesis
   c) inhibits glycogenesis
   d) stimulates glycolysis
   e) inhibits kreb's cycle

5. Which of the following enzymes have a high affinity for glucose in liver.
   a) hexokinase
   b) glucose-6-phosphatase
   c) glucokinase
   d) aldolase
   e) phosphofructokinase

Mark 'True' or 'False' for each response from question number 06 to 20.

6. Membrane carrier proteins differ from membrane channel proteins by,
   a) carrier proteins are transport proteins while channel proteins are not.
   b) channel proteins form aqueous pores across the bilayer while carrier proteins cannot.
   c) channel proteins can mediate active transport, but carrier proteins cannot.
   d) channel proteins can mediate passive transport, but channel proteins cannot.
   e) carrier proteins undergoes conformational changes but channel proteins does not.

7. Which of the following is/are correct regarding glycogenesis?
   a) the process cannot start de novo and requires the primer glucose.
   b) glycosyl-4,6- transferase enzyme is involved for the cleavage of α1,6 branches.
   c) UDP glucose is the immediate donor of glucose to produce glycogen.
   d) starting molecule of the process is glucose-1-phosphate.
   e) UDP glucose phosphatase is important for the formation of the UDP glucose.

8. True or false regarding G protein linked membrane receptors,
   a) G protein is inactive when ATP is bound to it.
   b) is important for the hydrophilic signal transduction pathway.
   c) consists of an area to bind to the substrate.
   d) oestrogen hormone is able to bind to G-protein linked receptor.
   e) usually peptide hormones bind to G-protein linked receptors.

9. Which of the following is/are correct regarding Sodium pump?
   a) exchange extracellular Na^+ for intracellular K^+.
   b) is an ion channel.
   c) is important for maintaining a constant cell volume.
   d) can be inhibited by metabolic poisons.
   e) having the ratio of 3 sodium ions out for every 2 potassium ions brought in.

10. True or false regarding glycogenolysis?
   a) requires inactivation of phosphorylase kinase.
   b) uses ATP to produce glucose-1-phosphate.
   c) requires activation of glycogen synthase.
   d) it involves enzymes cleaving β-1-4 glycosidic linkage.
   e) requires a dual action enzyme α-1-6 glycosidase and transferase.

11. True or false regarding reducing sugars?
   a) fructose is a reducing sugar as it has a free aldehyde group.
   b) all polysaccharides are non-reducing sugars.
   c) maltose and sucrose are non-reducing disaccharides.
   d) the branches of glycogen consists of α 1-4 glycosidic linkages.
   e) hyaluronic acid is an example for heteropolysaccharide.

12. Carrier protein can
    a) transport only one substance.
    b) transport more than one substance.
    c) exchange one substance to another.
    d) only by diffusion and active transport.
    e) undergo conformational changes during solute transport.

13. Which of the following is/are correct regarding Kreb's cycle?
    a) α-ketoglutarate synthetase is involved in forming α-ketoglutarate.
    b) occurs in the matrix of mitochondria.
    c) CO_2 is generated in the conversion of isocitrate to α-ketoglutarate.
    d) $FADH_2$ is generated in the conversion of malate to oxaloacetate.
    e) it is also known as Citric acid cycle.

14. Pyruvate dehydrogenase enzyme complex,
    a) interconnects glycolysis and citric acid cycle.
    b) involved in oxidative carboxylation of pyruvate to Acetyl CoA.
    c) consists of a multienzyme complex including ten coenzymes.
    d) increased rates of Acetyl CoA produces a negative feedback on the complex.
    e) pyruvate dehydrogenase is independent on c-AMP.

15. The ability of the cell membrane to act as a selective barrier depends upon
    a) the lipid composition of the membrane.
    b) the pores which allows small molecules.
    c) the special mediated transport system.
    d) the protein composition of the membrane.
    e) the concentration gradient.

16. True or false regarding disorders of carbohydrate metabolism?
    a) type III glycogen storage disease affects only liver.
    b) glucose-6-phosphate dehydrogenase deficiency lead to Cori's disease.
    c) deficiency of the debranching enzyme leads to abnormal structure of glycogen.
    d) deficiency of glycogen phosphorylase leads to abnormal structure of glycogen.
    e) deficiency of acid maltase leads to lactic acidosis.

17. True or False regarding the signal transduction pathway,
    a) glucagon hormone binds with intracellular receptors for signal transduction pathway.
    b) epinephrine involves cyclic AMP for the signal transduction.
    c) pituitary hormone binds with extracellular receptors for signal transduction.
    d) Adenylyl cyclase converts G protein to cycle AMP during the transduction pathway.
    e) Thyroid hormone conducts the signal transduction as per the hydrophobic pathway.

