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# FIRST PROFESSIONAL MBBS EXAMINATION

University of Dhaka

## Question Bank

November 2024 Edition

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# Anatomy.

Paper I



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## Examination of May 2024

### GROUP-A

1. Mention the components of the lymphatic system. Write down the factors helping tissue fluid to enter the lymph capillaries. Give the differences between lymph capillaries and blood capillaries.  
Or,  
Give an account of the fluid mosaic model of the plasma membrane (use diagram).
2. A woman has had several bouts of pelvic inflammatory disease and now wants to have children. However, she has been having difficulty becoming pregnant. Taking into consideration this scenario, answer the following questions:
  - a) What is likely to be the problem?
  - b) What would you suggest?
3. Draw and label the histological structure of:
  - a) Compact bone
  - b) Cardiac muscle
4. Define cleavage and morula. Why is the 2nd week of development called the week of Two's?
5. Give the differences between the following paired terms (any TWO):
  - a) 'Euchromatin' and 'Heterochromatin'
  - b) 'Barr body' and 'Polar body'
  - c) 'Aneuploidy' and 'Polyploidy'
6. Write down the different parts of the developing long bone. State the importance of the metaphysis.
7. Write short notes on:
  - a) Somite - definition, number, and importance
  - b) Chemical structure of DNA

### GROUP-B

8. Describe the interior of the larynx (use diagram). State the motor and sensory nerve supply of the larynx. Mention the name of the laryngeal cartilages.  
Or,  
Write down the origin, insertion, and actions of masseter and frontalis. What is tongue tie?

9. A 58-year-old college teacher went to the OPD of DMCH and complained that since morning he has not been able to close his right eye and, during eating, food accumulates between the teeth and cheek on the right side. He is also not able to wrinkle his forehead. With the given scenario, answer the following questions:
  - a) What might be the cause of this disability?
  - b) What condition is this called?
10. Give the formation of the nasal septum. Write down the contents of the carotid triangle.
11. Write down the development of the thyroid gland. Why does the thyroid gland move with deglutition?
12. Draw and label the transverse section of the midbrain at the level of the superior colliculus.
13. What are the components of the limbic system? What do you mean by anterograde amnesia?
14. Write short notes on:
  - a) Paranasal air sinuses - location and functions
  - b) Formation of hypophyseal portal system

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## Examination of November 2023

### GROUP-A

1. Give an account of the cell cycle mentioning its different phases and checkpoints.  
Or, Define joint. Classify synovial joint according to the axis of movement with examples. Write down the characteristic features of a synovial joint (use diagram).
2. An ultrasound scan detects a large mass near the sacrum of a 26-week female fetus. Taking into consideration this scenario, from your knowledge of embryology, answer the following questions:
  - a) What might the origin of such a mass be?
  - b) What type of tissue might it contain?
3. Draw and label the histological structure of:
  - a) Elastic artery
  - b) Loose areolar tissue
4. Define epiphysis. Classify epiphysis with examples.
5. Give the differences between the following paired terms (any TWO):
  - a) 'Genotype' and 'Phenotype'
  - b) 'Ion transporting cell' and 'Steroid secreting cell'
  - c) 'Anaphase lag' and 'Non-disjunction'
6. Describe the process of the notochord. Define cleavage and compaction.
7. Explain from your knowledge of anatomy/embryology:
  - a) Thymus is called the primary lymphoid organ.
  - b) Epiblast is the source of all the germ layers.

### GROUP-B

8. Give the formation, circulation, absorption, and function of CSF. Name the structures pierced by a lumbar puncture needle before it enters the subarachnoid space.  
Or, Write down the origin, insertion, nerve supply, and actions of sternocleidomastoid and trapezius muscles. What is wryneck?
9. A 24-year-old man attended the Emergency Department of DMCH with complaints of generalized swelling over the dome of the skull and around the eyelids after a head injury due to a motorcycle accident. The physician noticed that there was black discoloration of the skin around the eyes. With the given scenario, answer the following questions:
  - a) What may be the cause of generalized swelling over the mentioned areas?
  - b) What condition is this called?
10. Describe the interior of the larynx. Draw and label the histological structure of the epiglottis.
11. Explain from your knowledge of anatomy how/why:
  - a) Avascular cornea gets its nutrition.
  - b) Upper lip and tip of the nose is the danger area of the face.

