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Beyond A Graduate

Faculty of Health Sciences
B.Sc. (Hons) in Cosmetic Sciences, B.Sc. (Hons) in Industrial Pharmaceutical Sciences,
B.Sc. (Hons) in Medical & Health Product Management
IPS 8th Batch/ BCS 6th Batch/ MHPM 2nd Batch
IPS 2243 /BCS 2243 /MHPM 2243 – Inorganic Chemistry
End Semester Examination
2nd Year 2nd Semester –SEQ

Date: 25th of February 2026
Time: 09.00 am – 12.00 pm – Three Hours

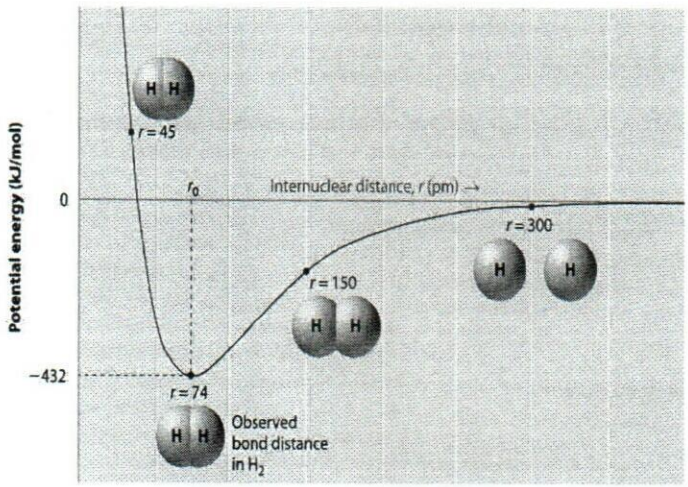
Index Number.....

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 List **three** types of chemical bonding observed in inorganic compounds (15 marks)

1.2 Answer the following questions based on the following graph energy profile of hydrogen gas (H_2) given below.



1.2.1 What is the bond energy of H_2 molecule? (10 marks)

1.2.2 What is the equilibrium bond length of H_2 molecule? (10 marks)

1.2.3 What is the bond length with maximum repulsive forces? (10 marks)

1.3 Coulomb's law can be used to calculate the interaction energy between a pair of ions, accounting for both attractive and repulsive forces. Two-point charges, $q_1 = +2.0 \times 10^{-6}$ C and $q_2 = -3.0 \times 10^{-6}$ C, are placed in a medium with relative permittivity $\varepsilon_r = 4$ and are separated by a distance of 0.50 m. Coulomb's constant in vacuum is $k = 8.987 \times 10^9\ \mathrm{N \cdot m^2/C^2}$.

1.3.1 Calculate the Coulomb's constant in the medium. (15 marks)

$$k_{\text{medium}} = \frac{k}{\varepsilon_r}$$

1.3.2 Calculate the magnitude of the force between the two charges. (20 marks)

1.3.3 Calculate the net electrostatic force acting on q_3 when three-point charges are placed in a straight line. Charge $q_1 = +2.0 \times 10^{-6}$ C is at one end, $q_2 = -3.0 \times 10^{-6}$ C is at the other end, and charge $q_3 = +1.0 \times 10^{-6}$ C is located exactly midway between them. The distance between q_1 and q_2 is 0.50 m. (20 marks)

Question 02 **(100 marks)**

2.1 Evaluate how electron configuration of Xenon (Xe) relates to its chemical inertness. (20 marks)

2.2 Explain why noble gases have very low boiling points. (20 marks)

2.3 Find the molecular shapes of XeF_6 and XeO_3 compounds. (20 marks)

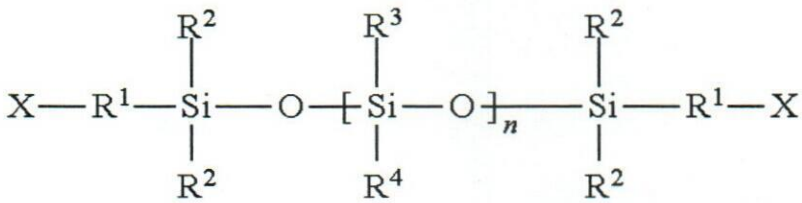
2.4 "Xenon more likely to form compounds compared to lighter noble gases like Helium or Neon" Justify this statement. (20 marks)

2.5 State two uses of noble gases in the field of medicine. (20 marks)

Question 03 **(100 marks)**

3.1 Classify the **four** types of copolymers. (20 marks)

3.2 Identify the type of the following silicone polymer. (10 marks)



3.3 In the production of industrial polyethylene terephthalate (PET) fibers and bottles, controlling the molecular weight distribution is critical to achieving the desired mechanical strength, thermal stability, and processability. A sample of PET polymer from a production batch was analyzed using Gel Permeation Chromatography (GPC/SEC), and the molar masses and corresponding number of molecules were recorded as follows before the final processing stage.

But during the final processing, 30% of the highest-molecular-weight chains (D) degrade due to thermal stress.

Polymer Chain	Molar mass (g/mol)	Number of molecules
A	50,000	20,000
B	100,000	40,000
C	200,000	25,000
D	500,000	15,000

3.3.1 Calculate the **number-average molecular weight (Mn)** of this PET polymer sample after the processing stage. (20 marks)

3.3.2 Calculate the and **weight-average molecular weight (Mw)** of this PET polymer sample after the processing stage. (20 marks)

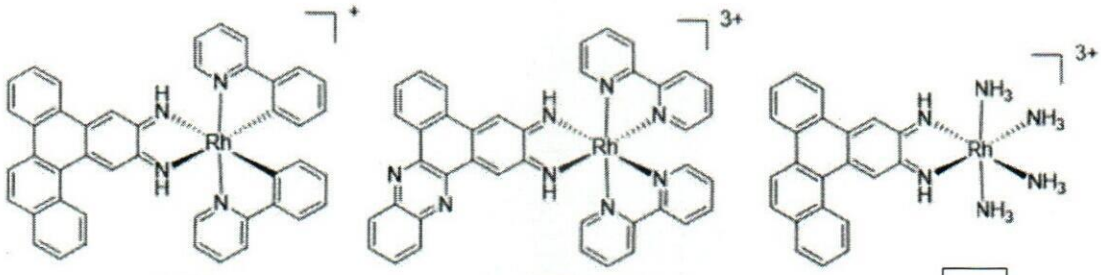
3.3.3 Calculate the polydispersity index (PDI) of this PET polymer sample after the processing stage. (10 marks)

3.3.4 Comment on the molecular weight uniformity of this industrial batch based on the PDI value. (10 marks)

3.3.5 Explain how this degradation would affect the viscosity of PET. (10 marks)

Question 04 **(100 marks)**

4.1 Unique structure, characteristic reactivity, and facile synthesis of metal complexes have made them efficient ligands in drug development research. Among them, rhodium complexes have a limited history and there are a few discussions about their biological activities **(structures A-C).** However, investigation of kinetically inert rhodium complexes has recently attracted lots of attention and especially there is evidence of their anti-cancer activity. (Rh= [Kr] $4d^8$ $5s^1$)



A B C

4.1.1 Calculate the total number of valence electrons of each of the above **compounds A-C** and show how you arrived at the answer? (20 marks)

4.1.2 Calculate the formal oxidation states of Rh in each of the **compounds (A-C).** (20 marks)

4.1.3 Calculate the coordination number of Rh in each of the **compounds (A-C).** (20 marks)

4.2 Determine the hapticity of the Cp rings in $Cp_2Fe(CO)_2$. Given that Cp=C_5H_5 and Fe= [Ar] $3d^6$ $4s^2$ (20 marks)

4.3 Evaluate the importance of organotransition metal complexes? (20 marks)

Question 05 **(100 marks)**

5.1 Explain the "Lattice Energy" of a crystal. (10 marks)

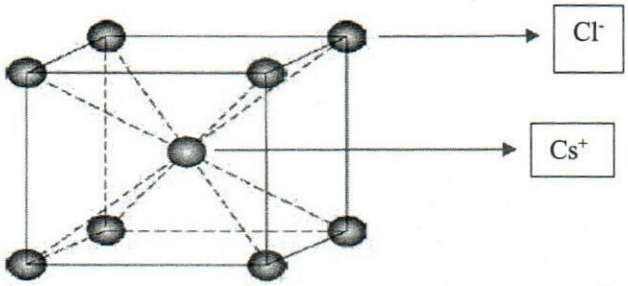
5.2 List three types of crystalline solids. (15 marks)

5.3 A cubic crystalline solid has sodium, tungsten and oxygen atoms. Sodium atom is located at the center of the cube, tungsten atoms are located at the corners of the unit cell and oxygen atoms are at the middle of the cube edges.

5.3.1 Draw the unit cell. (20 marks)

5.3.2 Find the empirical formula of the compound. (15 marks)

5.4 The unit cell of a Cesium chloride (CsCl) crystal is shown below.



5.4.1 Identify the type of unit cell. (10 marks)
5.4.2 Determine the number of Cl^- atoms per unit cell. (10 marks)
5.4.3 Determine the atomic packing efficiency of CsCl unit cell based on the following details. (20 marks)

Ionic radius of Cs^+ ion $=1.67 \times 10^{-10}$ m
Ionic radius of Cl^- ion $= 1.81 \times 10^{-10}$ m
$Voluem\ of\ an\ atom\ (V) = \frac{4}{3}\pi r^3$
$\Pi = 3.14$

Question 06 **(100 marks)**

6.1 Correlate how strong intermolecular interactions of water and their contribution to its essential roles in living systems. (20 marks)

6.2 Differentiate between bulk metals and trace metals in the biological systems. (20 marks)

6.3. Draw the dose response curves for Mercury (Hg) in the biological systems. (30 marks)

6.4 Evaluate how incorporation of the iron (Fe^{2+}) ion into the protein structure enhances the biological regulation of oxygen transport. (20 marks)

6.5 Justify why free metal ions such as Fe^{2+}, Cu^{2+}, or Zn^{2+} are generally unsuitable for direct use in biological systems. (10 marks)

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Beyond A Graduate

Faculty of Health Sciences

Bachelor of Science Honors in Industrial Pharmaceutical Science/ Bachelor of Science Honors in Medical and Health Product Management

IPS 2233 Industrial Pharmaceutics I/ MHPM 2233 Pharmaceutics I

Batch 08

2nd Year 2nd Semester

End Semester Examination - SEQ

Date : 23rd of February 2026

Time : 9.00 a.m. - 12.00 noon (Three hours)

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **SIX** structured essay type questions.
- Answer **ALL** the questions.
- Final answers should be given legibly in black or blue ink.

Question 01 **(100 marks)**

1.1 List **four (04)** characteristics of tertiary information sources. (20 marks)

1.2 Write an account on online drug databases, giving **two (02)** examples. (25 marks)

1.3 Relate the design of patient information leaflet to achieve its intended function. (25 marks)

1.4 "Glyceryl trinitrate (GTN) should be always stored in amber coloured bottles." Do you agree with this statement? Justify your answer. (30 marks)

Question 02 **(100 marks)**

2.1 List **four (04)** intrinsic factors influencing the solubility of a drug. (20 marks)

2.2 Differentiate the amorphous structure and crystalline structure of a drug molecule. (30 marks)

2.3 State **four (04)** factors that influence the activity of surfactants. (20 marks)

2.4 Propose methods to prevent pharmaceutical problems associated with **hygroscopic** raw materials while discussing the impact of hygroscopicity in manufacturing. (30 marks)

Question 03 **(100 marks)**

3.1 Mention **four (04)** polymeric excipients with a high swelling capacity. (20 marks)

3.2 Classify commonly used suppository bases. (20 marks)

3.3 Write a short account on molding method of suppository manufacture. (30 marks)

3.4 How does the melting point of suppository base affect the absorption of its drug? (30 marks)

Question 04 **(100 marks)**

4.1 Illustrate process flow diagrams of **two (02)** methods of powder manufacturing. (20 marks)

4.2 Justify the reasons for following scenarios. (4 x 15 marks)

4.2.1 Antibiotics are formulated as powder for suspension rather than suspension.

4.2.2 Dry powder suspension mixture is provided in a slightly over-sized container.

4.2.3 Potent drugs are not intended for formulating as bulk powders.

4.2.4 Active ingredients and certain excipients of dry powder inhaler formulation are preferably micronized before the manufacture.

4.3 A formulation scientist intends to develop a powder formulation masking the bitter taste of the active ingredient. Outline a suitable manufacturing method to overcome this issue. (20 marks)

Question 05 **(100 marks)**

5.1 State **five (05)** reasons for the selection of a particular shape for a tablet. (25 marks)

5.2 Outline the incompatibility of soft gelatin capsules with respect to the fill content. (20 marks)

5.3 Relate the release mechanism and rationale for formulation of enteric coated tablet. (25 marks)

5.4 Critically analyze **five (05)** tablet compression issues/ defects and suggest **one (01)** trouble-shooting method for each. (30 marks)

Question 06 **(100 marks)**

6.1 Illustrate the emulsification process of Silverson homogenizer. (20 marks)

6.2 Classify emulsifying agents with suitable examples. (25 marks)

6.3 Analyze the factors to be considered during selection of an ointment base. (25 marks)

6.4 Write a short note on adsorption bases. (30 marks)

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CINEC CAMPUS
Beyond A Graduate

Faculty of Health 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

IPS 2223/ BCS 2223/ MHPM 2223 – Biochemistry II

2nd Year 2nd Semester

Batch 08

End Semester SEQ Examination

Date	:	**19th of February 2026**
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 allowed used a scientific calculator for the examination.

QUESTION 01 **(100 marks)**

Tyrosine is a polar, aromatic amino acid with a side-chain hydroxyl group pKa of 10.1.

1.1. Explain how the hydroxyl group of tyrosine can influence its buffering ability and interactions in proteins. (20 marks)

1.2. Write short notes on the following:

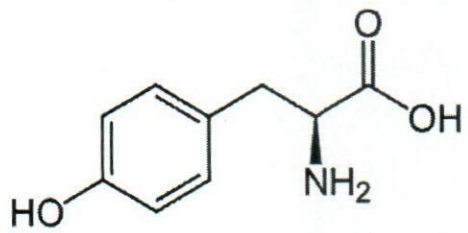
i. The role of protein buffers in extracellular versus intracellular fluids. (30 marks)

ii. The bicarbonate buffer system and its role in maintaining blood pH. (20 marks)

iii. Compare the buffering capacity of polar uncharged amino acids versus charged amino acids in proteins. (30 marks)

QUESTION 02 **(100 marks)**

2.1. The isoelectric point (pI) of tyrosine is approximately 5.7. Draw the predominant ionic forms at the following pH values, showing protonation/deprotonation states of each functional group:



i. pH = 2.0 (25 marks)

ii. pH = 5.7 (25 marks)

iii. pH = 7.4 (25 marks)

iv. pH = 11.0 (25 marks)

QUESTION 03 **(100 marks)**

3.A 28-year-old male marathon runner was admitted to hospital after collapsing during an ultramarathon event conducted under extreme environmental conditions. He had inadequate caloric intake for several days, severe dehydration, and continued intense physical exertion.

3.1. Identify the major metabolic pathways responsible for maintaining blood glucose levels in this individual during prolonged energy deficit. (15 marks)
3.2. Describe the changes in substrate utilization by skeletal muscle during prolonged fasting combined with endurance exercise. (25 marks)
3.3. Illustrate, using a flow chart, the metabolic adaptations of the liver and adipose tissue under conditions of prolonged fasting and sustained physical activity. (30 marks)
3.4. Explain the hormonal regulation of metabolism during prolonged fasting, focusing on insulin and glucagon. (30 marks)

QUESTION 04 **(100 marks)**

4.1. Distinguish between essential and non-essential amino acids with respect to their dietary requirement, synthesis, and metabolic significance. (20 marks)
4.2. Classify proteins based on their biological function and provide one suitable example for each category. (25 marks)
4.3. Justify the following statement: "Deficiency of tyrosinase activity results in albinism." Include relevant biochemical pathways and molecular mechanisms in your answer. (25 marks)
4.4. Describe the role of the glucose–alanine cycle in amino acid and nitrogen metabolism. (30 marks)

QUESTION 05 **(100 marks)**

5.1 Analyze the structural organization of DNA. (25 marks)
5.2 Evaluate the role of hydrogen bonding in maintaining the structural integrity of DNA. (25 marks)
5.3 Compare and contrast the structural features of DNA and RNA. (25 marks)
5.4 Analyze how structural variations of RNA contribute to its functional diversity. (25 marks)

QUESTION 06 **(100 marks)**

6.1 Assess the biological relevance through comparing the melting behavior of AT-rich and GC-rich DNA regions. (25 marks)
6.2 Differentiate de novo synthesis and salvage pathways of DNA nucleotide production. (25 marks)
6.3 Critically evaluate the role of *de novo* DNA synthesis in cancer therapy. (25 marks)
6.4 Analyze the biochemical basis of gout. (25 marks)

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Faculty of Health 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

IPS 2223/ BCS 2223/ MHPM 2223 – Biochemistry II

2nd Year 2nd Semester

Batch 08

End Semester SEQ Examination

Date	:	**19th of February 2026**
Time	:	**9.00 a.m. to 12.00 p.m.**

INSTRUCTIONS TO CANDIDATES

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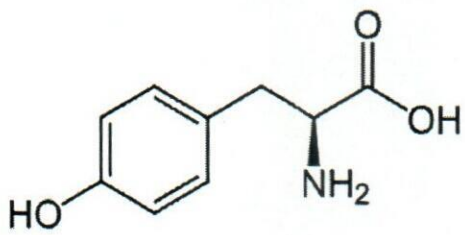
i. The role of protein buffers in extracellular versus intracellular fluids. (30 marks)

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6.4 Analyze the biochemical basis of gout. (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 Cosmetics Sciences/ Bachelor of Science Honours in Medical Health Products Management
BMS 2213/ IPS 2213/BCS 2213/ MHPM 2213
Anatomy and Physiology II
2nd Year 2nd Semester
End Semester BRQ/MCQ Examination
8th Batch

Date : **17th February 2026**
Time : **11.30 a.m. – 12.30 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 the most appropriate answer among give five statements.

Ex:

1	2	3	4	5
		X		

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

Ex:

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. **Identify the component primarily responsible for urine concentration through counter-current mechanisms, analyzing the structural organization of the kidney.** **(5 marks)**

   1. Renal cortex
   2. Proximal convoluted tubule
   3. Loop of Henle
   4. Glomerulus
   5. Renal pelvis

2. **Identify the hormone responsible for increasing basal metabolic rate by enhancing cellular oxygen consumption, applying your knowledge of thyroid physiology. (5 marks)**

1. Calcitonin
2. Thyroxine (T_4)
3. Tri-iodothyronine (T_3)
4. Thyroid-stimulating hormone (TSH)
5. Thyroglobulin

3. **Identify the ovarian structure primarily responsible for progesterone secretion during the luteal phase of the menstrual cycle. (5 marks)**

1. Primary follicle
2. Secondary follicle
3. Graafian follicle
4. Corpus luteum
5. Corpus albicans

4. **Identify the site where sperm production (spermatogenesis) occurs correlating the anatomical structure of the testis with its function. (5 marks)**

1. Epididymis
2. Seminiferous tubules
3. Vas deferens
4. Rete testis
5. Leydig cells

5. **Review the lobes of the cerebrum and identify the lobe primarily responsible for processing visual information. (5 marks)**

1. Frontal lobe
2. Parietal lobe
3. Temporal lobe
4. Occipital lobe
5. Insular lobe

6. **Identify the organ responsible for T-lymphocyte maturation by reviewing the primary lymphoid organs. (5 marks)**

1. Spleen
2. Lymph node
3. Thymus
4. Tonsils
5. Peyer's patches

7. **Identify the photoreceptor responsible for vision under low-light (scotopic) conditions analyzing the structure of the retina. (5 marks)**

1. Cones
2. Rods
3. Bipolar cells
4. Ganglion cells
5. Amacrine cells

8. Identify the structure that contains the taste receptor cells responsible for detecting different taste modalities analyzing the mechanism of gustatory perception. (5 marks)

1. Filiform papillae
2. Fungiform papillae
3. Taste buds
4. Vallate papillae
5. Lingual tonsils

9. Evaluate the statements and indicate whether they are True (T) or False (F). (5 marks)

1. Antidiuretic hormone (ADH) increases water excretion by making the collecting ducts more permeable to water.
2. The renal pelvis collects urine directly from the minor calyces before it enters the ureters.
3. The renal cortex contains the renal corpuscles.
4. The proximal convoluted tubule does not reabsorb glucose.
5. The glomerular filtration rate (GFR) is directly regulated by the juxtaglomerular apparatus through renin secretion.