18. Which of the following is/are correct regarding membrane transport?
    a) ATP is hydrolyzed in secondary active transport.
    b) Cells shrinks in a hypertonic solution.
    c) One ATP molecule is used to pump 3 Na^+ into the cell.
    d) Na^+ - co transport system involves in transport of macromolecules.
    e) Voltage gated ion channels are responsible for resting membrane potential.

19. Which of the following is/are True or False regarding transport systems ?
    a) glucose transporter in erythrocytes is a antiporter, powered by ATP.
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    c) transport of sodium and glucose in intestine is an example for symport systems.
    d) valinomycin selectively translocate small molecules across biological membranes.
    e) antiporters involve movement of two different solutes in the same direction.

20. True or False regarding the common differences observed in glycolysis and gluconeogenesis,
    a) oxaloacetate is the starting molecule of gluconeogenesis.
    b) glycolysis happens during fed state.
    c) phosphofructokinase-1 is involved in both processes.
    d) gluconeogenesis happens during fasting state.
    e) there are 4 bypass reactions in gluconeogenesis compared to glycolysis.

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Faculty of Health Sciences

Bachelor of Science Honours in Biomedical Science/ Bachelor of Science Honours in Industrial Pharmaceutical Science/ Bachelor of Science Honours in Cosmetic Science

BMS 2113/ IPS 2113/ BCS 2113 Anatomy and Physiology I

2nd Year 1st Semester

Mid Semester MCQ Examination

6h Batch

Date : **1st December 2023**
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
		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	T	X T	X T	T
F	X F	F	F	X F

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

1. **Which component in the conducting system involve for ventricle contraction?**
   1. SA node
   2. AV node
   3. Internodal pathway
   4. AV bundle
   5. Purkinje fibers

2. **A cardiac valve with two flaps,**
   1. Mitral valve
   2. Tricuspid valve
   3. Aortic valve
   4. Semilunar valve
   5. Pulmonary valve

3. **In which mitosis phase chromosomes line up across center of the cells?**
   1. Interphase
   2. Prophase
   3. Metaphase
   4. Anaphase
   5. Telophase

4. **Cell organelle contains oxidase enzymes,**
   1. Peroxisomes.
   2. Lysosomes.
   3. Ribosomes.
   4. Secretory vesicles of Golgi apparatus.
   5. Vacuoles.

5. **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

6. **Which of the following cell organelles does the 'autolysis?**
   1. Nucleus
   2. Lysosomes
   3. Peroxisome
   4. Mitochondria
   5. Centrioles

7. **Which is the most suitable name for body fluid compartment that contains cerebrospinal fluid?**
   1. Intracellular fluids
   2. Extracellular fluids
   3. Interstitial fluids
   4. Transcellular fluids
   5. Plasma

8. **Which vertebrae is having a heart shaped vertebral body?**
   1. Cervical
   2. Lumbar
   3. Thoracic
   4. Atlas
   5. Axis

9. **In the cell cycle,**
   1. Chromosomes travel to opposite ends of cells in anaphase.
   2. Organelles are duplicated in the G_2 phase.
   3. spindle fibres start to disappear in telophase.
   4. G_2 phase is the shortest part of the interphase.
   5. meiosis makes four identical cells.

10. **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.

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

12. **Regarding the thoracic vertebrae,**
   1. there are seven thoracic vertebrae.
   2. sixth thoracic vertebra is one of the atypical thoracic vertebrae.
   3. spinous process contains facets for tubercles of ribs.
   4. body contains facets for heads of ribs.
   5. body is kidney shape.

13. **Regarding white blood cells,**
   1. basophils release heparin.
   2. T cells mainly works against to bacteria.
   3. monocytes are the first white blood cells which respond to infections.
   4. macrophages show phagocytosis.
   5. eosinophils can increase in allergic reaction.

14. **Regarding the atrioventricular (AV) node in heart,**
   1. it directs the cardiac impulse from the atria to the ventricles.
   2. it serves as the pacemaker for the heart.
   3. it delays the transmission of the cardiac impulse.
   4. from the AV node, the action potential enters the bundle of his.
   5. AV node can directly contract the ventricles in the heart.

15. True or false?

1. Pectoralis major is the most superficial muscle in the pectoral region.
2. Eighth rib is a false rib.
3. Anterior mediastinum is the largest subdivision of the mediastinum.
4. Arch of aorta presents in the superior mediastinum.
5. Middle mediastinum contains pericardium.

16. Regarding human cell,

1. all plasma proteins are presented at peripherally.
2. tight junctions allow ions to pass for intercellular communication.
3. cristae are infoldings of inner membrane of mitochondria.
4. ribosomes are sites of protein synthesis.
5. microtubules are made of tubulin proteins.