12. Mention the nerve supply of the tongue on a developmental basis. What is tongue tie?
13. Write about the origin, course, and termination of the pyramidal tract. What are Betz cells?
14. Write short notes on:
  - a) Carotid sheath - formation and contents
  - b) Auditory tube - formation and functions

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## Examination of May 2023

### GROUP-A

1. Name the apical cell surface modifications mentioning their functional significance. Why is the cell membrane structure termed as a fluid-mosaic model?
2. Name connective tissue fibers with their locations. Mention the differences between capillary and sinusoid.
3. Draw and label the light microscopic structure of:
  - i) Epidermis of skin
  - ii) Compact bone
4. What is gametogenesis? Describe the steps of spermatogenesis.
5. Give an account of the formation and derivatives of neural crest cells. Mention the functions of the placenta.
6. Classify synovial joints with examples. Draw and label the arterial supply of a growing long bone.
7. Explain anatomically why/how:
  - i) Meiosis ensures genetic variability.
  - ii) Thymus is called the primary lymphoid organ.
  - iii) The age of an embryo can be determined by counting somites.

### GROUP-B

8. Trace the pathway of the pyramidal tract. Mention the function of the pyramidal tract.
9. Write down the mechanism of formation, absorption, and functions of CSF. State the clinical importance of the pyriform fossa.
10. Draw and label the:
  - i) Sensory nerve supply of the face
  - ii) Histological structure of the thyroid gland
11. Write down the nerve supply of the tongue on a developmental basis. Mention the communication of the cavernous sinus.
12. Describe the features present on the lateral wall of the nose. What is epistaxis?
13. Give an account of the boundaries and contents of the middle ear cavity. Mention the clinical importance of the maxillary air sinus.
14. Explain anatomically why/how:
  - i) The digastric muscle has dual nerve supply.
  - ii) The vocal cord is lined by nonkeratinized stratified squamous epithelium.
  - iii) A small hemorrhage in the internal capsule may produce widespread effects.



## Examination of November 2022

### GROUP-A

1. Describe the events in different phases of interphase of the cell cycle. Mention the functions of the Golgi apparatus.
2. Describe the process of gastrulation. Write about the importance of the notochord.
3. Draw and label the histological structure of:
  - i) Thin skin
  - ii) Lymph node
4. List the connective tissue cells, mentioning the functions of any **two** of them. Draw and label the structure of a blastocyst.
5. Give the characteristic features of a synovial joint. Mention how the stability of synovial joints is maintained. What do you mean by the growing end of a long bone?
6. Name the layers of periosteum, mentioning the functions of each layer. Classify blood vessels functionally with examples.
7. Explain from your knowledge of anatomy, why:
  - i) The embryonic period is called the "period of greatest sensitivity."
  - ii) Nerve fibers are surrounded by myelin sheath
  - iii) Tight junctions are present in epithelium of urinary bladder

### GROUP-B

8. Describe the process of development of the face. Mention the location and importance of the danger area of the face.
9. Give the area of supply of the mandibular nerve. Write about the facial expression defects associated with infra-nuclear lesions of the facial nerve.
10. Name the muscles of the soft palate with their nerve supply. Mention the functions of the soft palate. Explain why the superior thyroid artery is ligated close to the thyroid gland during thyroidectomy.
11. Write about the functions, arterial supply, and histological structure of the primary motor area of the cerebral cortex. Mention the effects of lesions in the superior parietal lobule.
12. Draw and label:
  - i) Transverse section of the spinal cord at the mid-thoracic level
  - ii) Histological structure of the cerebellum
13. Name the muscles of the iris with their nerve supply. What is an adenoid? State the functions of the limbic system.
14. Explain from your knowledge of anatomy:
  - i) How the tympanic membrane is derived from all three germ layers
  - ii) Why the fourth layer is the dangerous area of the scalp
  - iii) Why air sinuses communicate with the nasal cavity

## Examination of May 2022

### GROUP-A

1. Classify covering epithelium with examples. Mention the structure and functions of mitochondria.
2. Write down the phases of fertilization. Mention its results. State the functions of the placenta.
3. Describe the process of spermatogenesis. Mention the derivatives of paraxial mesoderm.
4. Classify joints with examples. How do capillaries differ from sinusoids structurally?
5. Draw and label the:
  - i) Artery supply of a developing long bone
  - ii) Structure of compact bone
6. Explain anatomically, why/how:
  - i) Mitotic division gives rise to identical daughter cells.
  - ii) Epiblast is the source of the trilaminar germ layer.
  - iii) Cilia is present in the conductive zone of the respiratory tract.
7. Write briefly on:
  - i) Structure and functions of fibroblasts
  - ii) Structure of the epidermis of the skin