10. Analyze the statements and indicate whether they are True (T) or False (F). (5 marks)

1. The ovaries function as both endocrine glands and sites of oogenesis.
2. Estrogen is primarily responsible for the maintenance of the secretory phase of the endometrium.
3 Fertilization normally occurs in the ampulla of the fallopian tube.
4. The myometrium consists mainly of smooth muscle fibers.
5. Human chorionic gonadotropin (hCG) maintains the corpus luteum during early pregnancy.

11. Analyze the statements and indicate whether they are True (T) or False (F). (5 marks)

1. The seminiferous tubules are the primary site of spermatogenesis within the testes.
2. Testosterone is secreted by Sertoli cells in response to luteinizing hormone (LH).
3. The epididymis is responsible for sperm maturation and acquisition of motility.
4. The prostate gland contributes to alkaline fluid that neutralizes vaginal acidity.
5. Spermatogenesis is completed only after ejaculation from the male reproductive tract.

12. Evaluate the statements and indicate whether they are True (T) or False (F). (5 marks)

1. The hypothalamus serves as a functional link between the nervous system and the endocrine system.
2. Thyroxine (T_4) is the biologically most active thyroid hormone at the cellular level.
3. Aldosterone is secreted from the zona glomerulosa of the adrenal cortex.
4. Insulin secretion increases in response to elevated blood glucose levels.
5. The posterior pituitary synthesizes antidiuretic hormone (ADH) and oxytocin.

13. Analyze the statements and indicate whether they are True (T) or False (F).
(5 marks)

1. The cerebellum plays a critical role in coordinating voluntary movements and maintaining balance.
2. The gray matter of the spinal cord is located peripherally, while white matter is located centrally.
3. The medulla oblongata contains vital centers that regulate respiration and cardiovascular activity.
4. The blood–brain barrier selectively restricts the passage of substances from the blood into neural tissue.
5. Action potentials in neurons are transmitted through chemical synapses by direct electrical continuity.

14. Analyze the statements and indicate whether they are True (T) or False (F).
(5 marks)

1. The cornea is the primary refractive surface of the eye.
2. Rod cells are responsible for color discrimination.
3. The aqueous humor maintains intraocular pressure and provides nutrients to the avascular lens.
4. The optic nerve transmits visual information from the retina to the visual cortex.
5. The fovea centralis contains a high density of rod photoreceptors for night vision.

15. Analyze the statements and indicate whether they are True (T) or False (F). (5 marks)

1 Cranial nerves arise directly from the brain and brainstem.

2 The vagus nerve (cranial nerve X) provides parasympathetic innervation to thoracic and abdominal organs.

3 All cranial nerves contain both sensory and motor fibers.

4. The trigeminal nerve (cranial nerve V) is the main sensory nerve of the face.

5. Damage to the oculomotor nerve (cranial nerve III) results in loss of facial expression.

16. Evaluate the statements and indicate whether they are True (T) or False (F).
(5 marks)

1 Articular cartilage covering the ends of long bones reduces friction.

2. Synovial joints are completely immovable.

3 Parathyroid hormone increases blood calcium levels by stimulating bone resorption.

4. The axial skeleton includes the skull, vertebral column, ribs, and sternum.

5. Osteoclasts are responsible for bone matrix synthesis and mineralization.

17. Analyze the statements and indicate whether they are True (T) or False (F). (5 marks)

1 The thymus is a primary lymphoid organ.

2. Lymph nodes are secondary lymphoid organs that filter lymph and trap pathogens.

3. Peyer's patches are aggregates of lymphoid tissue located in the small intestine, primarily the ileum.

4. The bone marrow functions as a primary lymphoid organ.

5. The red pulp of the spleen is primarily involved in lymphocyte activation and proliferation.

18. Analyze the statements and indicate whether they are True (T) or False (F). (5 marks)

1 The cochlea in the inner ear is responsible for converting sound vibrations into nerve impulses.
2. The ossicles (malleus, incus, stapes) amplify sound waves.
3. The semicircular canals are part of the outer ear.
4. The eustachian tube connects the middle ear to the nasopharynx.
5. The vestibule contains structures that detect both linear acceleration and head position relative to gravity.

19. Analyze the statements and indicate whether they are True (T) or False (F). (5 marks)

1. Skeletal muscles are attached to bones via tendons.
2. The sliding filament theory explains muscle contraction through interactions between actin and myosin filaments.
3. Cardiac muscle fibers are multinucleated.
4. Smooth muscle contraction is primarily regulated by calcium.
5. The sarcoplasmic reticulum stores calcium ions.

20. Evaluate the statements and indicate whether they are True (T) or False (F). (5 marks)

1. Growth hormone (GH) stimulates protein synthesis.
2. The pineal gland secretes melatonin, which regulates circadian rhythms.
3. Aldosterone secretion from the adrenal cortex is primarily regulated by the hypothalamus.
4. Glucagon decreases blood glucose levels by promoting glycogenolysis.
5. The anterior pituitary releases follicle-stimulating hormone (FSH).

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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 Cosmetics Sciences/ Bachelor of Science Honours in Medical Health Products Management

BMS 2213/ IPS 2213/BCS 2213/ MHPM 2213

Anatomy and Physiology II

2nd Year 2nd Semester

End Semester BRQ/MCQ Examination

8th Batch

Index Number: .....

Date : 17th February 2026

Time : 11.30 a.m. – 12.30 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 08.

Ex:

1	2	**X**	4	5

- Mark True **'T'** or False **'F'** for each response from question number 09 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 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**

Mark True 'T' or False 'F' for each response from question number 09 to 20.

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.

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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00065

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Beyond A Graduate

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/ / Bachelor of Science Honours in Medical Health Product Management
BMS 2213/ IPS 2213/ BCS 2213/MHPM 2213
Anatomy and Physiology II
2nd Year 2nd Semester
End Semester SEQ Examination
8th Batch

Date	:	**17th February 2026**
Time	:	**09.00 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 Correlate the anatomical organization of the nephron with its functional role in filtration, reabsorption, and secretion. (25 marks)

1.2 Analyze the anatomical differences between the male and female urethra. (25 marks)

1.3 Integrate the anatomical structure of the ureter with its role in urine transport. (25 marks)

1.4 Briefly describe the physiological effects of antidiuretic hormone (ADH) on water reabsorption and urine concentration. (25 marks)

Question 2 **(100 marks)**

2.1 Justify how anatomical structure of the uterus and its layers support reproductive function. (25 marks)

2.2 Compare and contrast the anatomical organization of male and female reproductive systems. (25 marks)

2.3 Briefly describe how the accessory glands of the male reproductive system contribute to the composition and function of semen. (25 marks)

2.4 Describe the physiological changes that occur in the ovaries during the follicular and luteal phases of the menstrual cycle. (25 marks)

Question 3 **(100 marks)**

3.1 Analyze the anatomical features of a synovial joint to justify its classification as a freely movable joint. (25 marks)

3.2 Explain the mechanism of skeletal muscle contraction using the sliding filament model. (25 marks)

3.3 Justify why pancreas classify as a mixed gland. (25 marks)

3.4 Justify the designation of pituitary gland as the "master gland" of the endocrine system. Write a short note on renal corpuscle. (25 marks)

Question 4 **(100 marks)**

4.1 Differentiate between sympathetic and parasympathetic nervous system actions. (20 marks)

4.2 Explain the mechanism of vision, highlighting the role of the retina and photoreceptors. (30 marks)

4.3 Assess the protective coverings of the central nervous system to justify their importance in maintaining neural integrity. (25 marks)

4.4 Evaluate the anatomical features of lymph nodes to correlate them with their immune function. (25 marks)

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Beyond A Graduate

Faculty of Health Sciences
Bachelor of Science Honours in Biomedical Sciences/ Industrial Pharmaceutical Science/ Cosmetics Sciences/ Medical and Health Product Management
BMS 2225 / IPS 2223/ BCS 2223/ MHPM 2223 – Biochemistry II
Batch – 08
2nd Year 2nd Semester
Mid semester MCQ/BRQ Examination

Date : **25th of November 2025**
Time : **01.30 p.m. – 02.30 p.m. (One Hour)**

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **Twenty** main questions.
- Answer **ALL** questions.
- Select the single best response for the questions from 01 to 05.
- Mark 'True' or 'False' for each response from question number 06 to 20.
- You are not allowed to take out the examination papers.

(05 x 20 = 100 marks)

1. Which of the following amino acids contains a sulfur atom? (05 marks)
   a. Serine
   b. Methionine
   c. Threonine
   d. Histidine
   e. Glutamine

2. Which of the following amino acids serves as a precursor for catecholamine synthesis? (05 marks)
   a. Phenylalanine
   b. Lysine
   c. Tryptophan
   d. Glutamate
   e. Arginine

3. Which cofactor is required for the activity of transaminases? (05 marks)
   a. Biotin
   b. Pyridoxal phosphate (PLP)
   c. FAD
   d. NAD^+
   e. Coenzyme A

4. Which of the following amino acids is purely ketogenic? (05 marks)
   a. Isoleucine
   b. Leucine
   c. Phenylalanine
   d. Tyrosine
   e. Threonine

5. Which of the following enzyme is deficient in phenylketonuria (PKU)? (05 marks)
   a. Tyrosine hydroxylase
   b. Alanine transaminase
   c. Phenylalanine hydroxylase
   d. Dihydropteridine reductase
   e. Asparate transaminase

6. "True" or "False" regarding peptide bond formation? (05 marks)
   a. It involves the α-carboxyl group of one amino acid and the α-amino group of another.
   b. It is catalyzed by peptidyl transferase activity in the ribosome.
   c. It releases a molecule of water.
   d. It is an example of a condensation reaction.
   e. It occurs spontaneously without energy.

7. "True" or "False" regarding branched-chain amino acid metabolism? (05 marks)
   a. Valine, leucine, and isoleucine are essential amino acids.
   b. Their metabolism occurs mainly in the liver.
   c. Impaired branched-chain amino acid metabolism causes metabolic complications.
   d. The first step involves transamination.
   e. Leucine is both glucogenic and ketogenic.

8. "True" or "False" about nitrogen excretion? (05 marks)
   a. Urea is the major nitrogen excretion product in humans.
   b. Ammonia is the main nitrogen excretion product in birds.
   c. Uric acid is water soluble.
   d. Ammonotelic organisms excrete ammonia directly.
   e. The urea cycle occurs in both cytosol and mitochondria.

9. "True" or "False" regarding the urea cycle regulation? (05 marks)
   a. Carbamoyl phosphate synthetase I is activated by N-acetylglutamate.
   b. Arginine stimulates N-acetylglutamate synthesis.
   c. Deficiency of ornithine transcarbamylase leads to hyperammonemia.
   d. Argininosuccinate synthetase deficiency causes citrullinemia.
   e. Urea cycle occurs entirely in cytoplasm.

10. "True" or "False" regarding genetic enzyme defects? (05 marks)
    a. Histidinemia is occurred due to a genetic mutation in HAI gene.
    b. Cystinuria is characterized by excretion of three amino acids in urine.
    c. Maple syrup urine disease involves defective tyrosine metabolism.
    d. Alkaptonuria is due to homogentisate oxidase deficiency.
    e. PKU can be treated with dietary phenylalanine restriction.

11. "True" or "False" about protein tertiary structure? (05 marks)
    a. It refers to the sequence of amino acids.
    b. Stabilized by disulfide bonds.
    c. Hydrophobic interactions contribute to this structure.
    d. Involves interactions between R-groups.
    e. Determines the protein's biological function.

12. "True" or "False" regarding glutamine metabolism? (05 marks)
    a. Glutamine acts as a nitrogen donor in nucleotide biosynthesis.
    b. Glutaminase converts glutamine to glutamate.
    c. Glutamine is a major fuel for rapidly dividing cells.
    d. Glutamine cannot cross the mitochondrial membrane.
    e. The amide nitrogen of glutamine participates in purine synthesis.

13. "True" or "False" regarding ketogenic amino acids? (05 marks)
    a. Can form ketone bodies.
    b. Include glycine and tyrosine.
    c. Converted to intermediates like acetyl-CoA.
    d. Cannot be used for glucose production.
    e. Glutamate is a ketogenic amino acid.

14. "True" or "False" regarding transamination? (05 marks)
    a. Pyridoxal phosphate is a required cofactor.
    b. Transamination is reversible.
    c. It involves the transfer of amino groups.
    d. Alanine aminotransferase requires FAD as a coenzyme.
    e. Glutamate is a common amino group acceptor.

15. "True" or "False" regarding the fate of tyrosine? (05 marks)
    a. It forms dopamine, norepinephrine, and epinephrine.
    b. It is a precursor for thyroid hormones.
    c. It is a precursor for melanin.
    d. Tyrosine degradation defect causes albinism.
    e. It is synthesized from phenylalanine.

16. "True" or "False" regarding protein turnover? (05 marks)
    a. All proteins have the same half-life.
    b. Ubiquitin tags proteins for degradation.
    c. Lysosomes are involved in protein degradation.
    d. Protein degradation is only extracellular.
    e. Proteins are synthesized and degraded continuously.

17. "True" or "False" regarding DNA structure and function? (05 marks)
    a. DNA contains deoxyribose sugar and the base thymine instead of uracil.
    b. The two DNA strands run in an antiparallel direction.
    c. Hydrogen bonds between phosphate groups stabilize the double helix.
    d. DNA replication is semiconservative, producing one old and one new strand.
    e. The A–T base pair is connected by three hydrogen bonds.

18. "True" or "False" regarding enzymes in protein digestion? (05 marks)
    a. Pepsin acts in acidic pH.
    b. Trypsin activates other zymogens in the intestine.
    c. Carboxypeptidase removes amino acids from the carboxyl end.
    d. Elastase cleaves peptide bonds near aromatic residues.
    e. Pepsinogen is activated by low gastric pH.

19. Which of the following statements is true regarding the secondary and tertiary structure of RNA? (05 marks)
    a. The secondary structure of RNA is stabilized primarily by covalent bonds between bases.
    b. The cloverleaf structure of tRNA is an example of RNA tertiary structure.
    c. Stem-loop (hairpin) formations in RNA arise due to intramolecular base pairing.
    d. RNA cannot form double-helical regions because uracil does not participate in hydrogen bonding.
    e. RNA molecules are stable than DNA in alkaline conditions.

20. "True" or "False" regarding cofactors in amino acid metabolism? (05 marks)
    a. Biotin transfers carboxyl groups.
    b. THF transfers one-carbon units.
    c. Pyridoxal phosphate transfers amino groups.
    d. FAD acts in oxidation–reduction reactions.
    e. NADPH is required for transamination.

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Beyond A Graduate

Faculty of Health Sciences
BSc. Industrial Pharmaceutical Sciences / BSc. Cosmetic sciences
IPS 2253 - Pathology of Diseases/ BCS 2253 - Pathology for Cosmetic Sciences/ MHPM 2253 - General Pathology
2nd Year 2nd Semester
7th Batch
End Semester SEQ Examination

Date: 22nd August 2025
Time: 09.00 am – 12.00 pm – Three Hours

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **SIX** structured essay type 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 Compare physiological and pathological hyperplasia (25 marks)
1.2 List all vascular changes seen in acute inflammation. (25 marks)
1.3 List all cellular changes seen in acute inflammation. (25 marks)
1.4 Briefly describe coagulative necrosis. (25 marks)

Question 02 (100 marks)

2.1 List **fives (05)** causes for cell injury. (15 marks)
2.2 Briefly describe the importance of inflammation. (15 marks)
2.3 What are the causes for inflammation? (25 marks)
2.4 Compare dystrophic calcification and metastatic calcification. (25 marks)
2.5 Compare regeneration and repair. (20 marks)

Question 03 (100 marks)

3.1 What are neoplasms? (25 marks)
3.2 List **five (05)** risk factors for cancer formation (25 marks)
3.3 What are the clinical features of gastric cancer? (25 marks)
3.4 What are the main differences between benign and malignant tumors? (25 marks)

Question 04 (100 marks)

4.1 What is cardiac hypertrophy? (10 marks)
4.2 List **four (04)** risk factors for developing atherosclerosis. (20 marks)
4.3 What are the clinical features of pneumonia? (20 marks)
4.4 Write a short note on chronic obstructive pulmonary disease. (50 marks)

Question 05 (100 marks)

5.1 a) What is amenorrhea? (10 marks)
b) What is dysmenorrhea? (10 marks)
5.2 What are diagnostic tests for cervical cancer? (10 marks)
5.3 What are the the signs and symptoms of vaginitis? (20 marks)
5.4 Write a short note on endometriosis. (50 marks)

Question 06 (100 marks)

6.1 What are the **four (o4)** types of intra-cranial haemorrhages? (ICH) (20 marks)
6.2 List **four (o4)** signs and symptoms of intra-cranial haemorrhages. (20 marks)
6.3 Name **four (04)** causative agents for meningitis. (20 marks)
6.4 Write a short note on diabetes mellitus. (40 marks)

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CINEC CAMPUS
Beyond A Graduate

Faculty of Health Sciences
BSc. Industrial Pharmaceutical Sciences / BSc. Cosmetic sciences
IPS 2253 - Pathology of Diseases/ BCS 2253 - Pathology for Cosmetic Sciences/ MHPM 2253 - General Pathology
2nd Year 2nd Semester
7th Batch
End Semester SEQ Examination

Date: 22nd August 2025
Time: 09.00 am – 12.00 pm – Three Hours

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **SIX** structured essay type 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 Compare physiological and pathological hyperplasia (25 marks)
1.2 List all vascular changes seen in acute inflammation. (25 marks)
1.3 List all cellular changes seen in acute inflammation. (25 marks)
1.4 Briefly describe coagulative necrosis. (25 marks)

Question 02 (100 marks)

2.1 List **fives (05)** causes for cell injury. (15 marks)
2.2 Briefly describe the importance of inflammation. (15 marks)
2.3 What are the causes for inflammation? (25 marks)
2.4 Compare dystrophic calcification and metastatic calcification. (25 marks)
2.5 Compare regeneration and repair. (20 marks)

Question 03 (100 marks)

3.1 What are neoplasms? (25 marks)
3.2 List **five (05)** risk factors for cancer formation (25 marks)
3.3 What are the clinical features of gastric cancer? (25 marks)
3.4 What are the main differences between benign and malignant tumors? (25 marks)

Question 04 (100 marks)

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4.2 List **four (04)** risk factors for developing atherosclerosis. (20 marks)
4.3 What are the clinical features of pneumonia? (20 marks)
4.4 Write a short note on chronic obstructive pulmonary disease. (50 marks)

Question 05 (100 marks)

5.1 a) What is amenorrhea? (10 marks)
b) What is dysmenorrhea? (10 marks)
5.2 What are diagnostic tests for cervical cancer? (10 marks)
5.3 What are the the signs and symptoms of vaginitis? (20 marks)
5.4 Write a short note on endometriosis. (50 marks)

Question 06 (100 marks)

6.1 What are the **four (o4)** types of intra-cranial haemorrhages? (ICH) (20 marks)
6.2 List **four (o4)** signs and symptoms of intra-cranial haemorrhages. (20 marks)
6.3 Name **four (04)** causative agents for meningitis. (20 marks)
6.4 Write a short note on diabetes mellitus. (40 marks)

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Beyond A Graduate

Faculty of Health Sciences
B.Sc. (Hons) in Cosmetic Sciences, B.Sc. (Hons) in Industrial Pharmaceutical Sciences,
B.Sc. (Hons) in Medical & Health Product Management
7th Batch
BCS 2243 /IPS 2243 /MHPM 2243 – Inorganic Chemistry
End Semester Examination
2nd Year 2nd Semester –SEQ

Date: 20th of August 2025
Time: 09.00 am – 12.00 pm – Three Hours

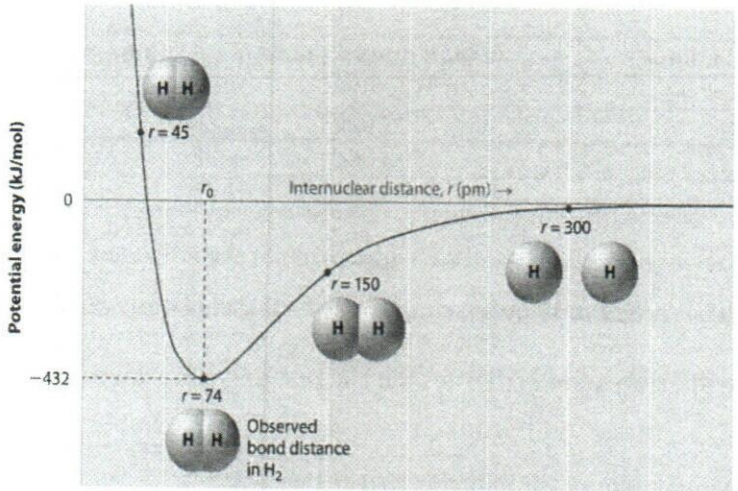
Index Number.....