17. Regarding heart anatomy,

1. anterior surface is mainly formed by left ventricle.
2. fibrous pericardium is elastic structure.
3. epicardium is a part of myocardium.
4. endocardium consists of simple cuboidal epithelium.
5. coronary sulcus separates right ventricle from left ventricle.

18. Regarding the nucleus,

1. nuclear envelop is a single layered membrane.
2. it is important in regulating the actions of the cells.
3. euchromatin are less condensed DNA.
4. heterochromatin are mostly located adjacent to the nuclear membrane.
5. outer layer is connected to the smooth endoplasmic reticulum.

19. Regarding the transport systems through the cell membrane,

1. facilitated diffusion follows a concentration gradient.
2. active transport follows a concentration gradient.
3. facilitated diffusion is an active process.
4. oxygen can be transported by simple diffusion.
5. osmosis is the passive movement of water across a semipermeable membrane.

20. True or False?

1. Polycythemia shows increasement in red blood cell.
2. There is a reduction of hemoglobin in anaemia.
3. Red cell indices only give detaols on cell number.
4. Red blood cells produce in bone marrows.
5. Life span of red blood cells in 120 days.

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Bachelor of Science Honours in Industrial Pharmaceutical Science/ Bachelor of Science Honours in Biomedical Science/ Bachelor of Science Honours in Cosmetic Science

IPS 2113/ BMS 2113/ BCS 2113 Anatomy and Physiology I

2nd year 1st semester

End Semester MCQ Examination

6th Batch

Date : **1st December 2023**
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
		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.
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1.

1	2	3	4	5

2.

1	2	3	4	5

3.

1	2	3	4	5

4.

1	2	3	4	5

5.

1	2	3	4	5

6.

1	2	3	4	5

7.

1	2	3	4	5

8.

1	2	3	4	5

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.

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F	F	F	F	F

15.

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F	F	F	F	F

16.

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F	F	F	F	F

17.

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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

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Faculty of Health Sciences

Bachelor of Science Honours in Biomedical Sciences/ Industrial Pharmaceutical Science/ Cosmetic Science

BMS 2123 / IPS 2123/ BCS 2123– Biochemistry I

Batch – 06

2nd Year 1st Semester

Mid semester MCQ/BRQ Examination

Date : **01st of December 2023**
Time : **9.00 a.m. – 10.00 p.m. (One Hour)**

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **Twenty MCQ** questions.
- Answer **ALL** questions.
- Select the **single best response** for the questions from 01 to 05.
- Mark **True 'T'** or **False 'F'** for each response from question number 06 to 20.
- You should write legibly in black or blue ink.

Select the best response for the questions from 01 to 05.

1. A monosaccharide which contains a ketose functional group is,
   a) ribose
   b) ribulose
   c) xylose
   d) erythrose
   e) glucoheptose

2. What is the metabolite which is responsible for the coordinated regulation of glucose and glycogen metabolism ?
   a) NADH
   b) Acetyl CoA
   c) NAD+
   d) Fructose 1,6-bisphosphate
   e) Fructose 2,6-bisphosphate

3. Select the peripheral protein from the following membrane proteins.
   a) helical bundle
   b) α- helix
   c) carrier protein
   d) β barrel
   e) channel protein

4. What is the metabolic process which occurs when the insulin concentration is high?
   a) stimulates glycogenolysis
   b) stimulates gluconeogenesis
   c) inhibits glycogenesis
   d) stimulates glycolysis
   e) inhibits kreb's cycle

5. Which of the following enzymes have a high affinity for glucose in liver.
   a) hexokinase
   b) glucose-6-phosphatase
   c) glucokinase
   d) aldolase
   e) phosphofructokinase

Mark 'True' or 'False' for each response from question number 06 to 20.

6. Membrane carrier proteins differ from membrane channel proteins by,
   a) carrier proteins are transport proteins while channel proteins are not.
   b) channel proteins form aqueous pores across the bilayer while carrier proteins cannot.
   c) channel proteins can mediate active transport, but carrier proteins cannot.
   d) channel proteins can mediate passive transport, but channel proteins cannot.
   e) carrier proteins undergoes conformational changes but channel proteins does not.

7. Which of the following is/are correct regarding glycogenesis?
   a) the process cannot start de novo and requires the primer glucose.
   b) glycosyl-4,6- transferase enzyme is involved for the cleavage of α1,6 branches.
   c) UDP glucose is the immediate donor of glucose to produce glycogen.
   d) starting molecule of the process is glucose-1-phosphate.
   e) UDP glucose phosphatase is important for the formation of the UDP glucose.

8. True or false regarding G protein linked membrane receptors,
   a) G protein is inactive when ATP is bound to it.
   b) is important for the hydrophilic signal transduction pathway.
   c) consists of an area to bind to the substrate.
   d) oestrogen hormone is able to bind to G-protein linked receptor.
   e) usually peptide hormones bind to G-protein linked receptors.