### GROUP-B

8. Describe the nerve supply of the tongue on a developmental background. What is tongue tie?
9. Give an account of the interior of the larynx. Mention the clinical importance of the piriform fossa. Draw and label the transverse section of the midbrain at the level of superior colliculi.
10. Mention the functions of the thalamus.
11. Give the histological structure of the thyroid gland. Mention the importance of the maxillary air sinus. What is epistaxis?
12. Draw and label the:
  - i) Sensory nerve supply of the face
  - ii) Layers of the retina
13. Explain anatomically, why/how:
  - i) Inflammation of the parotid gland is painful.
  - ii) Middle ear infection is common in children.
  - iii) Black eye occurs in scalp injury.
14. Write briefly on:
  - i) Circulation and clinical importance of CSF
  - ii) Primary motor area - location and function

## Examination of November 2021

### GROUP-A

1. Write down the characteristic features of epithelial tissue. Mention the structure, locations, and functions of microvilli.
2. Draw and label a human embryo at the end of the 2nd week of development. Give an account of the process of development and the importance of the notochord.
3. Define joint. State the characteristic features of synovial joints. Classify synovial joints according to the axis of movements with examples.
4. Mention the histological features and locations of elastic cartilage. State the functions of the lymphatic system. How do arteries differ from veins structurally?
5. Draw and label the microscopic structure of:
  - i) Loose areolar tissue
  - ii) Adrenal cortex
6. Explain anatomically, why/how:
  - i) The structure of a cell membrane is characterized as a fluid mosaic model.
  - ii) Periosteum takes part in the repair of fractures.
  - iii) Monozygotic twins are developed.
7. Write briefly on:
  - i) Events in the interphase of a cell cycle
  - ii) Pennate muscle types with examples and functional importance

### GROUP-B

8. Name the extrinsic and intrinsic muscles of the tongue with their functions. Give the arterial supply of the palatine tonsil.
9. Mention the nuclei and distribution of the facial nerve. Mention the effects of lesions in the right hypoglossal nerve.
10. Write down the process of development of the face. How does cleft lip occur?
11. Give an account of the arterial supply of the spinal cord. Mention the features present in the nasopharynx.
12. Draw and label the histological structure of the cerebellum. Classify the white matter of the cerebrum with examples.
13. Explain anatomically, why/how:
  - i) The location of the mental foramen can determine the age of an individual.
  - ii) Special precautions are taken during ligation of arteries supplying the thyroid gland.
  - iii) The soft palate is raised during swallowing.
14. Write briefly on:
  - i) Cornea - structure and function
  - ii) Tympanic membrane - parts, structure, and function

## Examination of May 2021

### GROUP-A

1. Describe the phases of fertilization. Mention the events that occur in the second week of development.
2. Classify glandular epithelium with examples. Give the locations and functions of goblet cells.
3. Show in a diagram the arrangement of different compositions of a cell membrane. Mention three functions of the cytoskeleton of a cell.
4. Draw and label the microscopic structure of:
  - i) Compact bone
  - ii) Medium-sized artery
5. Classify synovial joints with examples. Mention the differences between primary and secondary cartilaginous joints.
6. Explain from your knowledge of anatomy, why:
  - i) Myelination occurs in nerve fibers.
  - ii) Crossing over occurs in meiotic cell division.
  - iii) Intercalated discs are present in cardiac muscle.
7. Write briefly on:
  - i) Arterial supply of a developing long bone
  - ii) Cilia

### GROUP-B

8. Describe the interior of the larynx. Mention the features present on the lateral wall of the nose.
9. Write down the nerve supply of the tongue on a developmental background. What is tongue tie?
10. Draw and label the section of pons at the level of facial colliculus. Give the histological structure of the cerebellar cortex.
11. Outline the formation and fate of the neural tube. Mention the functions of the tympanic membrane.
12. Give the arrangement of cells in different layers of the adrenal cortex with a diagram. Mention the origin and distribution of the oculomotor nerve.
13. Explain from your knowledge of anatomy, why/how:
  - i) Middle ear infection is common in children.
  - ii) Small hemorrhage in the internal capsule may produce widespread effects.
  - iii) Avascular cornea gets its nutrition.
14. Write briefly on:
  - i) Danger area of the face - location and importance
  - ii) Broca's motor speech area - location and function