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 Write the **three** types of chemical bonding observed in inorganic compounds (15 marks)

1.2 You have given the energy profile of Hydrogen (H_2). Answer the following questions based on the following graph.



1.2.1 What is the bond energy of H_2 molecule? (10 marks)

1.2.2 What is the equilibrium bond length of H_2 molecule? (10 marks)

1.2.3 What is the bond length with maximum repulsive forces? (10 marks)

1.3 What is meant by **Lattice Energy** of a compound? (20 marks)

1.4 Coulomb's law can be used to calculate the energy of an interaction between a pair of ions. It can be used for both attractive and repulsive forces. Two-point charges are placed in vacuum. Charge $q_1=+2.0\times10^{-6}$ C and charge $q_2= -3.0\times10^{-6}$ C are separated by a distance of 0.50 m. (Coulomb's constant $=8.987\times10^{9}$ N.m.^{2}C^{-2})

1.4.1 Calculate the magnitude of the force between the two charges. (25 marks)

1.4.2 Predict the direction of the electrostatic force between the two charges. (10 marks)

Question 02 **(100 marks)**

2.1 Write the electron configuration of **Neon** (Ne). (20 marks)

2.2 Explain why noble gases have very low boiling points. (20 marks)

2.3 Find the molecular shapes of XeF_2 and XeF_4 compounds. (20 marks)

2.4 Why are heavier noble gases like Xenon more likely to form compounds compared to lighter noble gases like Helium or Neon? (20 marks)

2.5 Write two uses of noble gases in the field of medicine. (20 marks)

Question 03 **(100 marks)**

3.1 Explain the difference between homopolymer and copolymer. (20 marks)

3.2 A silicone sample was analyzed by MALDI-TOF-MS technology and the following information was extracted. The following table indicates the molar mass (g/mol) and the number of molecules.

Polymer Chain	Molar mass (g/mol)	Number of molecules
A	100,000	10,000
B	200,000	50,000
C	500,000	30,000
D	1,000,000	10,000

3.2.1 Calculate the **number average molecular weight (Mn)** of the silicone polymer sample. (20 marks)

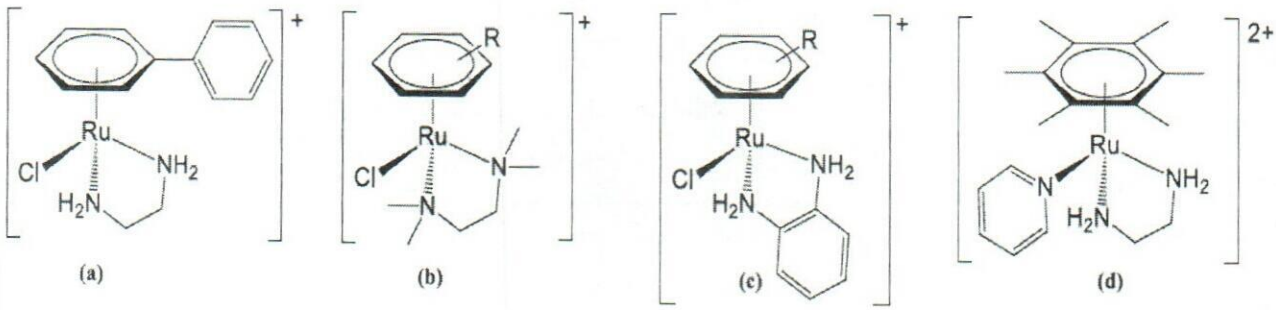
3.2.2 Calculate the **weight average molecular weight (Mw)** of the silicone polymer sample. (20 marks)

3.2.3 Calculate the **polydispersity index (PDI)** of the silicone polymer sample and comment on the result. (20 marks)

3.2.4 Explain why silicone polymers exhibit high thermal stability. (20 marks)

Question 04 **(100 marks)**

4.1 Several Ruthenium (Ru) (II) organometallic complexes, mainly with an arene ligand, have been intensively investigated for their biological catalytic activity. The nature of the chelating ligand in the Ru-arene structure has a dramatic influence on the biological activity of the resulting complexes by inhibiting the growth of cancer cells. Further studies revealed that the -NH protons following organometallic compounds **(structures a-d)** are probably related to inhibiting cancer cells. (Ru= [Kr] $4d^7\ 5s^1$)



4.1.1 Calculate the total number of valence electrons of each of the above **compounds a-d** and show how you arrived at the answer? (20 marks)

4.1.2 Calculate the formal oxidation states of Ru in each of the **compounds (a-d).** (20 marks)

4.1.3 Calculate the coordination number of Ru in each of the **compounds (a-d).** (20 marks)

4.2 Determine the hapticity of the Cp rings in $Cp_2Fe(CO)_2$. Given that Cp=C_5H_5 and Fe= [Ar] $3d^6\ 4s^2$ (20 marks)

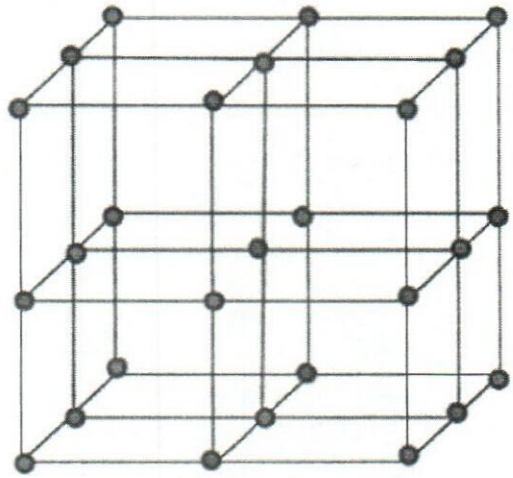
4.3 Write two importance of organotransition metal complexes? (20 marks)

Question 05 **(100 marks)**

5.1 Write the difference between amorphous and crystalline solids. (10 marks)

5.2 Write the difference between crystal lattice and unit cell. (10 marks)

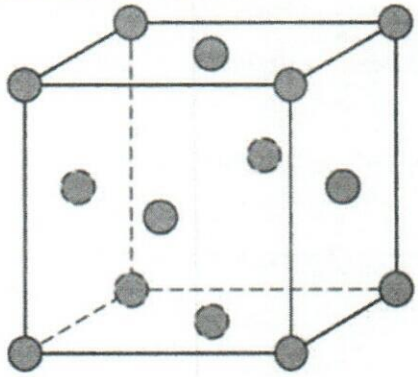
5.3 The unit cell of compound AB is given below and the distance between centers adjacent A^+ and B^- ions in compound AB is 2.82 Å. The molar mass of compound AB= 58.5 $gmol^{-1}$ (1 Å= 1×10^{-8} cm)



5.3.1 Calculate the volume of one unit cell. (10 marks)

5.3.2 Calculate the moles of AB, if the density of solid AB is 2.163 gcm^{-3}. (20 marks)

5.4 The unit cell of a crystal of metal Z is shown below.



5.4.1 Identify the type of unit cell. (10 marks)

5.4.2 Determine the number of Z atoms per unit cell. (20 marks)

5.4.3 If the length of the diagonal of the unit cell is 300.09 nm, calculate the radius of a Z atom. (20 marks)

Question 06 **(100 marks)**

6.1 Briefly describe how the high heat of vaporization and dipolar in nature of water is important to biological systems. (20 marks)

6.2 Write the difference between bulk metals and trace metals in the biological systems. (20 marks)

6.3. Draw the dose response curves for Arsenic (As) in the biological systems. (30 marks)

6.4 Metalloenzymes often rely on transition metals like iron, copper, or zinc to perform essential biological reactions. Why do cells incorporate metals into protein structures rather than using the free ions directly? (30 marks)

ANNEX I — MCQ ANSWER SHEET

Student ID: .....

Instructions — Shade the correct letter using a pencil.

1. (A) (B) (C) (D)
2. (A) (B) (C) (D)
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4. (A) (B) (C) (D)
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23. (A) (B) (C) (D)
24. (A) (B) (C) (D)
25. (A) (B) (C) (D)

ANNEX I — MCQ ANSWER SHEET

Student ID: .....

Instructions — Shade the correct letter using a pencil.

1. (A) (B) (C) (D)
2. (A) (B) (C) (D)
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22. (A) (B) (C) (D)
23. (A) (B) (C) (D)
24. (A) (B) (C) (D)
25. (A) (B) (C) (D)

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CINEC CAMPUS
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Faculty of Health Sciences
Bachelor of Science Honors in Industrial Pharmaceutical Science/ Bachelor of Science Honors in Medical and Health Product Management
IPS 2233 Industrial Pharmaceutics I/ MHPM 2233 Pharmaceutics I
Batch 07
2nd Year 2nd Semester
End Semester Examination - SEQ

Date : 18th of August 2025
Time : 9.00 a.m. - 12.00 noon (Three hours)

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **SIX** structured essay type questions.
- Answer **ALL** the questions.
- Final answers should be given legibly in black or blue ink.

Question 01 **(100 marks)**

1.1 List **four (04)** types of primary information sources. (20 marks)

1.2 State the characteristics of tertiery information sources. (20 marks)

1.3 Write a brief account on pharmaceopoeia. (30 marks)

1.4 Differentiate patient information leaflet and product information leaflet. (30 marks)

Question 02 **(100 marks)**

2.1 Why does aspirin lose its therapeutic activity when exposed to heat? (15 marks)

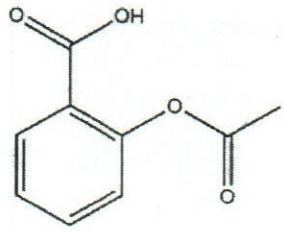
2.2 How does the polarity of a molecule affect its water solubility? (20 marks)

2.3 What is 'shelf-life' of a medicinal product? (20 marks)

2.4 Partition coefficient (P) is an important physicochemical property of drug molecules.

2.4.1 Outline the shake-flask method of determining P. (20 marks)

2.4.2 Determine the P of given molecule using Cate and Lemke method (see the next page). (25 marks)



Hydrophilic-Lipophilic Fragment Constants

Fragment	π Value
C (aliphatic)	+0.5
C_6H_5-	+2.0
Cl	+0.5
O_2NO	+0.2
IMHB*	+0.65
S	+0.5
O=C-O	-0.7
O=C-N	-0.7
O (hydroxyl, phenol, ether)	-1.0
N (amine)	-1.0
O_2N (aliphatic)	-0.85
O_2N (aromatric)	-0.28

* intramolecular hydrogen bonding

Question 03 **(100 marks)**

3.1 Differentiate hygroscopicity and deliquenscence. (20 marks)

3.2 List **four (04)** factors that influence the activity of surfactants. (20 marks)

3.3 Outline the methods to reduce interparticle friction during manufacturing. (20 marks)

3.4 Write a short account on glycerinated gelatin as a suppository base. (20 marks)

3.5 How does the nature of suppository base affect the absorption of its drug? (20 marks)

Question 04 **(100 marks)**

4.1 List **four (04)** types of powders used for internal/ systemic use. (20 marks)

4.2 Define the following terms. (10 x 3 marks)

4.2.1 Insufflation

4.2.2 Vaginal douche

4.2.3 Dentifrice

4.3 Pharmaceutical powders are prepared in several methods.

4.3.1 Name **four (04)** commercial equipment used for mixing of powders/ granules. (20 marks)

4.3.2 Outline the process flow (using flow chart) of any **two (02)** commercial manufacturing processes employed for preparation of powders/ granules. (30 marks)

Question 05 **(100 marks)**

5.1 Mention **four (04)** types of tablets, classified based on physical form or application. (20 marks)

5.2 Write a descriptive account of **four (04)** stages of tablet compression process. (30 marks)

5.3 What type of substances are not suitable for encapsulation of soft gelatin capsules? (20 marks)

5.4 Outline the process flow of manufacturing of empty hard gelatin capsules. (30 marks)

Question 06 **(100 marks)**

6.1 Define the following dosage forms. (10 x 3 marks)

6.1.1 Cream

6.1.2 Gel

6.1.3 Paste

6.2 List **four (04)** bases used in the manufacturing of ointments (as per USP). (20 marks)

6.3 Write a short description on **one (01)** of the bases you mentioned in 6.2 above. (25 marks)

6.4 Mention **five (05)** essential ingredients used in a cream formulation. (25 marks)

***

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Faculty of Health Sciences

BSc Honours in Biomedical Sciences/ Industrial Pharmaceutical Sciences/ Cosmetic Science

BIOCHEMISTRY II – BMS 2225/IPS 2223/ BCS 2223
2ND YEAR 2ND SEMESTER
BATCH 07
MID SEMESTER ASSIGNMENT

Date : **13th of August 2025**
Time : **01.30 p.m. – 02.30 p.m. (ONE HOUR)**

INSTRUCTIONS TO CANDIDATES

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

QUESTION 01 **(100 marks)**

1.1. Discuss the importance of the quaternary structures of proteins in determining their biological activity. (40 marks)

1.2.Differentiate between globular and fibrous proteins with examples. (30 marks)

1.3. Describe how defects in protein degradation pathways, such as the ubiquitin-proteasome system, can contribute to disease development. (30 marks)

QUESTION 02 **(100 marks)**

2.1. Define amino acid classification based on the side chain (R group) properties. (30 marks)

2.2. Outline the role of the stomach, pancreas, and small intestine in protein digestion. (35 marks)

2.3. Illustrate the transamination and deamination reactions of amino acids with relevant enzymes and cofactors. (35 marks)

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Faculty of Health 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

IPS 2223/ BCS 2223/ MHPM 2223 – Biochemistry II

2nd Year 2nd Semester

Batch 07

End Semester SEQ Examination

Date	:	**13th of August 2025**
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 allowed used a scientific calculator for the examination.
- You are not allowed to take out the examination paper.

QUESTION 01 **(100 marks)**

1.1. State how the isoelectric point (pI) of a protein influences its buffering ability in different pH environments. (20 marks)

1.2. Write short notes on the following:

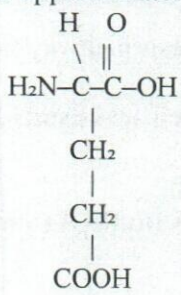
i. The bicarbonate buffer system and its role in maintaining blood pH. (30 marks)

ii. Hemoglobin as a buffer. (20 marks)

iii. Comparison of the effectiveness of protein buffers and inorganic buffers in biological systems. (30 marks)

QUESTION 02 **(100 marks)**

The isoelectric point (pI) of glutamic acid is approximately **3.2**.



2.1. Draw a diagram to indicate the predominant ionic form of glutamic acid by showing the ionization states of each functional group at the below pH values. Justify your answers by referring to protonation/deprotonation based on the pKa values.

i. pH = 1.0 (25 marks)

ii. pH = 3.2 (25 marks)

iii. pH = 7.0 (25 marks)

iv. pH = 11.0 (25 marks)

QUESTION 03 **(100 marks)**

3.1. Differentiate between ketogenic and glucogenic amino acids. (20 marks)
3.2. Classify proteins based on their solubility and provide an example for each class. (25 marks)
3.3. Justify the following statement:"Untreated Phenylketonuria (PKU) leads to hypopigmentation." Include relevant biochemical pathways and mechanisms in your explanation. (25 marks)
3.4. Compare and contrast the roles of transamination and deamination in amino acid metabolism. (30 marks)

QUESTION 04 **(100 marks)**

4. A 30-year-old female was recently rescued after being isolated in a rural mountainous region following a natural disaster. She had minimal food access for approximately 07 days, surviving on small amounts of water and occasional wild fruits.

4.1. Mention the major metabolic pathways activated in this individual during the prolonged starving period. (15 marks)
4.2. Shortly describe the hormonal changes expected in this individual during this situation. (25 marks)
4.3. Draw a flow chart to denote the metabolic adaptations of the liver during prolonged staving. (30 marks)
4.4. Disccuss briefly the physiological consequences of prolonged starvation on muscle tissue. (30 marks)

QUESTION 05 **(100 marks)**

5.1. Write short notes on followings.
5.1.1 Pyrimidine bases (25 marks)
5.1.2. Melting temperature of DNA. (25 marks)
5.2. List characteristic features of DNA molecule. (25 marks)
5.3.Define following terms.
5.3.1 DNA replication (12.5 marks)
5.3.2 Annealing (12.5 marks)

QUESTION 06 **(100 marks)**

6.1 Compare and contrast "De Novo synthesis pathway" and "Salvage pathway" of purine nucleotides synthesis. (25 marks)
6.2 Briefly describe how does 5-fluorouracil act as suicide inhibitor/ irreversible inhibitor in a cancer chemotherapy. (25 marks)
6.3 What is the biochemical basis of gout? (25 marks)
6.4 Compare and contrast messenger RNA (m.RNA) and transfer RNA (t.RNA). (25 marks)

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BMS 2213/ IPS 2213/ BCS 2213/ MHPM 2213
Anatomy and Physiology II
2nd Year 2nd Semester
End Semester BRQ/MCQ Examination
7th Batch

Date	:	**11th August 2025**
Time	:	**11.30 a.m. – 12.30 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. **What is the sensory receptor type which can detect carbon dioxide concentration?**
   1. Nociceptor
   2. Mechanoreceptor
   3. Thermoreceptor
   4. Chemoreceptor
   5. Electromagnetic receptor

2. **Which part of ear is mostly importance for balance?**
   1. Cochlea
   2. Vestibule
   3. Malleus
   4. Auricle
   5. Stapes

3. **What is the largest cranial nerve?**
   1. Trigeminal nerve
   2. Abducens nerve
   3. Vagus nerve
   4. Accessory nerve
   5. Hypoglossal nerve

4. **Which area of the muscle contains both thick and thin filaments?**
   1. Z disc
   2. I band
   3. M line
   4. A band
   5. H zone

5. **Which bone is not a long bone?**
   1. Tibia
   2. Metatarsals
   3. Carpals
   4. Fibula
   5. Femur

6. **What is first class of antibodies released by B cells during primary response?**
   1. IgG
   2. IgM
   3. IgD
   4. IgA
   5. IgE

7. **Which of the following hormone is secreted by the adrenal cortex?**
   1. Renin
   2. Aldosterone
   3. Adrenalin
   4. ADH
   5. Noradrinalin

8. **Which of the following best describes the function of the cerebral cortex,**
   1. Changes in heart rate
   2. Thermoregulation
   3. Sensory perception
   4. Regulation of respiration
   5. Coordination of voluntary movements

9. True of false regarding human kidneys system?

1. Kidneys are retroperitoneal organs.
2. Juxtamedullary nephrons are the abundant nephron type.
3. Left kidney is usually slightly lower than right kidney.
4. The renal medulla contains pyramids.
5. Nephrons open to collecting duct.