9. Which of the following is/are correct regarding Sodium pump?
   a) exchange extracellular Na^+ for intracellular K^+.
   b) is an ion channel.
   c) is important for maintaining a constant cell volume.
   d) can be inhibited by metabolic poisons.
   e) having the ratio of 3 sodium ions out for every 2 potassium ions brought in.

10. True or false regarding glycogenolysis?
   a) requires inactivation of phosphorylase kinase.
   b) uses ATP to produce glucose-1-phosphate.
   c) requires activation of glycogen synthase.
   d) it involves enzymes cleaving β-1-4 glycosidic linkage.
   e) requires a dual action enzyme α-1-6 glycosidase and transferase.

11. True or false regarding reducing sugars?
   a) fructose is a reducing sugar as it has a free aldehyde group.
   b) all polysaccharides are non-reducing sugars.
   c) maltose and sucrose are non-reducing disaccharides.
   d) the branches of glycogen consists of α 1-4 glycosidic linkages.
   e) hyaluronic acid is an example for heteropolysaccharide.

12. Carrier protein can
    a) transport only one substance.
    b) transport more than one substance.
    c) exchange one substance to another.
    d) only by diffusion and active transport.
    e) undergo conformational changes during solute transport.

13. Which of the following is/are correct regarding Kreb's cycle?
    a) α-ketoglutarate synthetase is involved in forming α-ketoglutarate.
    b) occurs in the matrix of mitochondria.
    c) CO_2 is generated in the conversion of isocitrate to α-ketoglutarate.
    d) $FADH_2$ is generated in the conversion of malate to oxaloacetate.
    e) it is also known as Citric acid cycle.

14. Pyruvate dehydrogenase enzyme complex,
    a) interconnects glycolysis and citric acid cycle.
    b) involved in oxidative carboxylation of pyruvate to Acetyl CoA.
    c) consists of a multienzyme complex including ten coenzymes.
    d) increased rates of Acetyl CoA produces a negative feedback on the complex.
    e) pyruvate dehydrogenase is independent on c-AMP.

15. The ability of the cell membrane to act as a selective barrier depends upon
    a) the lipid composition of the membrane.
    b) the pores which allows small molecules.
    c) the special mediated transport system.
    d) the protein composition of the membrane.
    e) the concentration gradient.

16. True or false regarding disorders of carbohydrate metabolism?
    a) type III glycogen storage disease affects only liver.
    b) glucose-6-phosphate dehydrogenase deficiency lead to Cori's disease.
    c) deficiency of the debranching enzyme leads to abnormal structure of glycogen.
    d) deficiency of glycogen phosphorylase leads to abnormal structure of glycogen.
    e) deficiency of acid maltase leads to lactic acidosis.

17. True or False regarding the signal transduction pathway,
    a) glucagon hormone binds with intracellular receptors for signal transduction pathway.
    b) epinephrine involves cyclic AMP for the signal transduction.
    c) pituitary hormone binds with extracellular receptors for signal transduction.
    d) Adenylyl cyclase converts G protein to cycle AMP during the transduction pathway.
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    a) oxaloacetate is the starting molecule of gluconeogenesis.
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    d) gluconeogenesis happens during fasting state.
    e) there are 4 bypass reactions in gluconeogenesis compared to glycolysis.

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Faculty of Health Sciences

Bachelor of Science Honours in Biomedical Sciences/ Industrial Pharmaceutical Science/ Cosmetic Science

BMS 2123 / IPS 2123/ BCS 2123– Biochemistry I

Batch – 06

2nd Year 1st Semester

Mid semester MCQ/BRQ Examination

Date	**: 01st of December 2023**
Time	**: 9.00 a.m. – 10.00 p.m. (One Hour)**

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **Twenty MCQ** questions.
- Answer **ALL** questions.
- Select the single best response for the questions from 01 to 05.

Ex:

a	b	X	d	e

- Mark True **'T'** or False **'F'** for each response from question number 06 to 20.

Ex:

T	X	T	T	X
X	F	X	X	F

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

Select the best response for the questions from 01 to 05.

1.

a	b	c	d	e

2.

a	b	c	d	e

3.

a	b	c	d	e

4.

a	b	c	d	e

5.

a	b	c	d	e

Mark True 'T' or False 'F' for each response from question number 06 to 20.

6.

T	T	T	T	T
F	F	F	F	F

7.

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F	F	F	F	F

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F	F	F	F	F

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18.