## Examination of May & November 2020

### GROUP-A

1. Describe the process of oogenesis. Describe the events occurring during the prophase of the 1st meiotic cell division.
2. Give the structure of the Golgi apparatus. Mention the functions of the smooth endoplasmic reticulum at different locations of the body.
3. Define anastomoses. Mention the types with locations. Give their importance.
4. Distinguish histologically between different types of muscular tissue. Mention the structural differences between capillaries and sinusoids.
5. Draw and label the microscopic structure of:
  - i) Thin skin
  - ii) Lymph node
6. Explain from your knowledge of anatomy why/how:
  - i) Mast cells are absent in the CNS.
  - ii) The matrix of hyaline cartilage appears homogeneous under a microscope.
  - iii) The sympathetic trunk is connected to the spinal nerve.
7. Write briefly on:
  - i) Vertebral venous plexus
  - ii) Placental barrier - structure and function

### GROUP-B

8. Draw and label the layers of the scalp. Discuss the boundaries and contents of the middle ear cavity.
9. Draw and label the histological structure of the thyroid gland. Mention the communications of the cavernous sinus.
10. Draw and label the transverse section of the spinal cord at the mid-cervical level showing different tracts. What is the sensory association area?
11. Give the origin, course, and distribution of the accessory cranial nerve.
12. Describe the histological structure of the pituitary gland. From where does it develop? Why is portal circulation necessary for performing the functions of this gland?
13. Explain from your knowledge of anatomy why/how:
  - i) The digastric muscle has dual nerve supply.
  - ii) A newborn with a facial defect will be checked for possible heart defects.
  - iii) Locations of the right and left recurrent laryngeal nerves are different.
14. Write briefly on: i) Layers of retina ii) Piriform fossa

## Examination of November 2019

### GROUP-A

1. Draw and label the electron microscopic structure of the cell membrane. Name the membrane-bound organelles. Mention the structure and functions of the Golgi apparatus.
2. State the characteristic features of epithelial tissue. Classify covering epithelium with examples.
3. Describe the process of fertilization. Mention its results.
4. Draw and label the parts of the cardiovascular system. Mention the differences between blood capillaries and lymphatic capillaries.
5. Draw and label the light microscopic structure of:
  - i) Haversian system of compact bone
  - ii) Medium-sized artery
6. Explain from your knowledge of anatomy, why:
  - i) Pneumatic bones are present in the skull.
  - ii) Leg veins possess valves.
  - iii) Deep fascia is absent in the face.
7. Write briefly on:
  - i) Structure and functions of intervertebral disc
  - ii) Derivatives of ectoderm

### GROUP-B

8. Describe the developmental process of the tongue. Explain the nerve supply of the tongue on a developmental background.
9. Mention the boundaries and contents of the middle ear cavity. Why is chronic suppurative otitis media (CSOM) common in children?
10. Describe the histological structure of the thyroid gland (use diagram). Mention the arterial supply and developmental source of the thyroid gland.
11. Draw and label the functional areas of the superolateral surface of the cerebrum. Name the types of white matter in the cerebral cortex with examples.
12. Draw the transverse section of the spinal cord at the mid-thoracic level. Write a brief note on CSF circulation.
13. Explain from your knowledge of anatomy, why/how:
  - i) Profuse bleeding occurs in scalp injury.
  - ii) Craniofacial defects are common.
  - iii) Regeneration of peripheral nerves is possible.
14. Write briefly on:
  - i) Interior of the larynx
  - ii) Parts and functions of the basal ganglia

## Examination of May 2019

### GROUP-A

1. Define the cell cycle. Mention the events occurring in different stages of the cell cycle (use a diagram). Enumerate the importance of meiotic cell division.
2. Describe the process of spermatogenesis. Mention the derivatives of intraembryonic mesoderm.
3. Write in tabulated form the histological differences between skeletal, cardiac, and smooth muscle. Mention the structural differences between large and medium-sized arteries.
4. Classify joints with examples. Mention the functions of bone cells.
5. Draw and label the light microscopic structure of:
  - i) Hyaline cartilage
  - ii) Tongue
6. Explain from your knowledge of anatomy, why/how:
  - i) Genetic determination of sex occurs at fertilization.
  - ii) The lower end of the radius is the growing end.
  - iii) Cilia is present in the respiratory tract.
7. Write briefly on:
  - i) Classification and functions of neuroglia.
  - ii) Structure and functions of the cell membrane.