10. True or false regarding skeletal muscle contraction?

1. Calcium ion (Ca^{2+}) gates in sarcoplasmic reticulum get stimulated.
2. Ca^{2+} ions are released from sarcoplasmic reticulum.
3. Ca^{2+} binds to Troponin.
4. Tropomyosin hinds the binding sites of myosin head located on the actin filament.
5. ATP binds to actin and hydrolyzed.

11. True or false regarding immune organs?

1. Tonsils are mucosa-associated lymphoid tissue.
2. Thymus is a secondary immune organ.
3. Spleen is the largest immune organ.
4. Thymus present in middle mediastinum.
5. Peyer's patches are examples for immune organs.

12. True or false regarding pancreas hormone?

1. Alpha cells secrete insulin.
2. Somatostatin stimulate glucagon secretion.
3. Pancreatic polypeptide inhibits insulin.
4. Insulin decrease glycogenolysis.
5. Delta cells secrete pancreatic polypeptide.

13. Regarding polarization of plasma membrane,

1. the inside of plasma membrane has a positive charge compared to the outside in polarized state.
2. the polarized state is creating by sodium and chloride ions.
3. any changes in membrane potential tending to make the inside even more negative is called hyperpolarization.
4. any change tending to make it less negative is called depolarization.
5. the Na^+/K^+ pump is involved in determining membrane potential of the cells.

14. The olfactory epithelium,

1. contains only olfactory receptor cells.
2. is a squamous epithelium.
3. response for chemical stimuli.
4. contains non-motile cilia.
5. contains olfactory receptor cells in the middle stratum.

15. Which of the followings are correct regarding the female hormones?

1. Placenta secrets high levels of progesterone.
2. Estrogen becomes the predominant sex hormone at the end of pregnancy.
3. Oxytocin release is controlled by positive feedback.

4. Prolactin is secreted from the posterior pituitary to stimulate the production of milk.
5. FSH promotes the maturation of ovarian follicles.

16. True or false regarding human eye?

1. It is supplied by 2nd cranial nerve.
2. Choroid is the outer fibrous layer.
3. Retina is the inner nervous layer.
4. Sclera is the white of the eye.
5. Ciliary muscles control size and thickness of the lens.

17. True or false regarding human immune cells?

1. Lymphocytes arise from stem cells in bone marrow.
2. B- lymphocytes are involved for cell-mediated immune response.
3. Immunoglobulins are produced by B cells.
4. Macrophages are important for phagocytosis.
5. Helper T cells release cytokines.

18. True or False regarding the human ear?

1. The auricle is the middle part of the ear.
2. The tympanic membrane separates the external ear from the inner ear.
3. Malleus is a lateral hammer-shaped bone.
4. Membranous labyrinth is filled with endolymph.
5. Cochlea resembles a snail's shell.

19. True or false regarding male reproductive system?

1. Prostate gland makes bulk of the semen volume.
2. Parasympathetic nerves cause vasoconstriction in the penis during sexual excitement.
3. Secondary spermatocytes undergo meiosis I.
4. Testosterone enhances libido.
5. Sertoli cells important to nourish the developing spermatozoa.

20. True or False regarding the adrenal gland?

1. Zona glomerulosa makes 15% of the medulla of the adrenal gland.
2. Zona fasciculata contains foamy cells.
3. Zona reticularis contains lipofuscin pigment granules.
4. Chromaffin cells store norepinephrine.
5. Adrenal glands are enclosed by renal fascia.

Examination Department
11 AUG 2025
CINEC Campus, Sri Lanka

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BMS 2213/ IPS 2213/ BCS 2213/ MHPM 2213
Anatomy and Physiology II
2nd Year 2nd Semester
End Semester BRQ/MCQ Examination
7th Batch

Index Number: .....

Date	:	**11th August 2025**
Time	:	**11.30 a.m. – 12.30 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 08.

  Ex:

1	2	~~3~~	4	5

- Mark True **'T'** or False **'F'** for each response from question number 09 to 20.

  Ex:

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

Mark True 'T' or False 'F' for each response from question number 09 to 20.

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.

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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BMS 2213/ IPS 2213/ BCS 2213/MHPM 2213
Anatomy and Physiology II
2nd Year 2nd Semester
End Semester SEQ Examination
7th Batch

Date	:	**11th August 2025**
Time	:	**09.00 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 a short note on renal corpuscle. (25 marks)
1.2 How male urethra differ from female urethra? (25 marks)
1.3 Briefly describe the steps involved in urine formation process. (25 marks)
1.4 Briefly describe the role of angiotensin-aldosterone system in regulating blood pressure and urine output. (25 marks)

Question 2 **(100 marks)**

2.1 Illustrate anatomy of human eye. (25 marks)
2.2 Write a short note on tympanic membrane. (25 marks)
2.3 List the steps involved in how sound waves converted into nerve impulses in cochlear. (30 marks)
2.4 Differentiate between the Central Nervous System (CNS) and Peripheral Nervous System (PNS) in terms of function. (20 marks)

Question 3 **(100 marks)**

3.1 Compare and contrast three (03) main types of muscles in human body. (25 marks)
3.2 Briefly describe the structure of a synovial joint. (25 marks)
3.3 Briefly describe the sliding filament theory of muscle contraction step by step. (30 marks)
3.4 How is joint stability maintained physiologically? (20 marks)

Question 4 **(100 marks)**

4.1 Write a short note on mucosa-associated lymphoid tissue (MALT). (25 marks)

4.2 Write a short note on human uterus. (25 marks)

4.3 Briefly describe function of the three accessory glands in the male reproductive system involved in semen production. (25 marks)

4.4 What physiological changes occur in the uterus during the menstrual phase and proliferative phases? (25 marks)

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Faculty of Health Sciences

BSc Honours in Biomedical Sciences/ Industrial Pharmaceutical Sciences/ Cosmetic Science

BIOCHEMISTRY II – BMS 2225/IPS 2223/ BCS 2223
2ND YEAR 2ND SEMESTER
BATCH 04
SPECIAL REPEAT MID SEMESTER ASSIGNMENT

Date : **24th of June 2025**
Time : **01.30 p.m. – 02.30 p.m. (ONE HOUR)**

INSTRUCTIONS TO CANDIDATES

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

QUESTION 01 **(100 marks)**

1.1. Evaluate the significance of the following structures in cellular functions,

i. Secondary structure of proteins. (35 marks)
ii. Quaternary structure of proteins. (30 marks)
iii. Fibrous proteins. (35 marks)

QUESTION 02 **(100 marks)**

2.1. Denote the role of essential and non-essential amino acids in human body. (30 marks)
2.2. Outline the protein digestion process in the human body. (35 marks)
2.3. Draw a flow chart to represent the reactions involved in urea cycle. (35 marks)

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Bachelor of Science Honours in Biomedical Sciences/ Industrial Pharmaceutical Science/ Cosmetics Sciences/ Medical and Health Product Management
BMS 2225 / IPS 2223/ BCS 2223/ MHPM 2223 – Biochemistry II
Batch – 07
2nd Year 2nd Semester
Mid semester MCQ/BRQ Examination

Date : **19th of May 2025**
Time : **01.30 p.m. – 02.30 p.m. (One Hour)**

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **Twenty** main questions.
- Answer **ALL** questions.
- Select the single best response for the questions from 01 to 05.
- Mark 'True' or 'False' for each response from question number 06 to 20.
- You are not allowed to take out the examination papers.

1. Which of the following amino acids contains an imidazole ring in its side chain?
   a. Arginine
   b. Histidine
   c. Lysine
   d. Tyrosine
   e. Cysteine

2. Which of the following is the rate-limiting enzyme of the urea cycle?
   a. Arginase
   b. Ornithine transcarbamylase
   c. Argininosuccinate synthetase
   d. Carbamoyl phosphate synthetase I
   e. N-acetylglutamate synthetase

3. Which amino acid is the main carrier of nitrogen from peripheral tissues to the liver?
   a. Alanine
   b. Leucine
   c. Glutamate
   d. Lysine
   e. Valine

4. In phenylketonuria (PKU), phenylalanine accumulates due to deficiency of which enzyme?
   a. Homogentisate oxidase
   b. Phenylalanine hydroxylase
   c. Dihydropteridine reductase
   d. Tyrosine hydroxylase
   e. Alanine transaminase

5. Which of the following amino acids are both glucogenic and ketogenic?
    a. Valine
    b. Leucine
    c. Lysine
    d. Isoleucine
    e. Histidine

6. "True" or "False" regarding the synthesis of aromatic amino acids:
    a. Phenylalanine is an aromatic amino acid synthesized from tyrosine.
    b. Tryptophan is an aromatic amino acid that is synthesized from the precursor chorismate.
    c. The synthesis of aromatic amino acids occurs through the shikimate pathway in organisms.
    d. Aromatic amino acids are synthesized from 3-phosphoglycerate via the pentose phosphate pathway.
    e. Only 3 amino acids are derived directly from erythrose-4-phosphate.

7. "True" or "False" about protein tertiary structure:
    a. It refers to the sequence of amino acids.
    b. Stabilized by disulfide bonds.
    c. Hydrophobic interactions contribute to this structure.
    d. Involves interactions between R-groups.
    e. Determines the protein's biological function.

8. "True" or "False" regarding the enzymes involved in nucleotide salvage pathways?
    a. Adenine phosphoribosyltransferase (APRT)
    b. Hypoxanthine-guanine phosphoribosyltransferase (HGPRT)
    c. Ribonucleotide reductase
    d. Xanthine oxidase
    e. DNA polymerase

9. "True" or "False" regarding transamination:
    a. It involves the transfer of amino groups.
    b. Glutamate is a common amino group acceptor.
    c. Alanine aminotransferase requires FAD as a coenzyme.
    d. Pyridoxal phosphate is a required cofactor.
    e. Transamination is reversible.

10. "True" or "False" regarding ketogenic amino acids:
    a. Can form ketone bodies.
    b. Include glycine and tyrosine.
    c. Converted to intermediates like acetyl-CoA.
    d. Cannot be used for glucose production.
    e. Glutamate is a ketogenic amino acid.

11. Select whether the following statements are true or false regarding 3-phosphoglycerate.
    a. 3-phosphoglycerate can be converted directly into alanine.
    b. Serine can be synthesized from 3-phosphoglycerate through a multi-step process.
    c. The conversion of 3-phosphoglycerate to glycine requires the enzyme serine hydroxy methyltransferase.
    d. Cysteine can be synthesized directly from 3-phosphoglycerate without involving any intermediates.
    e. The synthesis of serine from 3-phosphoglycerate requires a transamination reaction.

12. Select "True" or "False" regarding de novo purine biosynthesis:
    a. PRPP synthetase the rate limiting step.
    b. Occurs in the mitochondria.
    c. The purine ring is built step by step on the ribose sugar.
    d. Inhibited by AMP and GMP.
    e. Glutamine amidotransferase involves in the PRPP.

13. "True" or "False" about enzymes of protein digestion:
    a. Trypsin is activated by enteropeptidase.
    b. Pepsin is active in the small intestine.
    c. Chymotrypsin cleaves aromatic amino acids.
    d. Carboxypeptidase removes terminal amino acids.
    e. Chymotrypsinogens are activated in acidic pH.

14. Which of the following is true about glutamate dehydrogenase?
    a. Converts glutamate to α-ketoglutarate.
    b. Catalyzes an oxidative deamination.
    c. Requires ATP.
    d. Can use NAD+ or NADP+ as cofactors.
    e. Involved in urea cycle directly.

15. "True" or "False" regarding protein turnover:
    a. Proteins are synthesized and degraded continuously.
    b. All proteins have the same half-life.
    c. Ubiquitin tags proteins for degradation.
    d. Lysosomes are involved in protein degradation.
    e. Protein degradation is only extracellular.

16. "True" or "False" about phenylalanine metabolism:
    a. Phenylalanine is converted to tyrosine.
    b. Phenylalanine hydroxylase requires biotin.
    c. Defect in metabolism causes alkaptonuria.
    d. PKU leads to accumulation of phenylpyruvate.
    e. Tyrosine becomes conditionally essential in PKU.

17. "True" or "False" about amino acid transport disorders:
    a. Hartnup disease affects neutral amino acid transport.
    b. Cystinuria leads to kidney stones.
    c. Cystinuria involves defective basic amino acid transport.
    d. Hartnup disease leads to pellagra-like symptoms.
    e. Formation of a black complex in cyanide nitroprusside test indicates the presence of Cystinuria.

18. "True" or "False" regarding the role of ribonucleotide reductase:
    a. Converts ribonucleotides to deoxyribonucleotides.
    b. Requires NADPH.
    c. Inhibited by dATP.
    d. Active in non-dividing cells.
    e. Acts on dAMP.

19. "True" or "False" regarding the factors required for thymidylate synthesis?
    a. dUMP
    b. Thymidylate synthase
    c. Tetrahydrofolate
    d. Methotrexate as an inhibitor
    e. ATP

20. "True" or "False" regarding the enzymes involved in purine catabolism?
    a. Xanthine oxidase
    b. Adenosine deaminase
    c. Guanine deaminase
    d. Urate oxidase
    e. Ribonuclease

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BMS 2213/ IPS 2213/BCS 2213// MHPM 2213
Anatomy and Physiology II
2nd Year 2nd Semester
Mid Semester BRQ/MCQ Examination
7th Batch

Date	:	**16th May 2025**
Time	:	**1.30 p.m. – 2.30 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 the most appropriate answer among the five given 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 one is a fat-soluble hormone?**
   1. Adrenalin
   2. Insulin
   3. Norepinephrine
   4. Thyroid hormone
   5. Glucagon

2. **Which one is an example of the primary immune system?**
   1. Lymph nodes
   2. Spleen
   3. Thymus
   4. Appendix
   5. Peyer's patches

3. **Most of the reabsorption from the glomerular filtrate will take place in,**
   1. Distal convoluted tubule
   2. Proximal convoluted tubule
   3. Ascending limb of loop of Henle
   4. Descending limb of loop of Henle
   5. Glomerulus

4. **What is the endocrine organ that has both exocrine and endocrine functions?**
   1. Pancreas
   2. Thyroid gland
   3. Parathyroid gland
   4. Pituitary gland
   5. Adrenal gland

5. **What is the part of the male reproductive system, functioning as a reservoir of spermatozoa?**
   1. Epididymis
   2. Seminal vesicles
   3. Bulbourethral gland
   4. Cowper gland
   5. Prostate gland

6. **Which of the hormones is not secreted by the corpus luteum?**
   1. Estrogen
   2. Progesterone
   3. Inhibin
   4. Relaxin
   5. Melatonin

7. **Which of the following hormones show slow secretion with aging?**
   1. Thyroid stimulating hormone
   2. Insulin
   3. Follicular stimulating hormone
   4. Parathyroid hormone
   5. Luteinizing hormone

8. **Which of the following is not a constituent of glomerular filtrate?**
   1. Creatinine
   2. Platelets
   3. Glucose
   4. Amino acids
   5. Water

9. True or false regarding renal corpuscle,

1. They are in only renal medulla.
2. Visceral layer of Bowmans' capsule contains podocytes.
3. Secretion is the main step of urine production happens there.
4. It is supplied by efferent arterioles.
5. Glomeruli contains fenestrated capillaries.

10. True or false regarding testis?

1. It contains seminiferous tubules.
2. During early fetal life, the testis develops in the pelvic cavity.
3. It is suspended in the scrotum.
4. Left testis is slightly lower than right testis.
5. Tunica vaginalis is the innermost cover.

11. True or false regarding female hormonal system?

1. It is regulated by positive feedback mechanisms.
2. FSH promotes the maturation of ovarian follicles.
3. LH inhibits development of corpus luteum.
4. Thickening of endometrium is caused by oestrogen.
5. Progesterone plays a major role at secretory phase of endometrial cycle.

12. True or false regarding female reproductive system?

1. Ovary medulla contains ovarian follicles in various stages.
2. Ovaries are inactive before puberty.
3. Zona granulosa presents in between oocyte and zona pellucida.
4. Graafian follicle is the mature stage.
5. Labia major contains sebaceous glands.

13. Regarding thymus,

1. It is located in anterior mediastinum.
2. It contains cortex and medulla.
3. Thymus will decrease in size when aging.
4. Thymus shows rapid autolysis after death.
5. Thymus is enclosed by a fibrous capsule.

14. True or false?

1. Urine contains 95% of water.
2. Emotional state affects urine volume.
3. Both sphincter muscles must open to allow micturition.
4. Internal urethral sphincter must be voluntarily relaxed.
5. Urine has a fixed composition always.

15. True or false regarding hormones?

1. Prolactin is secreted by anterior pituitary.
2. Prolactin is secreted by posterior pituitary.
3. High blood calcium levels inhibit calcitonin secretion.
4. Thymosin inhibits T cells maturation.
5. Somatosatatin slows nutrient absorption from gastro intestinal tract.

16. True or false regarding immune system?

1. Innate immunity is the first line of immune response in our body.
2. Acquired immunity shows comparatively rapid responses.
3. T and B lymphocytes play a major role in acquired immunity.
4. Innate immunity has no memory.
5. Innate immunity is very specific.

17. Lymph nodes,

1. are only arranged as superficial groups.
2. are immune organ.
3. contain afferent and efferent vessels.
4. have a fibrous capsule.
5. contains trabeculae outside.

18. Regarding Thyroid gland and its hormones,

1. The pyramidal lobe is found only in some individuals.
2. False capsule is derived from the pretracheal fascia.
3. Thyroid follicles are lined by a simple cuboidal epithelium.
4. Thyroxine decreases the basal metabolic rate.
5. It is a butterfly in shape.

19. True or false regarding urine formation process?

1. Hydrostatic pressure of blood forces substances through capillary wall.
2. In a healthy adult the glomerular filtration rate is 125 mL/min.
3. Na^+/K^+ ATPase pump in proximal convoluted tubules reabsorbs10% of sodium ions.
4. Creatinine is not reabsorbed.
5. Glomerular filtration is a non-selective active process. (

20. True or false regarding adrenal glands and their hormones?

1. Adrenal cortex produces androgens.
2. Left adrenal gland is crescent in shape.
3. Bulk of adrenal medulla is made by zona fasciculata layer.
4. Epinephrine is secreted by adrenal cortex.
5. Aldosterone is a mineralocorticoid.

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Bachelor of Science Honours in Biomedical Sciences/ Bachelor of Science Honours in Industrial Pharmaceutical Sciences/ Bachelor of Science Honours in Cosmetics Sciences/ Bachelor of Science Honours in Medical Health Products Management
BMS 2213/ IPS 2213/BCS 2213/ MHPM 2213
Anatomy and Physiology II
2nd Year 2nd Semester
Mid Semester BRQ/MCQ Examination
8th Batch

Date	:	**25th November 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 the most appropriate answer among give five statements.