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F	F	F	F	F

19

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F	F	F	F	F

20

T	T	T	T	T
F	F	F	F	F

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Bachelor of Science Honours in Cosmetic Science

BMS 2153 – General Microbiology

IPS 2153 – Pharmaceutical Microbiology

BCS 2153 – Cosmeceutical Microbiology

2nd year 1st semester – BMS/IPS Batch 03, BCS Batch 01

End Semester Online Examination - SEQ

INDEX NUMBER: .....

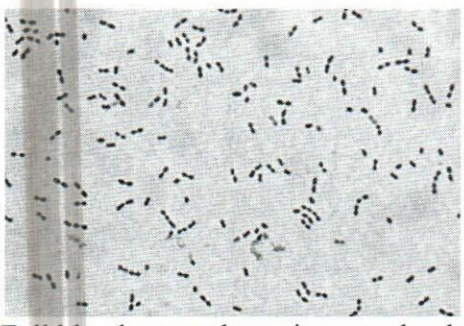
Date : **13th August 2021**
Time : **9.00 a.m. to 12.00 p.m.**

INSTRUCTIONS TO CANDIDATES

- This question paper consists of SIX questions.
- Answer ALL questions.
- You should write answers in lined papers legibly in black or blue ink.
- You MUST write your index number in the top right corner of each answer script.
- Answer script should be numbered (right bottom) clearly.
- Photograph of your answer scripts must be taken by keeping them on a clear platform (e.g. table).
- Arrange the photographs of your answer script in a word document in an orderly manner, then convert the word document to a PDF.
- Label the PDF: Your Index No-Module name.
- Upload the labelled PDF to LMS AND also email the PDF to Fohs.exams@cinec.edu

Question 01 **(100 marks)**

1.1.34 year old patient presented with high fever, cough and yellow sputum for 3 days. On examination he was febrile, ill and both lungs shows evidence of pneumonia. He was admitted to the medical casualty ward and following investigation were done. Full blood count, CRP and sputum gram staining was given below.



Full blood count shows increased polymorph.

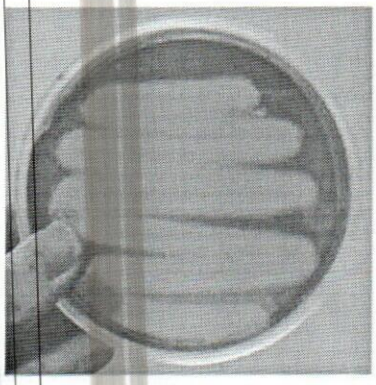
1.1.1 What is the possible diagnosis of this patient? (15 marks)
1.1.2. What is the organism identified in the direct microscopy (15 marks)
1.1.3. Name the virulence factors (10 marks)
1.1.4. How do you stain for bacterial identification? (20 marks)

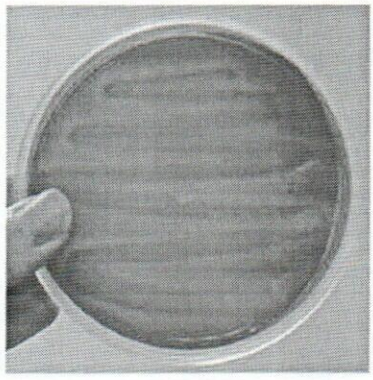
1.2. 12 year boy presented with high fever, tachycardia and evidence of endocarditis. On history, patient has had tonsillitis two weeks before and has not been treated for it. Throat swab was done and gram staining found positive chains of cocci. Culture plate shows gray tiny colonies with clear large zone around colonies in blood agar. Organism was susceptible for bacitracin sensitivity.

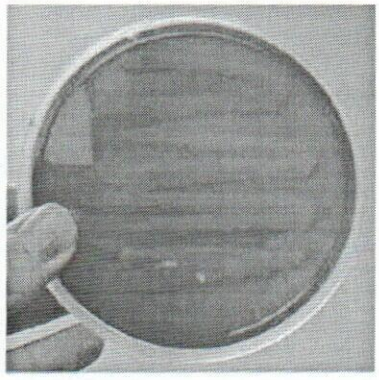




1.2.1 What is the suspected microorganism? (10 marks)
1.2.2. What is the reason for the clear large zone around the colonies in blood agar? (15 marks)
1.2.3 Identify the following types of haemlysis in blood agar (15 marks)







Question 02 **(100 marks)**

2.1. Describe the bacterial morphology, identification characteristics and the diseases of
- 2.1.1.*Clostridium perfringens* (25 marks)
- 2.1.2.*Vibrio cholerae* (25 marks)
- 2.1.3.*Bacillus anthracis* (25 marks)
- *2.1.4.Neisseria gonorrheae* (25 marks)