### GROUP-B

8. State the process of development of the face. How does the facial vein communicate with the cavernous sinus? Write the clinical importance of these connections.
9. Mention the formation and functions of Waldeyer's ring. Write down the importance of the piriform fossa. State the arterial supply of the palatine tonsil.
10. Describe the features present on the lateral wall of the nose. Why are air sinuses present in some craniofacial bones? Mention the clinical importance of the maxillary air sinus.
11. Write down the histological structure of the cerebrum (use a diagram). Draw and label the motor speech area and primary somasthetic area on the superolateral surface of the cerebral hemisphere, mentioning their functions.
12. Draw and label the different layers of the eyeball. Name the parts of the uveal tract, mentioning their functions.
13. Explain from your knowledge of anatomy, why/how:
  - i) Parotid swelling is painful.
  - ii) Fontanelles are important for the fetus and newborn.
  - iii) The cerebellum is connected with the brainstem.
14. Write briefly on:
  - i) Structure and functions of the vocal cord.
  - ii) Parts and functions of the reticular formation.

## Examination of November 2018

### GROUP-A

1. Name the membranous organelles of a cell. Mention the structure and functions of the nucleus of a cell (use diagram).
2. Write down the characteristic features of epithelial tissue. Classify covering epithelium with examples.
3. What is lesser circulation? Mention the histological differences between large and medium-sized arteries.
4. Define end artery with examples. Define fertilization. Mention the results of fertilization. How does the primitive streak influence development in the embryo?
5. Draw and label:
  - i) Arterial supply of a growing long bone
  - ii) Light microscopic structure of a lymph node
6. Explain from your knowledge of anatomy, why/how:
  - i) Mitotic division gives rise to identical daughter cells.
  - ii) Tight junctions are present in the urinary bladder.
  - iii) The metacarpal bone is a miniature long bone.
7. Write briefly on:
  - i) Synovial joint - classification with examples
  - ii) Placenta - formation and functions

### GROUP-B

8. Describe the developmental process and histological structure (use diagram) of the thyroid gland. What is tongue tie?
9. Name the extraocular muscles. Give their nerve supply and actions. Mention the functions of rods and cones.
10. Describe the boundaries and contents of the middle ear cavity. Why does the nasopharynx communicate with the middle ear cavity?
11. Draw and label the functional areas of the superolateral surface of the cerebrum. Mention the functions of Brodmann's Areas 17, 18, and 19.
12. Draw and label the transverse section of the pons at the level of the facial colliculi.
13. Explain from your knowledge of anatomy, why/how:
  - i) Scalp injury leads to profuse bleeding.
  - ii) Myelination occurs in the PNS.
  - iii) The spinal cord is kept in position in the vertebral canal.
14. Write briefly on:
  - i) Parts and functions of the limbic system
  - ii) Articulation of the 1st cervical vertebra (atlas)



## Examination of May 2018

### GROUP-A

1. Classify connective tissue proper. Name the connective tissue cells. Draw a fibroblast and mention its function.
2. Draw and label the different parts of the cardiovascular system. Mention the functional classification of blood vessels with examples.
3. Define implantation. Mention the day-by-day account of the major events of the second week of development (use diagram).
4. Write down the structure and functions of the periosteum. Classify glands based on the mode of secretion with examples.
5. Draw and label:
  - i) The structure of the cell membrane
  - ii) A synovial joint
6. Explain from your knowledge of anatomy, why:
  - i) Crossing over occurs in meiotic cell division.
  - ii) Gap junctions are present in cardiac muscle.
  - iii) The esophagus is lined by non-keratinized stratified squamous epithelium.
7. Write briefly on:
  - i) Types and functions of neuroglial cells
  - ii) Twinning - types and its basis of development