Ex:

1	2	3	4	5
		X		

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

Ex:

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. What cell is responsible for bone resorption? **(5 marks)**

1. Osteoblast
2. Osteocyte
3. Osteoclast
4. Osteon
5. Chondrocyte

2. Which of the following joints allows the greatest range of motion? **(5 marks)**

1. Suture
2. Symphysis
3. Hinge joint
4. Ball-and-socket joint
5. Pivot joint

3. What is the hormone increases water reabsorption in the kidneys? **(5 marks)**

1. Aldosterone
2. Antidiuretic hormone
3. Atrial natriuretic peptide
4. Cortisol
5. Insulin

4. What is the lined epithelial type in urinary bladder? **(5 marks)**

1. Stratified squamous epithelium
2. Simple cuboidal epithelium
3. Transitional epithelium
4. Simple columnar epithelium
5. Ciliated pseudostratified epithelium

5. What is the reason for the testes to be located outside the abdominal cavity? **(5 marks)**

1. It provides space for seminiferous tubules Seminal vesicles
2. Lower temperatures are required for spermatogenesis.
3. It helps with testosterone secretion.
4. It prevents infections.
5. It helps sperm storage

6. What is the site of fertilization? **(5 marks)**

1. Uterus
2. Cervix
3. Vagina
4. Ampulla of uterine tube
5. Isthmus of uterine tube

7. What is the largest lymphoid organ in the body? **(5 marks)**

1. Lymph node
2. Spleen
3. Tonsil
4. Thymus
5. Appendix

8. Which pancreatic cells produce insulin? **(5 marks)**

1. Alpha cells
2. Beta cells
3. Delta cells
4. F cells
5. Acinar cells

9. True or false regarding urinary bladder? **(5 marks)**

1. The bladder wall contains smooth muscle called the detrusor.
2. The internal urethral sphincter is under voluntary control.
3. The trigone is a smooth triangular area at the base of the bladder.

4. Stretch receptors in the bladder initiate the micturition reflex.
5. The bladder is located posterior to the pubic symphysis.

10. True or false regarding hormonal regulation? **(5 marks)**

1. Aldosterone increases sodium reabsorption in the distal tubule.
2. Antidiuretic hormone (ADH) increases water permeability in collecting ducts.
3. Atrial natriuretic peptide (ANP) promotes sodium reabsorption.
4. Parathyroid hormone increases calcium reabsorption.
5. ADH is released by the posterior pituitary gland.

11. True or false regarding kidneys? **(5 marks)**

1. The kidneys are retroperitoneal organs.
2. The right kidney is usually slightly higher than the left.
3. The renal cortex contains renal corpuscles.
4. The renal medulla consists of pyramids and columns.
5. The hilum is the point of entry and exit for vessels, nerves, and the ureter.

12. True or false regarding ovarian cycle? **(5 marks)**

1. The follicular phase is dominated by estrogen.
2. The luteal phase follows ovulation.
3. LH surge triggers ovulation.
4. The corpus luteum secretes mainly estrogen.
5. If fertilization does not occur, the corpus luteum degenerates into the corpus albicans.

13. True or false regarding male reproductive system? **(5 marks)**

1. The testes are located in the scrotum to maintain optimal temperature for spermatogenesis.
2. The epididymis stores and matures spermatozoa.
3. The ductus deferens carries sperm from the prostate to the epididymis.
4. The seminal vesicles secrete fructose-rich fluid.
5. The prostate gland contributes to semen alkalinity.

14. True or false regarding thymus function and age changes? **(5 marks)**

1. The thymus is most active during childhood.
2. It gradually decreases in size after puberty.
3. Thymic involution is associated with increased immune function.
4. T-cell production continues, though reduced, in adults.
5. Thymic hormones aid T-cell differentiation.

15. True or false regarding anatomy of female reproductive organs? **(5 marks)**

1. The ovaries are located in the pelvic cavity.
2. The uterine tubes transport the ovum to the uterus.
3. The uterus is composed mainly of skeletal muscle.
4. The vagina is lined with stratified squamous epithelium.
5. The cervix connects the uterus to the vagina.

16. True or false regarding thyroid gland and its hormones? **(5 marks)**

1. The thyroid gland lies anterior to the trachea.
2. It consists of two lobes connected by an isthmus.
3. The functional unit of the thyroid is the follicle.
4. Thyroid hormone secretion is stimulated by TSH.
5. Thyroid hormones increase basal metabolic rate.

17. True or false regarding adrenal gland and its hormone? **(5 marks)**

1. The medulla secretes adrenaline and noradrenaline.
2. The zona fasciculata secretes cortisol.
3. Adrenaline increases heart rate and blood pressure.
4. The zona glomerulosa is the outermost cortical layer.
5. The cortex constitutes about 80–90% of the gland's mass.

18. True or false regarding skeleton system? **(5 marks)**

1. The adult human skeleton consists of 206 bones.
2. Ligaments connect bones to muscles.
3. The appendicular skeleton includes limbs and girdles.
4. The sternum is part of the appendicular skeleton.
5. Bone is a type of connective tissue.

19. Regarding calcium and bone physiology? **(5 marks)**

1. Bone acts as a major reservoir for calcium and phosphate.
2. Parathyroid hormone increases calcium deposition in bone.
3. Calcitonin lowers blood calcium levels.
4. Vitamin D enhances calcium absorption from the gut.
5. Calcium homeostasis involves bone, kidney and intestine.

20. True or false regarding skull and facial bones? **(5 marks)**

1. Mandible is the only movable bone of the skull.
2. Maxilla forms the lower jaw.
3. Skull bones are joined by sutures.
4. Cranium consists of 8 bones.
5. Skull protects the brain and sensory organs.

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25 NOV 2025
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BMS 2213/ IPS 2213/BCS 2213/ MHPM 2213

Anatomy and Physiology II

2nd Year 2nd Semester

Mid Semester BRQ/MCQ Examination

8th Batch

Index No. - .....

Date	:	**25th November 2025**
Time	:	**9.00 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 08.

  Ex:

1	2	~~3~~	4	5

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

  Ex:

T	~~F~~	T	T	~~F~~
~~F~~	F	~~F~~	~~F~~	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.

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 06 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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Anatomy and Physiology II
2nd Year 2nd Semester
End Semester BRQ/MCQ Examination
6th Batch

Date	:	**25th October 2024**
Time	:	**11.15 a.m. – 12.15 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:

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. **What is the component in renal hilum present more anteriorly?**
    1. Renal artery
    2. Renal vein
    3. Renal pelvis
    4. Ureter
    5. Lymphatic vessels

2. **What is the nitrogenous waste material associated with metabolism of muscle component?**
    1. Urea
    2. Uric acid
    3. Creatinine
    4. Ammonium gas
    5. Ammonium ion

3. **Which one of the following is a lipid soluble hormone?**
    1. Adrenaline
    2. Noradrenaline
    3. Insulin
    4. Glucagon
    5. Thyroid hormone

4. **What is the hormone secreted from hypothalamus, relevant to the female hormonal system?**
    1. Gonadotropin-Releasing Hormone
    2. Follicular stimulating hormone
    3. Luteinizing hormone
    4. Estrogen
    5. Progesterone

5. **Which cranial nerve has both sensory and motor characters?**
    1. Olfactory nerve
    2. Optic nerve
    3. Vagus nerve
    4. Oculomotor nerve
    5. Trochlear nerve

6. **Which part of the brain is important for hearing?**
    1. Occipital lobe
    2. Parietal lobe
    3. Temporal lobe
    4. Frontal lobe
    5. Cerebellum

7. **Which of the following cell type is important for specific immunity?**
    1. B-lymphocytes
    2. Eosinophiles
    3. Neutrophiles
    4. Mast cells
    5. Macrophages

8. What is the most abundant antibody in primary and secondary immune systems?

1. IgM
2. IgE
3. IgA
4. IgG
5. IgD

9. True or false regarding urethra?

1. Female urethra is shorter than male urethra.
2. Spongy urethra is longer than prostatic urethra.
3. Female and male urethras show only structural differences.
4. Internal urethral sphincter is made by voluntary muscles.
5. Membranous urethra passes through the urogenital diaphragm.

10. True or false regarding endocrine organ?

1. Adenohypophysis is a downgrowth of nervous tissue from the brain.
2. Pineal gland contains astrocytes.
3. Thyroid follicles are filled by colloid.
4. Right adrenal gland crescent in shape.
5. Thymus is a pure endocrine organ.

11. True or false regarding male reproductive system?

1. Seminiferous tubules contain Sertoli cells.
2. Left testicular vein, empties into inferior vena cava.
3. Epididymis acts as a reservoir of spermatozoa.
4. Prostate is the largest accessory gland in male reproductive system.
5. Secondary spermatocytes undergo meiosis II to produce spermatids.

12. True or false regarding human eye?

1. Eyes are supplied by the 2^{nd} cranial nerve.
2. Retina is the inner nervous tissue layer.
3. The sclera is the white of the eye.
4. Choroid is very rich with blood vessels.
5. The iris is a visible coloured ring.

13. True or false regarding taste sensations?

1. Sour taste is the perception of H^+ concentration.
2. The G protein–coupled receptors are involved in making sweet taste.
3. All bitter molecules depolarize gustatory cells.
4. Taste buds have specialized gustatory receptor cells.
5. Taste perception is created by combining multiple sensory inputs

14. True or false regarding nerve cells membrane potential?

1. The inside surface of the membrane of resting neuron has a positive charge compared to the outside.
2. The difference in electrical charge across the membrane is called the resting membrane potential.
3. Membrane may hyperpolarize before potassium ion channels return to resting state.
4. Only a strong stimulus can produce an action potential in the relative refractory period.
5. Inactivation gates of voltage-gated sodium channels are opened at resting state.

15. True or false regarding hormones?

1. Delta cells of pancreas secrete somatostatin.
2. Epinephrine is produced by adrenal cortex.
3. High blood calcium level stimulates calcitonin secretion.
4. Melatonin coordinates circadian rhythms.
5. Gastrin stimulates gastric acid secretion.

16. True or false regarding muscles?

1. In concentric contraction, muscle contracts but lengthen to control the lowering of the weight.
2. Skeletal muscles are anchored to the bones by the tendons.
3. Endomysium is a tissue around an entire muscle belly.
4. Thick myofilaments in the skeletal muscles are made by actin protein.
5. Skeletal muscles are striated muscles.

17. True or false regarding the human immune system?

1. Innate immunity is a first line of immune response.
2. In acquired immunity responses happened slowly.
3. Lymphocytes arise from stem cells in bone marrow.
4. Helper T lymphocytes activate B-cells.
5. Immunoglobulin D protects gastric mucosa.

18. Regarding the female uterine cycle,

1. Average duration of menstruation is 5-10 days.
2. Regenerative phase starts about the 7^{th} day of the cycle.
3. The proliferative phase is under the control of progesterone.
4. The secretory phase occurs from the 16^{th} to 28^{th} day of the cycle.
5. The secretory phase is under the control of estrogen.

19. True or false regarding uterus?

1. Perimetrium is associated with vesicouterine pouch.
2. Myometrium is the thickest layer.
3. Endometrium consists of columnar epithelium.
4. Endometrium rich with spiral arteries.
5. Functional layer of the endometrium lies next to the myometrium.

20. True or false regarding the meninges?

1. The dura and arachnoid maters are separated by a subdurald space.
2. Pia matter adheres to the brain.
3. The superior sagittal sinus is formed by the falx cerebri.
4. Arachnoid matter is the outer most one.
5. Subdural space contains cerebrospinal fluid.

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Faculty of Health Sciences
B.Sc. (Hons) in Cosmetic Sciences, B.Sc. (Hons) in Industrial Pharmaceutical Sciences,
6th Batch
BCS 2243 – Inorganic Chemistry
End Semester Examination
2nd Year 2nd Semester –SEQ

Date: 1st of November 2024
Time: 09.00 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 Write the **two** types of chemical bonding observed in inorganic compounds (20 marks)

.....

.....

1.2 You have given the bond energies of HCl and HBr as 432 kJ/mol and 366 kJ/mol respectively. Predict the bond length of HCl and HBr based on the given bond energies. (20 marks)

.....

.....

.....

1.3 Briefly explain the nature of metallic bonding and how it influences the physical properties of metals. (20 marks)

.....

.....

.....

1.4 What is meant by **Lattice Energy** of a compound? (20 marks)

.....

.....

1.5 You have given the electronegativity of Calcium (Ca) and Oxygen (O) as 1.0 and 3.5 respectively. Based on the given information find the bond type of the Calcium oxide (CaO). (20 marks)

.....

.....

Question 02 **(100 marks)**

2.1 Write the electron configuration of **Neon** (Ne). (20 marks)

.....

2.2 Briefly explain why noble gases have very low boiling points and heat of vaporization. (20 marks)

.....

.....

.....

2.3 Find the molecular shapes of XeF_2 and XeF_4 compounds. (20 marks)

.....

.....

2.4 How do you isolate the Argon (Ar). (20 marks)

.....

.....

2.5 Write two uses of noble gases in the field of medicine. (20 marks)

.....

.....

Question 03 **(100 marks)**

3.1 Briefly explain what is meant by copolymer and write the types of copolymers. (20 marks)

.....

.....

.....

3.2 A silicone sample was analyzed by MALDI-TOF-MS technology and the following information was extracted. The first column indicates the molar mass (g/mol) and the second column indicate the number of molecules.

Molar mass (g/mol)	Number of molecules
100,000	1,000
200,000	5,000
500,000	3,000
1,000,000	1,000

3.2.1 Calculate the **number average molecular weight** (Mn) of the silicone polymer sample. (20 marks)

.....

.....

.....

.....

3.2.2 Calculate the **weight average molecular weight** (Mw) of the silicone polymer sample. (20 marks)

.....

.....

.....

.....

3.2.3 Calculate the **polydispersity index** (PDI) of the silicone polymer sample and comment on the result.

.....

.....

.....

(20 marks)

3.2.4 Write two applications of silicone polymers. (20 marks)

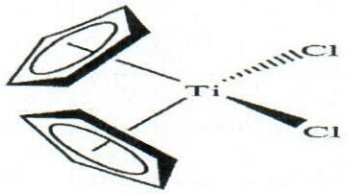
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Question 04 **(100 marks)**

4.1 Calculate the total number of valence electrons (NVE) for the following compounds.

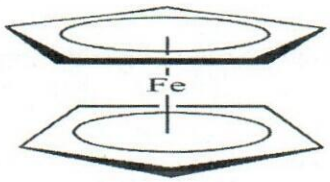
4.1.1 (60 marks)



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4.1.2



.....

.....

4.1.3



.....

.....

4.2 Determine the hapticity of the Cp rings in $Cp_2W(CO)_2$. Given that $Cp=C_5H_5$ and $W= d^6$ (10 marks)

.....

.....

4.3 Find the oxidation number of the metal for the following compounds. (20 marks)

4.3.1 $Ir(CO)(Cl)(PPh_3)_2$ - .....

4.3.2 $PtCl_3(C_2H_4)^-$ - .....

4.4 Write two importance of organotransition metal complexes? (10 marks)

.....

.....

Question 05 **(100 marks)**

5.1 Write the difference between amorphous and crystalline solids. (15 marks)

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.....

.....

5.2 Write the difference between crystal lattice and unit cell. (20 marks)

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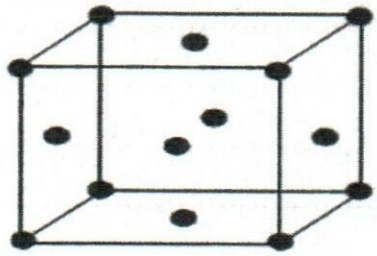
5.3 Write three cubic crystal systems. (15 marks)

.....

.....

.....

5.4 The unit cell of a crystal of metal Z is shown below.



5.4.1 Identify the type of unit cell. (10 marks)

.....

5.4.2 Determine the number of Z atoms per unit cell. (20 marks)

.....

.....

5.4.3 If the length of the diagonal of the unit cell is 300.09 nm, calculate the radius of a Z atom. (20 marks)

.....

.....

Question 06 **(100 marks)**

6.1 Briefly describe how the high heat of vaporization and dipolar in nature of water is important to biological systems. (20 marks)

.....

.....

.....

6.2 Write the difference between bulk metals and trace metals in the biological systems. (20 marks)

.....

.....

.....

6.3 Write the central metal atom of the heme group and the importance of the heme group in the hemoglobin molecule. (20 marks)

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6.4. Draw the dose response curves for sodium (Na) and arsenic (As) in the biological systems. (40 marks)

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-THE END-

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Faculty of Health Sciences
B.Sc. (Hons) in Cosmetic Sciences, B.Sc. (Hons) in Industrial Pharmaceutical Sciences,
6th Batch
BCS 2243 – Inorganic Chemistry
End Semester Examination
2nd Year 2nd Semester –SEQ

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

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **SIX** questions.
- Answer **ALL** questions.
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Question 01 **(100 marks)**

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.....

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.....

.....

.....

1.3 Briefly explain the nature of metallic bonding and how it influences the physical properties of metals. (20 marks)

.....

.....

.....

1.4 What is meant by **Lattice Energy** of a compound? (20 marks)

.....

.....

1.5 You have given the electronegativity of Calcium (Ca) and Oxygen (O) as 1.0 and 3.5 respectively. Based on the given information find the bond type of the Calcium oxide (CaO). (20 marks)

.....

.....

Question 02 **(100 marks)**

2.1 Write the electron configuration of **Neon** (Ne). (20 marks)

.....

2.2 Briefly explain why noble gases have very low boiling points and heat of vaporization. (20 marks)

.....

.....

.....

2.3 Find the molecular shapes of XeF_2 and XeF_4 compounds. (20 marks)

.....

.....

2.4 How do you isolate the Argon (Ar). (20 marks)

.....

.....

2.5 Write two uses of noble gases in the field of medicine. (20 marks)

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Question 03 **(100 marks)**

3.1 Briefly explain what is meant by copolymer and write the types of copolymers. (20 marks)

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3.2 A silicone sample was analyzed by MALDI-TOF-MS technology and the following information was extracted. The first column indicates the molar mass (g/mol) and the second column indicate the number of molecules.

Molar mass (g/mol)	Number of molecules
100,000	1,000
200,000	5,000
500,000	3,000
1,000,000	1,000

3.2.1 Calculate the **number average molecular weight** (Mn) of the silicone polymer sample. (20 marks)

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3.2.2 Calculate the **weight average molecular weight** (Mw) of the silicone polymer sample. (20 marks)

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3.2.3 Calculate the **polydispersity index** (PDI) of the silicone polymer sample and comment on the result.

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(20 marks)

3.2.4 Write two applications of silicone polymers. (20 marks)

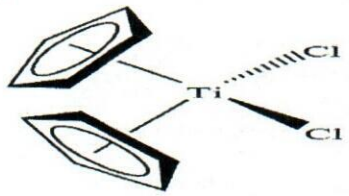
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Question 04 **(100 marks)**

4.1 Calculate the total number of valence electrons (NVE) for the following compounds.

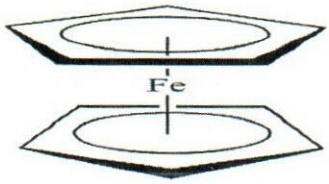
4.1.1 (60 marks)



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4.1.2



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4.1.3



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4.2 Determine the hapticity of the Cp rings in $Cp_2W(CO)_2$. Given that $Cp=C_5H_5$ and $W= d^6$ (10 marks)

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4.3 Find the oxidation number of the metal for the following compounds. (20 marks)

4.3.1 $Ir(CO)(Cl)(PPh_3)_2$ - .....

4.3.2 $PtCl_3(C_2H_4)^-$ - .....

4.4 Write two importance of organotransition metal complexes? (10 marks)

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Question 05 **(100 marks)**

5.1 Write the difference between amorphous and crystalline solids. (15 marks)

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5.2 Write the difference between crystal lattice and unit cell. (20 marks)

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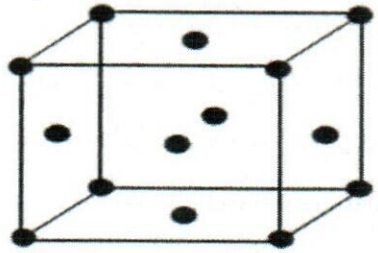
5.3 Write three cubic crystal systems. (15 marks)

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5.4 The unit cell of a crystal of metal Z is shown below.