Question 03 **(100 marks)**

3.1.Describe the bacterial morphology of the *Treponima pallidum* (20 marks)
3.2.List the diseases caused by the bacteria mentioned in 3.1. (10 marks)
3.3.Describe the clinical presentations of leptospirosis. (20 marks)
3.4.What is the organism causing leptospirosis? (10 marks)
3.5.Describe the bacterial morphology, cultures / colony characteristics of *Staphylococcus aureus.* (30 marks)
3.6.List the diseases caused by the organism mentioned in 3.5. (10 marks)

Question 04 **(100 marks)**

4.1.State the types of microscopy techniques. (10 marks)
4.2.Compare and contrast the optical microscope and electron microscope. (20 marks)
4.3.Differentiate sterilization and disinfection. (20 marks)
4.4.Describe the physical methods of sterilization used in the laboratory. (35 marks)
4.5.Briefly describe the indirect tests for check the sterility in the laboratory by giving examples. (15 marks)

Question 05 **(100 marks)**

5.1. Classify the culture methods based on ingredients and give example for each type. (15 marks)
5.2.Describe the difference and the uses of antibiotic sensitivity test (ABST) and E test. (30 marks)
5.3.What is the importance of staining in microbiology? (15 marks)
5.4.Describe the principles of Ziehl neelsen acid fast stain. (30 marks)
5.5.What are the methods of smear fixation? (10 marks)

Question 06 **(100 marks)**

6.1.Explain how the Trp and Lac operons are arranged and how genes are controlled in bacteria. (30 marks)
6.2. Explain the difference between transformation, transduction, and conjugation of bacterial DNA. (45 marks)
6.3.Describe the golden era of Microbiology and scientific discoveries during this era. (25 marks)

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Faculty of Health Sciences

Bachelor of Science Honours in Biomedical Sciences/

Bachelor of Science Honours in Industrial Pharmaceutical Science

BMS 2123/ IPS 2123 – Biochemistry I

2nd year 1st semester – Batch 02

End Semester SEQ Online Examination

INDEX NUMBER: .....

Date : **10th August 2021**
Time : **9.00 a.m. to 12.00 p.m.**

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **SIX** questions.
- Answer **ALL** questions.
- You should **write answers in lined papers** legibly in black or blue ink.
- You MUST write your **index number in the top right corner** of each answer script.
- **Answer script should be numbered** (right bottom) clearly.
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Question 01 **(100 marks)**

1.1 Discuss the role of phospholipase C (PLC) in Angiotensis II meadiated vasoconstriction. (30 marks)

1.2 Explain how glycogen metabolism is regulated by glucagon signaling pathway. (35 marks)

1.3 IGF-1 receptor belongs to tyrosine kinase family. Illustrate the activation of IGF-1 receptor upon binding of IGF-1. (35 marks)

Question 02 **(100 marks)**

2.1 The sodium/calcium exchanger transports sodium into and calcium out of cardiac muscle cells. Describe why this transporter is classified as secondary active transport. (25 marks)

2.2 Explain the role of sodium driven transporters in regulating cytosolic pH. (45 marks)

2.3 Proton motive force of mitochondria is generated through an electrochemical gradient. Explain this concept. (30 marks)

Question 03 **(100 marks)**

3.1 Describe the digestion and absorption of dietary lipids. (40 marks)

3.2 Justify the metabolic consequences with intake of high carbohydrate diet when your body is in an excess energy state. (30 marks)

3.3 Classify membrane lipids. Draw line structures and give an example for each. (20 marks)

3.4 What are omega-3 fats? (10 marks)

Question 04 **(100 marks)**

4.1 The ketogenic diet is a high-fat, moderate-to-low protein, low carbohydrate diet. It is intended to mimic the metabolic response to fasting and shift the body towards metabolizing lipids rather than glucose. Explain this biochemical concept. (40 marks)

4.2 Relate the role of Carnitine acyl transferase- I in lipid metabolism. (40 marks)

4.3 Justify how lovastatin regulates the cholesterol synthesis. (20 marks)

Question 05 **(100 marks)**

5.1 Discuss the fate of glucose-6-phosphate released by glycogenolysis. (35 marks)

5.2 Explain the role of pentose phosphate pathway in controlling oxidative stress. (40 marks)

5.3 Explain the significance of glucose-alanine cycle during starvation. (25 marks)

Question 06 **(100 marks)**

6.1 Explain glycolytic NADH produced in liver cell cytosol is usage in mitochondrial electron transport chain. (30 marks)

6.2 Discuss the energetics of glucose oxidation in skeletal muscle cell via glycerol-3-phosphate shuttle. (40 marks)

6.3 Explain the role of ubiquinone in electron transport chain. (30 marks)

ANSWER SCRIPTS PACKET

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CINEC CAMPUS
Beyond A Graduate

Faculty of Health Sciences

Bachelor of Science Honours in Biomedical Sciences/ Bachelor of Science Honours in Industrial Pharmaceutical Sciences/ Bachelor of Science Honours in Cosmetic Science

BMS 2123/ IPS 2123/ BCS 2123 – Biochemistry I

2nd Year 1st Semester

Batch 05

End Semester SEQ Examination

INDEX NUMBER: .....