### GROUP-B

8. Write down the derivatives of pharyngeal arches, pouches, and clefts. How does cleft lip occur?
9. Draw and label the transverse section of the spinal cord at the mid-thoracic level. Mention its location, function, and the effect of lesions in the primary motor speech area of Broca.
10. Describe the process of development of the tongue. Write a brief note on the histological structure and functions of the tympanic membrane.
11. Describe the histological structure of the cerebellum. Name the intraocular muscles with their nerve supply and actions.
12. Name the parts and functions of the basal ganglia. Mention the formation and contents of the carotid sheath.
13. Explain from your knowledge of anatomy, why/how:
  - i) Anencephaly develops.
  - ii) Inflammation of the parotid gland is painful.
  - iii) The pyramidal tract is an example of a projection fiber.
14. Write briefly on:
  - i) The paracentral lobule - its location, arterial supply, and clinical importance
  - ii) The sternocleidomastoid muscle - its nerve supply, action, and effects of lesions

# Anatomy.

## Paper II



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## Examination of May 2024

### GROUP-A

1. Write down the relations of the right lateral surface of the liver with its importance. Mention the development of the liver. Give the functions of the fetal liver.  
*Or,*  
Give the origin, insertion, nerve supply, and action of the hamstring muscles in a tabulated form. Explain why the upper and outer quadrant of the gluteus maximus is chosen as a site for deep intramuscular injection.
2. A 27-year-old woman was found to have an unstable right knee joint following a severe automobile accident. On examination, it was possible to pull the tibia excessively forward on the femur. A diagnosis of ruptured cruciate ligament was made. She was advised for an MRI of the right knee joint.  
Taking this scenario into consideration, answer the following questions:
  - a) Which cruciate ligament is most likely to be injured, and why?
  - b) Why did the tibia move excessively forward on the femur?
3. Write briefly on:
  - a) Ureter - length, parts, and constrictions
  - b) Femoral sheath - formation and content
4. Give the mode of artery supply of the kidney with a diagram. Mention the derivatives of the paramesonephric duct.
5. Explain anatomically/embryologically why:
  - a) Pouch of Douglas is clinically important
  - b) Undescended testis causes infertility
6. How is venous return from the lower limb maintained? Explain anatomically why an enlarged prostate causes difficulty in micturition.
7. Draw and label the microscopic structure of:
  - a) Cortex of the adrenal gland
  - b) Vermiform appendix

### GROUP-B

8. Describe the steps of dissection of the axilla, pointing out its skin incision, boundaries, and contents. Write briefly on the axillary group of lymph nodes and their area of drainage.  
*Or,*  
How is the base of the heart formed? Mention its posterior relations. Write briefly on pericardial sinuses. Mention the clinical importance of the transverse and oblique sinuses.

9. A 50-year-old drunk man fell asleep by hanging his right arm on a crutch. When he woke up, he found he was unable to extend his wrist as well as his elbow. On examination, the physician noticed the loss of cutaneous sensation on the dorsum of the hand.
  - a) Mention the name of the clinical condition of the above-mentioned scenario.
  - b) Which nerve might be involved in this condition?
  - c) Why is the person unable to extend his elbow?
10. Define dermatome. Draw and label the dermatome of the upper right limb.
11. Write down the formative elements of the shoulder joint. Name the factors responsible for maintaining the stability of the shoulder joint.
12. Explain using your understanding of Anatomy how/why:
  - a) Sternal angle is an important landmark
  - b) Antecubital vein is preferred for intravenous injection
13. Describe the development of the lung. Name the epithelial cells present in the bronchial tree.
14. Write briefly on:
  - a) Trachea - commencement, termination, and structure
  - b) Flexor retinaculum of the hand - formation and relations

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## Examination of November 2023

### GROUP-A

1. Name the muscles of the anterior abdominal wall.  
Give an account of the formation and contents of the rectus sheath (use diagram). What is linea alba?  
*Or*, Describe the steps of dissection of the femoral triangle mentioning its boundaries and contents (use diagram). Why is femoral hernia common in females?
2. A 37-year-old man was brought to the Orthopaedic Department with complaints of difficulty in walking and pain in the left leg. He gave a history of a fall from a motorcycle 10 days ago. On physical examination, the surgeon found foot drop on the left side. X-ray revealed a fracture of the left fibula.  
Taking this scenario into consideration, answer the following questions:
  - a) Which portion of the fibula was most likely to be fractured, and why?
  - b) Which muscles were most likely to be involved?
3. Write down the differences between the following paired terms (any TWO):
  - a) 'Male urethra' and 'Female urethra'
  - b) 'Atonic bladder' and 'Automatic bladder'
  - c) 'Omphalocele' and 'Gastroschisis'
4. Describe the interior of the anal canal. Write down the rotation of the midgut during development.
5. Explain anatomically/embryologically why:
  - a) Soleus muscle is called the peripheral heart.
  - b) Annular pancreas may develop.
6. Name the intra-articular structures of the knee joint.
7. Draw and label the microscopic structure of:
  - a) Liver
  - b) Adrenal cortex