5.4.1 Identify the type of unit cell. (10 marks)

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5.4.2 Determine the number of Z atoms per unit cell. (20 marks)

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5.4.3 If the length of the diagonal of the unit cell is 300.09 nm, calculate the radius of a Z atom.

(20 marks)

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Question 06 **(100 marks)**

6.1 Briefly describe how the high heat of vaporization and dipolar in nature of water is important to biological systems. (20 marks)

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6.2 Write the difference between bulk metals and trace metals in the biological systems. (20 marks)

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6.3 Write the central metal atom of the heme group and the importance of the heme group in the hemoglobin molecule. (20 marks)

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6.4. Draw the dose response curves for sodium (Na) and arsenic (As) in the biological systems. (40 marks)

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-THE END-

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Examination Department
28 OCT
CINEC Campus

CINEC CAMPUS
Beyond A Graduate

Faculty of Health Sciences

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

IPS/ BCS 2223 – Biochemistry II

2nd Year 2nd Semester

Batch 06

End Semester SEQ Examination

Date	:	**28th of October 2024**
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 allowed used a scientific calculator for the examination.

QUESTION 01 **(100 marks)**

1.1. Compare and contrast between nucleotides and nucleosides. (30 marks)

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1.2. Outline the reactions involved in denovo synthesis of purine nucleotides. (35 marks)

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1.3. Write a short note on metabolic defects associated with pyrimidine metabolism. (35 marks)

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QUESTION 02 **(100 marks)**

2.1. State the types of bonds involved in stabilizing the quaternary structure of proteins. (15 marks)

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2.2. . Classify proteins based on their solubility and provide an example. (25 marks)

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2.3. State the structure and significance of an alpha helix in proteins. (30 marks)

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2.4. Compare and contrast protein motifs and protein domains. (30 marks)

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QUESTION 03 **(100 marks)**

3.1. Outline the process of protein synthesis. (25 marks)

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3.2. Outline the catabolism of amino acids, including key pathways and end products. (35 marks)

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3.3. Compare and contrast the roles of transamination and deamination in amino acid metabolism. (40 marks)

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QUESTION 04 **(100 marks)**

4.1. Mention three essential amino acids. (15 marks)

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4.2. Draw a flow chart to denote the basic reactions of the urea cycle. (30 marks)

4.3. Compare the biochemical basis of Alkaptonuria and and Cystinuria. (30 marks)

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4.4. Justify the following statement. "Untreated Phenylketonuria (PKU) leads to hypopigmentation". (25 marks)

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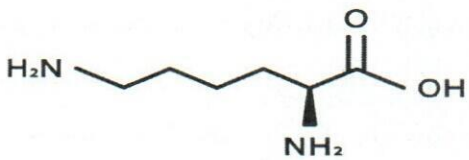
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QUESTION 05 **(100 marks)**

5.1. Define the isoelectric point (pI) and its importance in amino acid behavior. (25 marks)

5.2. Given the structure of the amino acid lysine, determine its form at the following pH values with explanations (pI = 9.74):



Lysine
$C_6H_{14}N_2O_2$

i. pH = 1 (25 marks)

ii. pH = 9.74 (25 marks)

iii. pH = 12 (25 marks)

QUESTION 06 **(100 marks)** 00015

6.1. State the role of amino acid side chains in the buffering capacity of proteins. (20 marks)

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6.2. Write short notes on the following.

i. Protein buffer system in intracellular fluid. (30 marks)

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ii. Phosphate buffer system. (20 marks)

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iii. Hemoglobin as a buffer. (30 marks)

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Faculty of Health Sciences

BSc Honours in Biomedical Sciences/ Industrial Pharmaceutical Sciences/ Cosmetic Science

BIOCHEMISTRY II – BMS 2225/IPS 2223/ BCS 2223
2ND YEAR 2ND SEMESTER
BATCH 06
MID SEMESTER ASSIGNMENT

Date : **28th of October 2024**
Time : **01.30 p.m. – 02.30 p.m. (ONE HOUR)**

INSTRUCTIONS TO CANDIDATES

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

QUESTION 01 **(100 marks)**

1.1. Evaluate the significance of the following structures in cellular functions,

i. Tertiary structure of proteins. (35 marks)
ii. β pleated structure of proteins. (30 marks)
iii. Fibrous proteins. (35 marks)

QUESTION 02 **(100 marks)**

2.1. Denote the role of essential and non-essential amino acids in human body. (30 marks)
2.2. Outline the protein digestion process in the human body. (35 marks)
2.3. Draw a flow chart to represent the mechanisms of protein degradation, including the ubiquitin-proteasome pathway. (35 marks)

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28 OCT 2024
CINEC Campus (Pvt) Ltd

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Beyond A Graduate

Faculty of Health Sciences

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

IPS/ BCS 2223 – Biochemistry II

2nd Year 2nd Semester

Batch 06

End Semester SEQ Examination

Date	:	**28th of October 2024**
Time	:	**9.00 a.m. to 12.00 p.m.**

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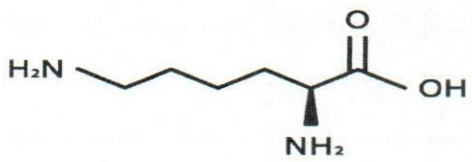
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i. pH = 1 (25 marks)

ii. pH = 9.74 (25 marks)

iii. pH = 12 (25 marks)

QUESTION 06 **(100 marks)** 00074

6.1. State the role of amino acid side chains in the buffering capacity of proteins. (20 marks)

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6.2. Write short notes on the following.

i. Protein buffer system in intracellular fluid. (30 marks)

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ii. Phosphate buffer system. (20 marks)

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iii. Hemoglobin as a buffer. (30 marks)

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Faculty of Health Sciences

BSc Honours in Biomedical Sciences/ Industrial Pharmaceutical Sciences/ Cosmetic Science

BIOCHEMISTRY II – BMS 2225/IPS 2223/ BCS 2223
2ND YEAR 2ND SEMESTER
BATCH 06
MID SEMESTER ASSIGNMENT

Date : **28th of October 2024**
Time : **01.30 p.m. – 02.30 p.m. (ONE HOUR)**

INSTRUCTIONS TO CANDIDATES

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

QUESTION 01 **(100 marks)**

1.1. Evaluate the significance of the following structures in cellular functions,

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QUESTION 02 **(100 marks)**

2.1. Denote the role of essential and non-essential amino acids in human body. (30 marks)
2.2. Outline the protein digestion process in the human body. (35 marks)
2.3. Draw a flow chart to represent the mechanisms of protein degradation, including the ubiquitin-proteasome pathway. (35 marks)

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BMS 2213/ IPS 2213/BCS 2213
Anatomy and Physiology II
2nd Year 2nd Semester
End Semester BRQ/MCQ Examination
6th Batch

Date	:	**25th October 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 Compare followings.

1.1.1 Cortical nephrons and juxtamedullary nephrons (25 marks)

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1.1.2 Tubular reabsorption and tubular secretion (25 marks)

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1.2 State main processes in three phases of urine production. (25 marks)

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1.3 Briefly describe the structure of lymph node. (25 marks)

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Question 2 **(100 marks)**

2.1 State the functions of each structure in male reproductive system. (25 marks)

2.1.1. Testis-

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2.1.2. Epididymis

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2.1.3 Vas deference

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2.1.4 Prostate gland

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2.1.5. Seminal vesicles

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2.2 Briefly describe the microscopic structure of cortex of human ovary. (25 marks)

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2.3 List main phases of the menstrual cycle and briefly describe what happens in each phases. (25 marks)

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2.4 List the functions of testosterone hormone. (25 marks)

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Question 3 **(100 marks)**

3.1 List two hormones released from posterior pituitary. (10 marks)

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3.2 State main functions of each hormone you mentioned in section 3.1. (20 marks)

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3.3 Write short notes on the following.

3.3.1 Thyroid follicle (15 marks)

3.3.2 Zona fasciculata of adrenal glands (15 marks)

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3.4 List main components in a synovial joint. (20 marks)

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3.5 Briefly describe sliding filament theory in muscle contraction. (20 marks)

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Question 4 **(100 marks)**

4.1 Briefly describe a structure of nerve trunk. (25 marks)

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4.2 Briefly describe how does the sympathetic nervous system prepare the body for the "fight-or-flight" response. (25 marks)

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4.3 Briefly describe a structure of middle ear. (25 marks)

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4.4 Briefly describe how do the different types of papillae on the tongue contribute to taste perception? (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 Sciences
BMS 2213/ IPS 2213/BCS 2213
Anatomy and Physiology II
2nd Year 2nd Semester
End Semester BRQ/MCQ Examination
6th Batch

Date	:	**25th October 2024**
Time	:	**11.15 a.m. – 12.15 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:

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. **What is the component in renal hilum present more anteriorly?**
    1. Renal artery
    2. Renal vein
    3. Renal pelvis
    4. Ureter
    5. Lymphatic vessels

2. **What is the nitrogenous waste material associated with metabolism of muscle component?**
    1. Urea
    2. Uric acid
    3. Creatinine
    4. Ammonium gas
    5. Ammonium ion

3. **Which one of the following is a lipid soluble hormone?**
    1. Adrenaline
    2. Noradrenaline
    3. Insulin
    4. Glucagon
    5. Thyroid hormone

4. **What is the hormone secreted from hypothalamus, relevant to the female hormonal system?**
    1. Gonadotropin-Releasing Hormone
    2. Follicular stimulating hormone
    3. Luteinizing hormone
    4. Estrogen
    5. Progesterone

5. **Which cranial nerve has both sensory and motor characters?**
    1. Olfactory nerve
    2. Optic nerve
    3. Vagus nerve
    4. Oculomotor nerve
    5. Trochlear nerve

6. **Which part of the brain is important for hearing?**
    1. Occipital lobe
    2. Parietal lobe
    3. Temporal lobe
    4. Frontal lobe
    5. Cerebellum

7. **Which of the following cell type is important for specific immunity?**
    1. B-lymphocytes
    2. Eosinophiles
    3. Neutrophiles
    4. Mast cells
    5. Macrophages

8. What is the most abundant antibody in primary and secondary immune systems?

1. IgM
2. IgE
3. IgA
4. IgG
5. IgD

9. True or false regarding urethra?

1. Female urethra is shorter than male urethra.
2. Spongy urethra is longer than prostatic urethra.
3. Female and male urethras show only structural differences.
4. Internal urethral sphincter is made by voluntary muscles.
5. Membranous urethra passes through the urogenital diaphragm.

10. True or false regarding endocrine organ?

1. Adenohypophysis is a downgrowth of nervous tissue from the brain.
2. Pineal gland contains astrocytes.
3. Thyroid follicles are filled by colloid.
4. Right adrenal gland crescent in shape.
5. Thymus is a pure endocrine organ.

11. True or false regarding male reproductive system?

1. Seminiferous tubules contain Sertoli cells.
2. Left testicular vein, empties into inferior vena cava.
3. Epididymis acts as a reservoir of spermatozoa.
4. Prostate is the largest accessory gland in male reproductive system.
5. Secondary spermatocytes undergo meiosis II to produce spermatids.

12. True or false regarding human eye?

1. Eyes are supplied by the 2^{nd} cranial nerve.
2. Retina is the inner nervous tissue layer.
3. The sclera is the white of the eye.
4. Choroid is very rich with blood vessels.
5. The iris is a visible coloured ring.

13. True or false regarding taste sensations?

1. Sour taste is the perception of H^+ concentration.
2. The G protein–coupled receptors are involved in making sweet taste.
3. All bitter molecules depolarize gustatory cells.
4. Taste buds have specialized gustatory receptor cells.
5. Taste perception is created by combining multiple sensory inputs

14. True or false regarding nerve cells membrane potential?

1. The inside surface of the membrane of resting neuron has a positive charge compared to the outside.
2. The difference in electrical charge across the membrane is called the resting membrane potential.
3. Membrane may hyperpolarize before potassium ion channels return to resting state.
4. Only a strong stimulus can produce an action potential in the relative refractory period.
5. Inactivation gates of voltage-gated sodium channels are opened at resting state.

15. True or false regarding hormones?

1. Delta cells of pancreas secrete somatostatin.
2. Epinephrine is produced by adrenal cortex.
3. High blood calcium level stimulates calcitonin secretion.
4. Melatonin coordinates circadian rhythms.
5. Gastrin stimulates gastric acid secretion.

16. True or false regarding muscles?

1. In concentric contraction, muscle contracts but lengthen to control the lowering of the weight.
2. Skeletal muscles are anchored to the bones by the tendons.
3. Endomysium is a tissue around an entire muscle belly.
4. Thick myofilaments in the skeletal muscles are made by actin protein.
5. Skeletal muscles are striated muscles.

17. True or false regarding the human immune system?

1. Innate immunity is a first line of immune response.
2. In acquired immunity responses happened slowly.
3. Lymphocytes arise from stem cells in bone marrow.
4. Helper T lymphocytes activate B-cells.
5. Immunoglobulin D protects gastric mucosa.

18. Regarding the female uterine cycle,

1. Average duration of menstruation is 5-10 days.
2. Regenerative phase starts about the 7^{th} day of the cycle.
3. The proliferative phase is under the control of progesterone.
4. The secretory phase occurs from the 16^{th} to 28^{th} day of the cycle.
5. The secretory phase is under the control of estrogen.

19. True or false regarding uterus?

1. Perimetrium is associated with vesicouterine pouch.
2. Myometrium is the thickest layer.
3. Endometrium consists of columnar epithelium.
4. Endometrium rich with spiral arteries.
5. Functional layer of the endometrium lies next to the myometrium.

20. True or false regarding the meninges?

1. The dura and arachnoid maters are separated by a subdurald space.
2. Pia matter adheres to the brain.
3. The superior sagittal sinus is formed by the falx cerebri.
4. Arachnoid matter is the outer most one.
5. Subdural space contains cerebrospinal fluid.

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Anatomy and Physiology II
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6th Batch

Date	:	**25th October 2024**
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1	2	3	4	5
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    2. Optic nerve
    3. Vagus nerve
    4. Oculomotor nerve
    5. Trochlear nerve

6. **Which part of the brain is important for hearing?**
    1. Occipital lobe
    2. Parietal lobe
    3. Temporal lobe
    4. Frontal lobe
    5. Cerebellum

7. **Which of the following cell type is important for specific immunity?**
    1. B-lymphocytes
    2. Eosinophiles
    3. Neutrophiles
    4. Mast cells
    5. Macrophages

8. What is the most abundant antibody in primary and secondary immune systems?

1. IgM
2. IgE
3. IgA
4. IgG
5. IgD

9. True or false regarding urethra?

1. Female urethra is shorter than male urethra.
2. Spongy urethra is longer than prostatic urethra.
3. Female and male urethras show only structural differences.
4. Internal urethral sphincter is made by voluntary muscles.
5. Membranous urethra passes through the urogenital diaphragm.

10. True or false regarding endocrine organ?

1. Adenohypophysis is a downgrowth of nervous tissue from the brain.
2. Pineal gland contains astrocytes.
3. Thyroid follicles are filled by colloid.
4. Right adrenal gland crescent in shape.
5. Thymus is a pure endocrine organ.

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1. Seminiferous tubules contain Sertoli cells.
2. Left testicular vein, empties into inferior vena cava.
3. Epididymis acts as a reservoir of spermatozoa.
4. Prostate is the largest accessory gland in male reproductive system.
5. Secondary spermatocytes undergo meiosis II to produce spermatids.

12. True or false regarding human eye?

1. Eyes are supplied by the 2^{nd} cranial nerve.
2. Retina is the inner nervous tissue layer.
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1. Sour taste is the perception of H^+ concentration.
2. The G protein–coupled receptors are involved in making sweet taste.
3. All bitter molecules depolarize gustatory cells.
4. Taste buds have specialized gustatory receptor cells.
5. Taste perception is created by combining multiple sensory inputs

14. True or false regarding nerve cells membrane potential?

1. The inside surface of the membrane of resting neuron has a positive charge compared to the outside.
2. The difference in electrical charge across the membrane is called the resting membrane potential.
3. Membrane may hyperpolarize before potassium ion channels return to resting state.
4. Only a strong stimulus can produce an action potential in the relative refractory period.
5. Inactivation gates of voltage-gated sodium channels are opened at resting state.

15. True or false regarding hormones?

1. Delta cells of pancreas secrete somatostatin.
2. Epinephrine is produced by adrenal cortex.
3. High blood calcium level stimulates calcitonin secretion.
4. Melatonin coordinates circadian rhythms.
5. Gastrin stimulates gastric acid secretion.

16. True or false regarding muscles?

1. In concentric contraction, muscle contracts but lengthen to control the lowering of the weight.
2. Skeletal muscles are anchored to the bones by the tendons.
3. Endomysium is a tissue around an entire muscle belly.
4. Thick myofilaments in the skeletal muscles are made by actin protein.
5. Skeletal muscles are striated muscles.

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4. Helper T lymphocytes activate B-cells.
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1. Average duration of menstruation is 5-10 days.
2. Regenerative phase starts about the 7^{th} day of the cycle.
3. The proliferative phase is under the control of progesterone.
4. The secretory phase occurs from the 16^{th} to 28^{th} day of the cycle.
5. The secretory phase is under the control of estrogen.

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1. Perimetrium is associated with vesicouterine pouch.
2. Myometrium is the thickest layer.
3. Endometrium consists of columnar epithelium.
4. Endometrium rich with spiral arteries.
5. Functional layer of the endometrium lies next to the myometrium.

20. True or false regarding the meninges?

1. The dura and arachnoid maters are separated by a subdurald space.
2. Pia matter adheres to the brain.
3. The superior sagittal sinus is formed by the falx cerebri.
4. Arachnoid matter is the outer most one.
5. Subdural space contains cerebrospinal fluid.

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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 Sciences
BMS 2213/ IPS 2213/BCS 2213
Anatomy and Physiology II
2nd Year 2nd Semester
End Semester BRQ/MCQ Examination
6th Batch

Date	:	**25th October 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 Compare followings.

1.1.1 Cortical nephrons and juxtamedullary nephrons (25 marks)

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1.1.2 Tubular reabsorption and tubular secretion (25 marks)

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1.2 State main processes in three phases of urine production. (25 marks)

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1.3 Briefly describe the structure of lymph node. (25 marks)

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Question 2 **(100 marks)**

2.1 State the functions of each structure in male reproductive system. (25 marks)

2.1.1. Testis-

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2.1.2. Epididymis

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2.1.3 Vas deference

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2.1.4 Prostate gland

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2.1.5. Seminal vesicles

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2.2 Briefly describe the microscopic structure of cortex of human ovary. (25 marks)

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2.3 List main phases of the menstrual cycle and briefly describe what happens in each phases. (25 marks)

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2.4 List the functions of testosterone hormone. (25 marks)

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Question 3 **(100 marks)**

3.1 List two hormones released from posterior pituitary. (10 marks)

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3.2 State main functions of each hormone you mentioned in section 3.1. (20 marks)

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3.3 Write short notes on the following.