Date : **07th of September 2022**
Time : **9.00 a.m. to 12.00 p.m.**

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **SIX** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink.
- You are not allowed to take out the examination papers.

QUESTION 01 **(100 marks)**

1.1. State the methods of cell communications. (15 marks)

1.2. Compare and contrast symposter and antiporter systems. (20 marks)

1.3. Illustrate the signaling cascade mediated by IP3 and DAG through G protein coupled receptor to increase cytosolic Calcium ion concentration. (40 marks)

1.4. Discuss the role of sodium driven transporters in regulating cytosolic pH. (25 marks)

QUESTION 02 **(100 marks)**

2.1. Draw the structures of the following molecules. (20 marks)

2.1.1 Cellulose
2.1.2 Sucrose
2.1.3 β-D glucose
2.2.4 Amylose

2.2. Discuss the biological significance of carbohydrates. (30 marks)

2.3. Draw a diagram to illustrate the reactions of the TCA cycle. (25 marks)

2.4. Describe the role of pentose phosphate pathway in regulating oxidative stress. (25 marks)

QUESTION 03 **(100 marks)**

3.1. Mention the enzymes involved in glycogenolysis. (15 marks)

3.2. Discuss the fate of glucose-6-phosphate released by glycogenolysis. (20 marks)

3.3. Discuss the significance of gluconeogenesis. (25 marks)

3.4. Write short notes on following.

3.4.1 Pompe's disease (20 marks)
3.4.2 Lactic acidosis (20 marks)

QUESTION 04 **(100 marks)**

4.1 List 03 biological and 03 clinical significance of lipids. (20 marks)

4.2 Define the following terms. (15 marks)

4.2.1 Ketogenesis
4.2.2 Ketonaemia
4.2.3 Ketonuria

4.3 Write a short note on Utilization of Ketone bodies with a suitable diaram. (35 marks)

4.4 What is mean by "Ketoacidosis" ? (15 marks)

4.5 List 03 early symptoms of ketoacidosis and 03 other symptoms of ketoacidosis. (15 marks)

QUESTION 05 **(100 marks)**

5.1 Define the term "β Oxidation". (15 marks)

5.2 Why this processed called "β Oxidation". (20 marks)

5.3 What are the 03 phases of β Oxidation. (20 marks)

5.4 Describe any of the above mentioned phases by using a suitable diagram. (45 marks)

QUESTION 06 **(100 marks)**

6.1 What is mean by "Electron Transport Chain" (20 marks)

6.2 Briefly describe an overview of "Electron Transport Chain" (35 marks)

6.3 Describe the de-nove synthesis cholesterol by using an appropriate diagram. (45 marks)

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Learning Recommissioning

Faculty of Health Sciences

Bachelor of Science Honours in Biomedical Science

Bachelor of Science Honours in Industrial Pharmaceutical Science

Bachelor of Science Honours in Cosmetic Science

BMS 2153 - General Microbiology

IPS 2153 - Pharmaceutical Microbiology

BCS 2153- Cosmeceutical Microbiology

2nd year 1st semester – Batch 5

End Semester Examination - SEQ

INDEX NUMBER: .....

Date : **9th September 2022**
Time : **9.00 a.m. to 12.00 p.m.**

INSTRUCTIONS TO CANDIDATES

- This question paper consists of SIX questions.
- Answer ALL questions.
- You should write answers in lined papers legibly in black or blue ink.
- You are not allowed to take out the examination papers.

Question 01 **(100 marks)**

Describe the bacterial morphology, pathogenesis and laboratory identification characteristics of following microorganisms.

1.1. *Mycobacterium tuberculosis* (25 marks)
1.2. *Chlostridium botulinum* (25 marks)
1.3. *Neisseria gonorrheae* (25 marks)
1.4. *Neisseria meningitidis* (25 marks)

Question 02 **(100 marks)**

2.1. A scientist wanted to identify the microorganisms present in a water sample taken from a pond. Therefore he spread 0.1 mL of the water sample on Nutrient Agar medium. For doing this he used many laboratory instruments.
State whether he had followed "sterilization" or "disinfection" for each of item mentioned below.
And mention the most **appropriate method** that he can use to achieve sterilization /disinfection of each item accordingly.