3.3.1 Thyroid follicle (15 marks)

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3.3.2 Zona fasciculata of adrenal glands (15 marks)

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3.4 List main components in a synovial joint. (20 marks)

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3.5 Briefly describe sliding filament theory in muscle contraction. (20 marks)

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Question 4 **(100 marks)**

4.1 Briefly describe a structure of nerve trunk. (25 marks)

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4.2 Briefly describe how does the sympathetic nervous system prepare the body for the "fight-or-flight" response. (25 marks)

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4.3 Briefly describe a structure of middle ear. (25 marks)

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4.4 Briefly describe how do the different types of papillae on the tongue contribute to taste perception? (25 marks)

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CINEC CAMPUS
Beyond A Graduate

Faculty of Health Sciences

BSc Honours in Biomedical Sciences/ Industrial Pharmaceutical Sciences/ Cosmetic Science

BIOCHEMISTRY II – BMS 2225/IPS 2223/ BCS 2223
2ND YEAR 2ND SEMESTER
BATCH 06
MID SEMESTER ASSIGNMENT

Date : **28th of October 2024**
Time : **01.30 p.m. – 02.30 p.m. (ONE HOUR)**

INSTRUCTIONS TO CANDIDATES

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

QUESTION 01 **(100 marks)**

1.1. Evaluate the significance of the following structures in cellular functions,

i. Tertiary structure of proteins. (35 marks)
ii. β pleated structure of proteins. (30 marks)
iii. Fibrous proteins. (35 marks)

QUESTION 02 **(100 marks)**

2.1. Denote the role of essential and non-essential amino acids in human body. (30 marks)
2.2. Outline the protein digestion process in the human body. (35 marks)
2.3. Draw a flow chart to represent the mechanisms of protein degradation, including the ubiquitin-proteasome pathway. (35 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 Sciences

BMS 2213/ IPS 2213/BCS 2213
Anatomy and Physiology II
2nd Year 2nd Semester
End Semester Assignment Examination
6th Batch

Date : **25th October 2024**
Time : **1.30 p.m. – 2.30 p.m. (One Hour)**

INSTRUCTIONS TO CANDIDATES

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

Assignment Question 1 **(100 marks)**

1.1 Discuss the importance of various adaptations in the human musculoskeletal system. (50 marks)

1.2 How hormonal changes in female body affect for the fertility. (50 marks)

Assignment Question 2 **(100 marks)**

2.1 "Pancreas is both exocrine and endocrine organ". Explain this statement by giving some examples. (50 marks)

2..2 Discuss how nephron arrangement importance in urine production. (50 marks)

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Anatomy and Physiology II
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6th Batch

Date	:	**25th October 2024**
Time	:	**11.15 a.m. – 12.15 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.
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1. **What is the component in renal hilum present more anteriorly?**
    1. Renal artery
    2. Renal vein
    3. Renal pelvis
    4. Ureter
    5. Lymphatic vessels

2. **What is the nitrogenous waste material associated with metabolism of muscle component?**
    1. Urea
    2. Uric acid
    3. Creatinine
    4. Ammonium gas
    5. Ammonium ion

3. **Which one of the following is a lipid soluble hormone?**
    1. Adrenaline
    2. Noradrenaline
    3. Insulin
    4. Glucagon
    5. Thyroid hormone

4. **What is the hormone secreted from hypothalamus, relevant to the female hormonal system?**
    1. Gonadotropin-Releasing Hormone
    2. Follicular stimulating hormone
    3. Luteinizing hormone
    4. Estrogen
    5. Progesterone

5. **Which cranial nerve has both sensory and motor characters?**
    1. Olfactory nerve
    2. Optic nerve
    3. Vagus nerve
    4. Oculomotor nerve
    5. Trochlear nerve

6. **Which part of the brain is important for hearing?**
    1. Occipital lobe
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Examination Department
21 OCT 2024
CINEC Campus, Sri Lanka

CINEC CAMPUS
Beyond A Graduate

Faculty of Health Sciences
BSc. Industrial Pharmaceutical Sciences / BSc. Cosmetic sciences
IPS2253 - Pathology of Diseases/ BCS2253 - Pathology for Cosmetic Sciences
2nd Year 2nd Semester
6th Batch
End Semester SEQ Examination

Date: 21st October 2024
Time: 09.00 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.
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Question 01 **(100 marks)**

Compare following pairs.

1.1 Atrophy and hypertrophy **(25 marks)**

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1.2 Metaplasia and dysplasia **(25 marks)**

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1.3 Coagulative necrosis and Caseous necrosis **(25 marks)**

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1.4 Cellular adaptation and Cell injury **(25 marks)**

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Question 02 **(100 marks)**

2.1 List **three (03)** phases of granulation tissue formation in wound healing. **(15 marks)**

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2.2 List the sequence of events in secondary union of wound healing. **(15 marks)**

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2.3 Give two **(02)** main causes for chronic inflammations? **(25 marks)**

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2.4 Briefly describe the role of macrophages in inflammation **(25 marks)**

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2.5 Define following terms. **(20 marks)**

2.5.1 Etiology **(10 marks)**

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2.5.2 Apoptosis **(10 marks)**

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Question 03 **(100 marks)**

3.1 What are neoplasms? **(25 marks)**

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3.2 List five **(05)** risk factors for cancer formation **(25 marks)**

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3.3 What are the clinical features of gastric cancer? **(50 marks)**

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Question 04 **(100 marks)**

4.1 What is atherosclerosis? **(20 marks)**

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4.2 Write **Two (02)** risk factors for ischemic heart disease **(20 marks)**

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Write a brief description on any **One (01)** of the following given topics

a) Pneumonia

4.3 b) Pulmonary tuberculosis **(60 marks)**

c) Asthma

d) Lung cancer

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Question 05 **(100 marks)**

5.1 a) What is amenorrhea? **(10 marks)**

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b) What is dysmenorrhea? **(10 marks)**

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5.2 What are the signs and symptoms of pelvic inflammatory disease? **(20 marks)**

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Write a brief description on any **One (01)** of the following given topics

a) Vaginitis

5.3 b) Endometriosis **(60 marks)**

c) Leiomyomas

d) Cervical cancer

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Question 06 **(100 marks)**

6.1 What are the four types of intra-cranial haemorrhages? (ICH) **(40 marks)**

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6.2 Write a brief description on any **One (01)** of the following given topics **(60 marks)**

1. Osteoporosis
2. Hyperthyroidism
3. Diabetes mellitus
4. Chronic renal failure

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EXAMINATION
21 OCT 2024
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2.5.2 Apoptosis **(10 marks)**

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Question 03 **(100 marks)**

3.1 What are neoplasms? **(25 marks)**

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3.2 List five **(05)** risk factors for cancer formation **(25 marks)**

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3.3 What are the clinical features of gastric cancer? **(50 marks)**

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Question 04 **(100 marks)**

4.1 What is atherosclerosis? **(20 marks)**

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4.2 Write **Two (02)** risk factors for ischemic heart disease **(20 marks)**

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Write a brief description on any **One (01)** of the following given topics

a) Pneumonia

4.3 b) Pulmonary tuberculosis **(60 marks)**

c) Asthma

d) Lung cancer

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Question 05 **(100 marks)**

5.1 a) What is amenorrhea? **(10 marks)**

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b) What is dysmenorrhea? **(10 marks)**

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5.2 What are the signs and symptoms of pelvic inflammatory disease? **(20 marks)**

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Write a brief description on any **One (01)** of the following given topics

a) Vaginitis

5.3 b) Endometriosis **(60 marks)**

c) Leiomyomas

d) Cervical cancer

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Question 06 **(100 marks)**

6.1 What are the four types of intra-cranial haemorrhages? (ICH) **(40 marks)**

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6.2 Write a brief description on any **One (01)** of the following given topics **(60 marks)**

1. Osteoporosis
2. Hyperthyroidism
3. Diabetes mellitus
4. Chronic renal failure

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PAST PAPERS

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Not Applicable	*Learning Resource Centre*

Past Papers

Faculty of Health Sciences

General Papers

(Year 2 – Semester 2)

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Faculty of Health Sciences

BSc(Hons)Biomedical Sciences/ BSc(Hons)Industrial Pharmaceutical Sciences

BIOCHEMISTRY II – BMS 2225/IPS 2223
2ND YEAR 2ND SEMESTER
BATCH 02 & 03
END SEMESTER SPECIAL REPEAT ASSIGNMENT

Date : 18th of June 2024
Time : 3.30 P.M – 4.30P.M (ONE HOUR)

INSTRUCTIONS TO CANDIDATES

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

QUESTION 01 **(100 marks)**

1.1 Discuss the importance of the following structures,

i. Double helix structure of DNA. (50 marks)
ii. Structure of transfer RNA. (50 marks)

QUESTION 02 **(100 marks)**

2.1. Draw a flow chart to represent the protein digestion process in the human body. (50 marks)

2.2. Outline the reaction steps involved in the urea cycle. (50 marks)

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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 2213/ IPS 2213/ BCS 2213-ANATOMY AND PHYSIOLOGY II

2ND YEAR 2ND SEMESTER-END SEMESTER BRQ/MCQ EXAMINATION-5TH BATCH

INDEX NUMBER: .....

Date	:	**10th May 2023**
Time	:	**11.15 a.m. – 12.15 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. **Part of the eye comparatively very rich in blood vessels,**
   1. Choroid
   2. Cornea
   3. Sclera
   4. Iris
   5. Retina

2. **Most of the reabsorption from the glomerular filtrate will take place in?**
   1. Proximal convoluted tubule
   2. Distal convoluted tubule
   3. Ascending limb of loop of Henle
   4. Descending limb of loop of Henle
   5. Collecting tubule

3. **Which one is an example for the mixed cranial nerve?**
   1. Olfactory (Sensory)
   2. Oculomotor (Motor)
   3. Glossopharyngeal
   4. Trochlear
   5. Hypoglossal

4. **Which immunity organ contains Hassal's corpuscles?**
   1. Tonsils
   2. Bone marrow
   3. Thymus
   4. Spleen
   5. Lymph nodes

5. **Which of the following hormone is secreted by the adrenal cortex?**
   1. Aldosterone
   2. Adrenalin
   3. ADH
   4. Noradrinalin
   5. Renin

6. **Which of the following best describes the function of the cerebral cortex,**
   1. Sensory perception
   2. Regulation of respiration
   3. Thermoregulation
   4. Coordination of voluntary movements
   5. Changes in heart rate

6. **Which of the hormone is not secreted by the corpus luteum?**
   1. Estrogen
   2. Progesterone
   3. Inhibin
   4. Relaxin
   5. Melatonin

7. **Which one is not a pure endocrine organ?**
   1. Pituitary gland
   2. Thyroid gland
   3. Thymus
   4. Parathyroid gland
   5. Adrenal gland

8. **True or false nervous system?**
   1. Ganglions are collection of neuron cell bodies.
   2. Thalamus is a part of brain stem.
   3. Gyri are fold in cerebral cortex.
   4. There are 11 pairs of cranial nerves.
   5. A bundle of axons are known as tracts.

10. **True or False regarding the muscle physiology?**
    1. When a nerve signal reaches the muscle cell, calcium is released from the sarcoplasmic reticulum surrounding the myofibrils.
    2. The myosin heads bind to the binding sites of the actin proteins, to form a cross-bridge as the inorganic phosphate is released.
    3. ATP is released which causes initiation of the power stroke
    4. A new ATP molecule binds to the myosin head causing the separation of the actin-myosin crossbridge.
    5. Muscle relaxation is a highly passive process.

11. **True or False regarding the cranal nerves,**
    1. Olfactory nerve is a sensory nerve which detect the smell
    2. Vestibulocochlear nerve is a motor nerve
    3. Vagus nerve innervates the heart, lungs and gastrointestinal system
    4. Trigeminal nerve is the 5^{th} cranial nerve which contain 3 branches
    5. Optic nerve is a motor nerve

12. **Hormones related with the kidney are,**
    1. Angiotensin II
    2. Parathyroid hormone
    3. Adrenaline
    4. ADH
    5. Thyroxin

13. **True or false regarding lymphatic system?**
    1. Neck region contains only superficial cervical nodes.
    2. Lymph nodes have an outer capsule.
    3. Lymph node contains number of efferent vessels.
    4. Jugular trunks receive lymph from head and neck.
    5. Lymph nodes contain trabeculae.

14. **Which of the followings are correct regarding the male reproductive system?**
    1. GnRH stimulate the secretion of FSH and LH
    2. LH stimulates spermatogenesis.
    3. FSH stimulates the secretion of testosterone.

4. Inhibin stimulates the secretion of FSH and LH
5. Testosterone inhibits the secretion of GnRH.

15. True of false regarding human urinary system?

1. Kidneys are intraperitoneal organs.
2. The renal cortex contains pyramids.
3. Ureters contain transitional epithelium.
4. Membranous urethra passes through the length of the penis.
5. The renal vein drains directly into the inferior vena cava.

16. True or false regarding the female reproductive system?

1. FSH stimulates the follicular phase of the ovarian cycle.
2. Estrogen stimulates the proliferative phase of the ovarian cycle.
3. Corpus luteum secretes progesterone.
4. Progesterone stimulates the secretary phase of the uterine cycle
5. Corpus luteum stimulates menstruation

17. Regarding Thyroid glands,

1. Skin is an innate defense mechanism.
2. Fever is an internal defense mechanism.
3. Inflammation is an innate defense mechanism.
4. B -lymphocytes are produced in the bone marrow and get matured in thymus.
5. T-lymphocytes are produced in thymus.

18. True or False regarding the musculoskeletal system?

1. Carpals are short bones.
2. Patella is an example for sesamoid bone.
3. Osteoclasts mature into new osteocytes.
4. External ear contains hyaline cartilage.
5. Hyoid bone does not articulate with another bones.

19. True or false regarding endocrine organs?

1. Anterior pituitary gland is a downgrowth of nervous tissue.
2. Thyroid gland is a highly vascular gland.
3. Follicles are the functional unit of the thyroid gland.
4. Pineal gland contains astrocytes.
5. Thyroid follicles are filled with colloid.

20. True or False regarding the human ear?

1. The auricle is the visible part of the ear.
2. The tympanic membrane separates the middle ear from the inner ear.
3. Incus is a lateral hammer-shaped bone.
4. Membranous labyrinth is filled with endolymph.
5. Cochlea resembles a snail's shell.

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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 2213/ IPS 2213/ BCS 2213 -ANATOMY AND PHYSIOLOGY II

2ND YEAR 2ND SEMESTER-END SEMESTER SEQ EXAMINATION- 5TH BATCH.

Date : 10th May 2023
Time : 09.00 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 List the deference between cortical and juxtamedullary nephrons. (15 marks)
1.2 Write a short note on followings.
1.2.1 Renal Corpuscle (10 marks)
1.2.2 Trigone of Urinary bladder (10 marks)
1.3 Write three differences between male and female urethra. (15 marks)
1.4 List the three main processes of urine formation. (15 marks)
1.5 Briefly describe the three (3) main steps of the uterine cycle of the of females. (35 marks)

Question 2 **(100 marks)**

2.1 Describe the microscopic view of thyroid tissues. (25 marks)
2.2 "Pancreas belongs to both exocrine and endocrine glands." Comment on this statement. (25 marks)
2.3 State the endocrine hormones of the pancreas and state the main action of each. (20 marks)
2.4 Draw and briefly describe the HPT axis (Hypothalamic-Pituitary-Thyroid axis). (30 marks)

Question 3 **(100 marks)**

3.1 Name two examples for each of the followings.
3.1.1 Primary immune organs (10 marks)
3.1.2 Secondary immune organs (10 marks)
3.2 Describe the anatomical features of synovial joints. (30 marks)
3.3 Briefly describe the main step of phagocytosis (30 marks)
3.4 Draw the flow chart to represent the Calcium Metabolism of the body of a patient diagnosed with increased calcium ions in the body. (20 marks)

Question 4 **(100 marks)**

4.1 Describe the structure of a neuron. (25 marks)
4.2 Name the main 4 parts of the human limbic system. (20 marks)
4.3 Describe the structure of auditory ossicles. (25 marks)
4.4 Describe the stepwise process of communication of neurons at 'Synapses'. (30 marks)

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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 2213/ IPS 2213/ BCS 2213 -ANATOMY AND PHYSIOLOGY II
2ND YEAR 2ND SEMESTER-END SEMESTER SEQ EXAMINATION- 5TH BATCH.

Date	:	**10th May 2023**
Time	:	**09.00 a.m. – 11.00 a.m. (Two Hours)**

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **FOUR** questions.
- Answer **ALL** questions.
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4.2 Name the main 4 parts of the human limbic system. (20 marks)
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4.4 Describe the stepwise process of communication of neurons at 'Synapses'. (30 marks)

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Faculty of Health Sciences
Bachelor of Science Honours in Biomedical Sciences/ Industrial Pharmaceutical Science/ Cosmetic Science
BMS 2225 / IPS 2223/ BCS 2223– Biochemistry II
Batch – 06
2nd Year 2nd Semester
Mid semester MCQ/BRQ Examination

Date	**: 01st of August 2024**
Time	**: 9.0 a.m. – 10.00 a.m. (One Hour)**

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **Twenty** main questions.
- Answer **ALL** questions.
- Select the single best response for the questions from 01 to 05.
- Mark 'True' or 'False' for each response from question number 06 to 20.

1. Select the best amino acid combination containing Sulphur.
   a. Cysteine and Glycine
   b. Methionine and Leucine
   c. Proline and Cysteine
   d. Serine and Aniline
   e. Cysteine and Methionine

2. Select the amino acid derived from Oxaloacetate,
   a. Glutamine
   b. Proline
   c. Cysteine
   d. Threonine
   e. Histidine

3. Select the best description regarding the tertiary structure of a protein,
   a. based on the order of amino acids
   b. there are ionic bonds between R groups
   c. considered based on the location of disulphide bonds
   d. there are loop regions of proteins
   e. based on the ways of protein folding

4. A person with phenylketonuria will convert
   a. phenylalanine to isoleucine
   b. phenylalanine to phenylpyruvate
   c. tyrosine to phenylalanine
   d. phenylpyruvate to tyrosine
   e. tyrosine to dopamine

5. What is the best response regarding Serine and Lysine ?
   a. Both are keto-gluco amino acids
   b. They are ketogenic and glucogenic amino acids respectively
   c. Both are ketogenic amino acids
   d. Both are glucogenic amino acids
   e. They are glucogenic and ketogenic amino acids respectively

6. "True" or "False" regarding guanosine and deoxycytidine?
   a. Both contain a pyranose
   b. Both contain a 1,1'-N-glycosidic bond
   c. Both contain a pyrimidine base
   d. Both contain a 3'-OH group
   e. Both contain an ester bond

7. "True" or "False" regarding alpha helix structure of protein ?
   a. It consists of a tightly packed coiled polypeptide backbone core.
   b. It is a secondary structure of protein.
   c. The side chains of the component amino acids extending inward from the central axis.
   d. It is stabilized by hydrogen bonds.
   e. Each turn of a helix contains 3-4 amino acids.

8. Amino acids are derived from,
   a. ammonia
   b. oxaloacetate
   c. citrate
   d. pyruvate
   e. glucose-6-phosphate

9. Which of the characteristic/s is/are common to both myoglobin and hemoglobin?
   a. Both are saturated with oxygen at low oxygen concentrations
   b. Both display cooperative binding when transporting oxygen
   c. Both contain strands of β-pleated sheet with a zig-zag shape
   d. Both contain segments of α-helix with a spiral shape
   e. Both contain heme as a prosthetic group

10. "True" or "False" regarding purine biosynthesis ?
   a. It can be synthesized from both de novo and salvage pathways.
   b. Synthesis of 5-Phosphoribosylamine is the rate limiting step.
   c. Excess Purines activates the first step.
   d. Inorganic phosphate activates the rate limiting step.
   e. PRPP synthetase is involved in the conversion of 5-Phosphoribosylamine to PRPP.

11. "True" or "False" regarding the special products derived from amino acids ?
   a. Glycine and Arginine are required for the synthesis of Creatinine.
   b. Melanine is derived from amino acids.
   c. Histamine is derived from Cysteine.
   d. Catecholamines are derived from Tyrosine.
   e. Tyrosine is involved for the synthesis of Melanin.

12. "True" or "False" regarding the first step of the Urea cycle ?
    a. The reaction is catalyzed by a rate-limiting enzyme carbamoyl phosphate synthase-I
    b. The presence N-acetyl glutamate inhibits the activity of CPS I enzyme
    c. A molecule of ATP is required for this reaction
    d. The reaction occurs in mitochondria
    e. Arginine positively regulates this reaction step

13. "True" or "False" regarding fibrous proteins ?
    a. Consists of a polypeptide chain parallel to the single axis
    b. Highly soluble in water
    c. They are very tough and strong
    d. Elastin is the most abundant protein in human body
    e. Quaternary structure is held by covalent bridges

14. Denaturation of proteins results in,
    a. disruption of primary structure
    b. breakdown of peptide bonds
    c. destruction of hydrogen bonds
    d. irreversible changes in the molecule
    e. loss of biological activity

15. True or false?
    a. Creatine is synthesized in liver
    b. Histamine is a biogenic amine
    c. Dopaquinone is a precursor for melanin
    d. Catecholamines are synthesized in kidney
    e. Dopamine synthesis is impaired in Parkinson's

16. True or false?
    a. Deamination liberates amine group of amino acids
    b. Transamination mainly involves in the breakdown of excess protein
    c. Amine group of amino acids are finally funneled to glutamic acid
    d. Pyridoxal phosphate is a co-factor of deaminases
    e. Glutamate dehydrogenases transfer the amine group of glutamic acid to α ketoglutarate

17. Which of the following is/are "True" or "False" regarding protein digestion ?
    a. Initial protein denaturation is facilitated by HCl.
    b. Carboxy-terminal of amino acids are removed by the action of carboxy peptidase.
    c. Protein digestion takes place in the intestine by trypsionogen and pepsinogen.
    d. Exopeptidase cleaves amino acids at N-terminal.
    e. Pepsin is the common activator of all pancreatic zymogens.

18. Which of the following is/are "True" or "False" about the structure of RNA?
    a. Anticodon arm of t-RNA serve as side of attachment for amino acid.
    b. RNA nucleotides are joined by glycosidic and phosphodiester bonds.
    c. All RNAs can increase the rate of a reaction.
    d. Poly-A tail of m-RNA contains both Adenine and Guanine Nitrogenous bases.
    e. m-RNA carries the genetic message from DNA.

19. Which of the statements is/are true regarding Urea cycle ?
    a. It provides intermediates for HMP shunt.
    b. It can be stimulated by a protein rich diet.
    c. It is regulated by N-acetylglutamate synthase.
    d. It occurs in the mitochondria of kidney and liver.
    e. Removes toxic ammonia from body.

20. Which of the following is/are "True" or "False" regarding phenylketonuria?
    a. It is an autosomal dominant disorder.
    b. Metabolic disorder of phenyl alanine and tyrosine.
    c. Mental retardation is observed in these patients.
    d. Biuret test used for the laboratory diagnosis of this disease.
    e. Hypopigmentation is observed in these patients.

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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 Sciences
BMS 2213/ IPS 2213/BCS 2213
Anatomy and Physiology II
2nd Year 2nd Semester
Mid Semester BRQ/MCQ Examination
6th Batch

Date	:	**30th July 2024**
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:

~~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 one is the part of the nephron with podocytes?**
   1. Distal convoluted tubule
   2. Proximal convoluted tubule
   3. Ascending limb of loop of Henle
   4. Descending limb of loop of Henle
   5. Glomerulus

2. **Which of the following hormones reacts to the body's' stress?**
   1. Aldosterone
   2. Cortisol
   3. Melatonin
   4. Androgens
   5. Calcitonin

3. **What is the endocrine organ comparatively small in adulthood?**
   1. Thymus
   2. Pancreas
   3. Thyroid gland
   4. Pituitary
   5. Adrenal gland

4. **Which of the following blood constituent remains inside the glomerular capillaries after glomerular filtration?**
   1. Creatinine
   2. Platelets
   3. Urea
   4. Amino acids
   5. Mineral salts

5. **What is the endocrine organ with additional exocrine function?**
   1. Pancreas
   2. Pituitary gland
   3. Thyroid gland
   4. Adrenal gland
   5. Parathyroid gland

6. **What is the part of the male reproductive system, act as a reservoir of spermatozoa?**
   1. Seminal vesicles
   2. Cowper gland
   3. Prostate gland
   4. Bulbouretharal gland
   5. Epididymis

7. **What is the stage of follicle with two layers of follicular cells present in ovarian cortex?**
   1. Primordial follicle
   2. Primary follicle
   3. Secondary follicle
   4. Tertiary follicle
   5. Graafian follicle

8. **Which of the following hormone is secreted/produced by the hypothalamus?**
   1. TSH
   2. LH
   3. GH
   4. GnRH
   5. FSH

9. **True or false regarding human urinary system?**
   1. The 85% nephrons are juxtamedullary nephrons.
   2. There are rugae in walls of empty bladder.
   3. Internal urethral sphincter is mainly made by voluntary muscles.
   4. Kidneys are covered by a fibrous capsule.
   5. Urine formed in the kidney passes through a papilla at the apex of a pyramid.

10. True or false regarding testis?

1. It contains seminiferous tubules.
2. During early fetal life, the testis develops in the abdominal cavity.
3. It is suspended in the scrotum.
4. Right testis is slightly lower than left testis.
5. Tunica vaginalis is the outermost cover.

11. True or False regarding ovarian cycle?

1. Body temperature slightly decrease immediately following ovulation.
2. After ovulation empty follicles becomes a corpus luteum.
3. Cervical mucus becomes thin during ovulation.
4. Some women experience abdominal discomfort.
5. Corpus albicans is a white scar tissue.

12. True or false regarding female reproductive system?

1. Bartholin's glands secrete mucus.
2. Clitoris is responsible for feelings of sexual pleasure.
3. Labia major absence with sebaceous glands.
4. Vagina acts as the receptacle for the penis.
5. Vestibule surrounds the opening of the vagina.

13. Regarding thymus,

1. It is located in superior mediastinum.
2. It contains cortex and medulla.
3. Thymus will increase in size when aging.
4. Thymus shows rapid autolysis after death.
5. Thymus is enclosed by a fibrous capsule.

14. Regarding pituitary gland,

1. Adenohypophysis mainly consists nervous tissues.
2. It is regulating the activity of most of the other endocrine glands.
3. Posterior pituitary secretes follicle stimulating hormone.
4. Anterior pituitary secretes oxytocin hormone.
5. Anterior pituitary secretes luteinizing hormone.

15. True or false?

1. Right testicular vein empties into right renal vein.
2. Epididymis stores the sperm cells.
3. Cowper glands secret mucus like secretion.
4. High concentration of testosterone inhibits the hypothalamus.
5. Spermatozoa transforms into spermatids in spermatogenesis.

16. True or false regarding hormones?

1. Gastrin hormone stimulate secretion of gastric juice.
2. Erythropoietin stimulates red blood cell production.
3. Leptin makes satiety.
4. Secretin accelerates emptying of the stomach.
5. Melatonin regulates circadian and diurnal rhythms.

17. Lymph nodes,

1. are immune organ.
2. are only at the deep region.
3. contain afferent and efferent vessels.
4. have a non-fibrous capsule.
5. contains trabeculae.

18. Regarding Thyroid gland and its hormones,

1. It is butterfly in shape.
2. Thyroid gland consists two capsules.
3. Thyroxine accelerates body growth.
4. The pyramidal lobe is an essential component in thyroid gland.
5. High blood calcium level stimulates calcitonin secretion.

19. True or false regarding urine formation?

1. Na^+/K^+ ATPase pump in proximal convoluted tubules reabsorbs 70% of sodium ions.
2. Glomerular filtration is a non-selective passive process.
3. Reabsorption starts from the Bowman's capsule.
4. An increase in blood volume can increase the GFR.
5. Water reabsorption occurs passively.

20. True or false regarding adrenal glands,

1. Adrenal cortex produces norepinephrine.
2. Adrenal medulla secretes glucocorticoids.
3. Left adrenal gland is pyramidal in shape.
4. Bulk of adrenal cortex is made by zona fasciculata layer.
5. Adrenal medulla consists chromaffin cells.

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Faculty of Health Sciences

BACHELOR OF SCIENCE HONOURS IN INDUSTRIAL PHARMACEUTICAL SCIENCES /BACHELOR OF SCIENC HONOURS IN COSMETIC SCIENCES
IPS 2243/ BCS 2243 INORGANIC CHEMISTRY
BATCH 05- 2ND YEAR 2ND SEMESTER-END SEMESTER SEQ EXAMINATION

Date: 11th of May 2023
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)**

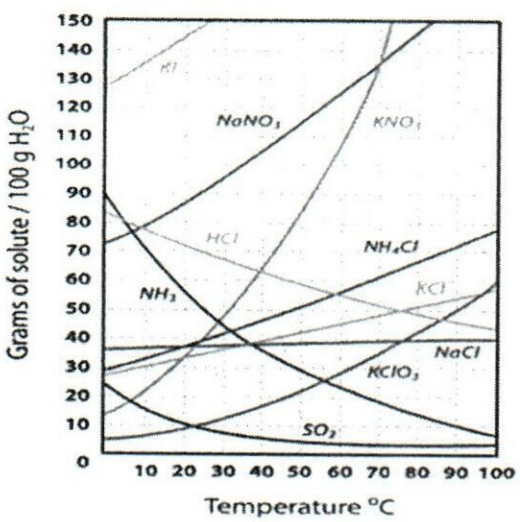
1.1 Co, Pt, Mn are commonly used as catalysts. Explain this statement. (20 marks)
1.2 Explain why many d-block elements are colored. (20 marks)
1.3 Explain why the size of the alkali metals increase when moving down the group. (20 marks)
1.4 Group 16 elements have the valence electron shell structure ns^2np^4. Explain the trends in atomic properties such a
Atomic radii, Ionization enthalpy, Electronegativity,
Melting and boiling point trends in Group 16. (40 marks)

Question 02 **(100 marks)**

2.1 Define Metallic bonds, Ionic bonds & Covalent bonds. (30 marks)

2.2 Explain the difference between homogeneous mixtures and heterogeneous mixtures. (20 marks)

2.3 Following figure shows how solubility of the compounds change with temperature.



2.3.1 Are the following solutions saturated, unsaturated, or supersaturated?

(Assume all are dissolved in 100 grams of water.) (10 marks)

2.3.1.1 Amount of 50 grams of KNO_3at 50°C

2.3.1.2 Amount of 100 grams of NaNO3at 80 °C

2.3.2 Which solid has the highest solubility at 30 °C? (10 marks)

2.3.3 A mass of 90 grams of KNO3 is placed in 100ml of water at 40 °C.

2.3.3.1 Will the solution be saturated?
If the answer is yes, how much KNO_3 will remain undissolved at the bottom of the container?
If the answer is no, how much more KNO_3 could be dissolved? (10 marks)

2.3.3.2 If the solution is heated to 70°C will it be saturated? If the answer is yes, how much KNO3 will be undissolved at the bottom of the container? If the answer is no, how much more KNO3 could be dissolved? (10 marks)

2.3.3.3 If the solution is cooled to 20°C will it be saturated? If the answer is yes, how much KNO3 will be undissolved at the bottom of the container? If the answer is no, how much more KNO3 could be dissolved? (10 marks)

Question 03 **(100 marks)**

3.1 Explain why noble gases are generally unreactive and do not form chemical bonds with other elements. (20 marks)

3.2 Briefly explain the process of isolating noble gases from air. Include the properties of the noble gases that make this process possible. (25 marks)

3.3 State four direct applications of noble gases in medicine. (20 marks)

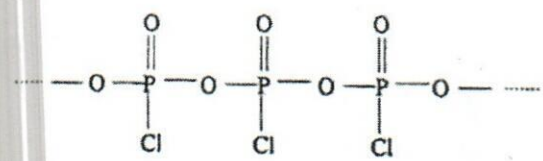
3.4 Briefly explain how XeF_4 is prepared including the chemical reactions and conditions? (20 marks)

3.5 Give three examples of how noble gases are used to create an inert atmosphere? (15 marks)

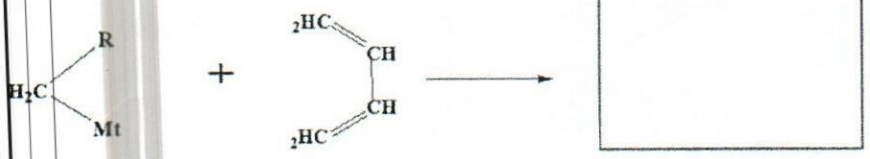
Question 04 **(100 marks)**

4.1 What types of reactions are involved in the formation of polymers? (10 marks)

4.2 Starting from PCl_5, using relevant reactions and conditions, illustrate the formation of the following linear long chain polymer. (20 marks)



4.3 What is the resulting monomer catalyst complex when an organometallic catalyst is combined with following diene monomer? (10 marks)

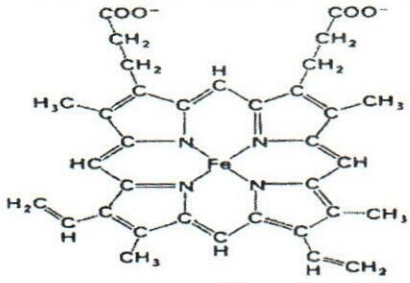


4.4 Mention four properties of silicones? (20 marks)

4.5 Briefly explain how do the mentioned properties of silicones make them useful in various applications? (40 marks)

Question 05 **(100 marks)**

5.1 Answer the following questions based on the heme molecule which is a subunit of the hemoglobin molecule.



Heme
(Fe-protoporphyrin IX)

5.1.1 Write the metal ion present in this molecule and state whether it's bulk or a trace metal. (10 marks)
5.1.2 Write the oxidation state of the metal ion. (10 marks)
5.1.3 Oxygen transport of the haemoglobin molecule ceased due to the presence of oxidants. Briefly explain the reason. (20 marks)
5.1.4 Explain the structural difference between the haemoglobin and myoglobin molecule. (30 marks)
5.2 Briefly explain the properties of water and how it's beneficial to the biological systems (30 marks)

Question 06 **(100 marks)**

6.1 The questions are based on the following metals.

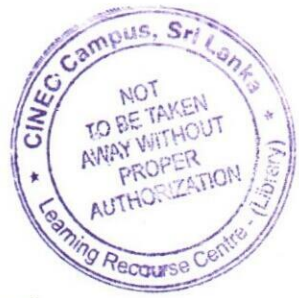
Na, Mg, Ca, K, Fe, Co, Ni, Zn, Cu, Cd, Hg, Mo, Pb

6.1.1 State the metal which is needed for blood clotting mechanism. (5 marks)
6.1.2 State two metals that are important to maintaining the osmotic pressure in cells. (5 marks)
6.1.3 Name the metal that is present in chlorophyll a. (5 marks)
6.1.4 Name the metal ion that is responsible for the active site of the urease enzyme. (5 marks)
6.1.5 Name the metal that is transported by ceruloplasmin protein. (5 marks)
6.1.6 Write the metal that is responsible for inhibiting heme synthase enzyme in red blood cells. (5 marks)
6.1.7 Name the metal that is responsible for forming the amalgam used to fill teeth. (5 marks)
6.1.8 State the metal that is present in vitamin B_{12} (5 marks)

6.1.9 Name the metal that is present in the nitrogenase enzyme. (5 marks)
6.1.10 State the metal present in the porphyrin ring of heme. (5 marks)

6.2 Mercury is classified as a toxic metal for biological systems, and it can inhibit enzymes by binding to the donor atoms in the enzyme.
6.2.1 Draw the dose response curve for the mercury. (Tolerance range for Hg is 5µg/L) (20 marks)
6.2.2 State two exposure routes for mercury. (10 marks)
6.2.3 Briefly explain the toxicity of ionic mercury and alkyl mercury based on their solubility. (20 marks)

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CINEC CAMPUS
Beyond A Graduate

Faculty of Health Sciences

Bachelor of Science Honours in Industrial Pharmaceutics Science/
Bachelor of Science Honours in Cosmetic Science

IPS 2253/ BCS 2253 Pathology of Diseases/ Pathology for Cosmetic Science

2nd Year 2nd Semester

End Semester SEQ Examination

4th Batch

INDEX NUMBER: .....

Date : **30th August 2022**
Time : **09.00 a.m. – 12.00 p.m. (Three Hours)**

INSTRUCTIONS TO CANDIDATES

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

Question 1 **(100 marks)**

1.1 Define following terms.

1.1.1. Hypertrophy (15 marks)
1.1.2. Hyperplasia (15 marks)
1.1.3. Atrophy (15 marks)
1.1.4. Metaplasia (15 marks)

1.2 Compare followings.

1.2.1 Acute inflammation and Chronic inflammation (20 marks)
1.2.2 Benign tumors and Malignant tumours (20 marks)

Question 2 **(100 marks)**

2.1 Describe different types of necrosis including examples. (40 marks)
2.2 Compare primary union and secondary union. (25 marks)
2.3 Describe the importance of inflammation. (35 marks)

Question 3 **(100 marks)**

3.1 Describe the pathological changes in following stages of lobar pneumonia.

3.1.1 Congestion (15 marks)
3.1.2 Red Hepatisation (15 marks)
3.1.3 Gray Hepatisation. (15 marks)
3.1.4 Stage of Resolution (15 marks)

3.2 Write short note on followings.

3.2.1 Emphysema (20 marks)
3.2.2 Components in atherosclerotic plaques (20 marks)

Question 4 **(100 marks)**

4.1 List three diseases associate with the oesophagus. (15 marks)
4.2 Write the major differences between Ulcerative colitis and Crohn's disease. (25 marks)
4.3 What is villous adenoma? (25 marks)
4.4 List three factors for hyperpituitarism (15 marks)
4.5 Write a short note on goiter. (20 marks)

Question 5 **(100 marks)**

5.1 Complete following table.

	Site	Causes
Epidural haemorrhages	5.1.1 (10 marks)	5.1.2 (10 marks)
Subdural haemorrhages	5.1.2 (10 marks)	5.1.4 (10 marks)

5.2 Write a short note on hydrocephalus. (25 marks)
5.3 Describe pathological changes in different stages of cerebral infarction (35 marks)

Question 6 **(100 marks)**

6.1 Name 3 types of Cystic Diseases of the Kidneys (15 marks)

6.2 Name 4 clinical signs and symptoms of renal stones (20 marks)

6.3 Briefly describe the condition cryptorchidism in males (15 marks)

6.4 Describe the disease named Myasthenia Gravis (20 marks)

6.5 Name 3 tests per analysis method mentioned below

6.3.1 Urinalysis

6.3.2 Blood chemistry (30 marks)

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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 2213/ IPS 2213/ BCS 2213
Anatomy and Physiology II

2nd Year 2nd Semester

End Semester SEQ Examination

4th Batch

INDEX NUMBER: .....

Date : **22nd August 2022**
Time : **09.00 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 Describe the microscopic structure of the functional unit of kidneys. (30 marks)
1.2 Write the differences between male and female urethra. (20 marks)
1.3 Describe the process of urine formation. (25 marks)
1.4 Outline the functions of following structures of male reproductive system. (15 marks)
1.5 Outline the functions of male sex hormones (10 marks)

Question 2 **(100 marks)**

2.1 "Pancreas belongs to both exocrine and endocrine glands." Comment on this statement. (25 marks)
2.2 Describe the microscopic view of cortex of human ovary. (25 marks)
2.3 Fill the table given below with the hormones secreted by anterior pituitary, target cells/organs and the function of hormone. (20 marks)

HORMONE	TARGET	FUNCTION
Eg. Thyroid (TSH) Stimulating Hormone	Thyroid gland	TH synthesis & release
a.		
b.		
c.		
d.		
e.		

2.4 Describe the process of oogenesis and the follicular development. (30 marks)

Question 3 **(100 marks)**

3.1 Describe the structure of a nurone. (25 marks)
3.2 Describe the structure of auditory ossicles. (25 marks)
3.3 Outline the functions of the skin. (25 marks)
3.4 Describe the stages of action potential of a nurone. (25 marks)

Question 4 **(100 marks)**

4.1 List the main types of joints based on their structural differences giving example for each type. (20 marks)
4.2 Describe the structure of a synovial joint. (30 marks)
4.3 Outline the functions of bones in human skeletal system. (20 marks)
4.4 Describe the process of skeletal muscle contraction. (30 marks)