2.1.1. Nutrient Agar medium
2.1.2. Petri dishes
2.1.3. Working bench
2.1.4. Inoculation loop
2.1.5. Glass spreader (50 marks)

2.2. Mention 2 key differences between sterilization and disinfection in microbiology. (20 marks)
2.3. Compare and contrast between simple staining and differential staining with examples. (30 marks)

Question 03 **(100 marks)**

34 year female patient with white/yellowish color patches on tongue came for treatments. Patient mentioned that she encounters a cotton-like sensation in her mouth with a bad taste and difficulty of swallowing, suspecting an oral thrush. A scraped biopsy sample from the affected area was subjected for direct microscopy after treating with KOH and **staining**. The medical laboratory technician suspected the causative agent as *Candida albicans*.

3.1. State the name of the test that he could perform for confirmation the presence of *Candida albicans* in patient sample. (20 marks)
3.2. What is the observation that he could get once he performed the test that you mentioned in 3.1. (20 marks)
3.3. State a drug which can be used for a fungal infection. (20 marks)
3.4. State two stains that you could use for staining fungal elements? (20 marks)
3.5. What is meant by "dimorphic fungi" ? (20 marks)

Question 04 **(100 marks)**

4.1. Mention the disease caused by each organism
4.1.1. *Corynebacterium diptheriae*
4.1.2. *Escherichia coli*
4.1.3. *Bacillus anthracis*
4.1.4. *Mycoplasma pneumoniae*
4.1.5. *Chlostridium perfringens*
4.1.6. *Treponima pallidum* (60 marks)

4.2. Describe the steps of "Generalized transduction" process in which DNA is transferred from one bacterium to another by a virus. (40 marks)

Question 05 **(100 marks)**

5.1. What are the advantages of dark field microscopy over the light microscope? (20 marks)
5.2. Mention the stains used for following bacterial staining methods.
5.2.1. Endospore staining
5.2.2. Flagella staining
5.2.3. Spirochete staining (30 marks)

5.3. What are the morphological features of a spirochete ? (10 marks)
5.4. State two special characteristic features of mycoplasma. (10 marks)
5.5. Describe the procedure of performing antibiotic sensitivity test (ABST) in microbiology. (30 marks)

Question 06 **(100 marks)**

6.1. Describe the bacterial morphology of the *Chlostridium tetani* (20 marks)
6.2. Mention the neurotoxin produced by the bacteria mentioned in 6.1. (20 marks)
6.3. Describe the action of neurotoxin mentioned in 6.2 and clinical symptoms of a patient which are arising due to that. (30 marks)
6.4. Classify the culture methods based on ingredients and give example for each type. (30 marks)

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CINEC CAMPUS
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Faculty of Health Sciences

Bachelor of Science Honours in Industrial Pharmaceutical Science/ Bachelor of Science Honours in Biomedical Science/ Bachelor of Science Honours in Cosmetic Science

IPS 2113/ BMS 2113/ BCS 2113 Anatomy and Physiology I

2nd year 1st semester

End Semester SEQ Examination

5th Batch

INDEX NUMBER: .....

Date	**: 05th September 2022**
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.
- You are not allowed to take out the examination papers.

Question 1 **(100 marks)**

1.1 Define following terms.

1.1.1True Ribs (10 marks)

1.1.2 False Ribs (10 marks)

1.1.3 Floating Ribs (10 marks)

1.2 Names the bones in upper limb. (20 marks)

1.3 Describe the conduction system of the heart. (30 marks)

1.4 Outline the functions of the following blood cells.

1.4.1 Red blood cells (10 marks)

1.4.2 White blood cells (10 marks)

Question 2 **(100 marks)**

2.1 Describe the general characters of epithelial tissues. (25 marks)

2.2 Describe structural diversity of animal cells, based on their functions, by giving 3 examples. (25 marks)

2.3 List the functions of the following cell organelles. (20 marks)

2.3.1 Smooth endoplasmic reticulum

2.3.2 Ribosome

2.3.3 Golgi apparatus

2.3.4 Lysosome

2.4 Write short notes on following fluid compartments in the body

2.4.1 Intra cellular fluid compartment (15 marks)

2.4.2 Extracellular fluid compartment (15 marks)

Question 3 **(100 marks)**

3.1 Write short notes on followings.

3.1.1 Paranasal sinuses (15 marks)

3.1.2 Respiratory epithelium (15 marks)

3.2 List four differences between right and left bronchi. (20 marks)

3.3 Define the lung volumes given below. (15 marks)

3.3.1 Tidal volume

3.3.2 Inspiratory reserve volume

3.3.3 Expiratory reserve volume

3.4 Describe the process of pulmonary ventilation. (35 marks)

Question 4 **(100 marks)**

4.1 Describe the microscopic structure of human liver. (25 marks)

4.2 Write a short not on pericardium. (25 marks)

4.3 List the functions of saliva. (10 marks)

4.4 List the constituents in gastric juice. (10 marks)

4.5 Outline the functions of liver. (15 marks)

4.6 Outline the process of fat absorption. (15 marks)