### GROUP-B

8. Give the origin, insertion, nerve supply, and action of the 'biceps brachii' and 'deltoid' muscle in a tabulated form. How does axillary nerve injury cause loss of abduction of the shoulder joint?  
*Or*, Write down the boundaries and contents of the superior mediastinum (use diagram). What is mediastinum syndrome? Mention its manifestations.

9. A 35-year-old lady came to the hospital with fever, shortness of breath, and heaviness in her left chest. After a chest X-ray, the physician confirmed that the trachea and heart shifted towards the right side and diagnosed the case as left-sided pleural effusion. The physician aspirated pleural fluid through the 6th intercostal space from the back. From your understanding of Anatomy, answer the following questions:
  - a) Explain why the trachea and heart shifted towards the right side?
  - b) What structures had to be pierced by the cannula to draw pleural fluid from the patient?
10. Draw and label the brachial plexus. What is Erb's palsy?
11. How is the base of the heart formed? Draw and label the different parts of a primitive heart tube. What do you mean by respiratory distress syndrome (RDS)?
12. Explain using your understanding of Anatomy, how/why:
  - a) Foreign body is more commonly lodged in the right principal bronchus.
  - b) Median nerve compression leads to carpal tunnel syndrome.
13. Enumerate the lymphatic drainage of the female breast. What is Peau d'orange of the breast?
14. Write briefly on:
  - a) Thoracic duct - beginning, course, and termination
  - b) Parietal pleura - layers, parts, and nerve supply

Ganglyon

## Examination of May 2023

### GROUP-A

1. Write down the general histological structural plan of the gastrointestinal tract.
2. Describe the mode of artery supply of the kidney. What is red pulp and white pulp?
3. Write down the mode of artery supply of the stomach. Mention the contents of the mesentery.
4. Draw and label the:
  - i) Parts of extra-hepatic biliary apparatus
  - ii) Boundaries and contents of the popliteal fossa
5. Draw and label the dermatome of the lower limb. Mention the formation and clinical importance of the pouch of Douglas.
6. Mention the formation and maintenance of the medial longitudinal arch of the foot. State the functions of the arches of the foot.
7. Explain anatomically why/how:
  - i) Hepatic veins provide support to the liver.
  - ii) Physiological hernia occurs in intrauterine life.
  - iii) Pancreas is a mixed gland.

### GROUP-B

8. Draw and label the bronchopulmonary segments of the right lung. What is respiratory distress syndrome?
9. What is a typical intercostal space? State the steps of dissection of a typical intercostal space.
10. Describe the interior of the right atrium. State the importance of the oblique pericardial sinus.
11. Describe the lymphatic drainage of the breast, mentioning its clinical importance.
12. Define mediastinum. Mention the boundaries and contents of the superior mediastinum.
13. Write down in a tabulated form the origin, insertion, nerve supply, and actions of the following muscles:
  - i) Biceps brachii
  - ii) Deltoid
14. Explain anatomically why/how:
  - i) Fracture of the clavicle usually occurs at the junction between the medial two-thirds and lateral one-third.
  - ii) Neural crest cells contribute to the development of the heart.
  - iii) Goblet cells are present in the respiratory tract.

## Examination of November 2022

### GROUP-A

1. Describe the artery supply of the stomach.  
Mention the functions of the peritoneum.
2. Give an account of the interior of the urinary bladder.  
Mention the effects of sympathetic and parasympathetic innervation on the urinary bladder.
3. Draw and label the microscopic structure of:
  - i) Adrenal cortex
  - ii) Classical hepatic lobule
4. What is an indifferent gonad?  
Write down the process of development of the testis.
5. Describe the lymphatic drainage of the lower limb. State the factors responsible for venous return from the lower limb.
6. Give the origin, insertion, nerve supply, and actions of the muscles of the lateral compartment of the leg in a tabulated form. What is foot drop?
7. Explain from your knowledge of anatomy:
  - i) How annular pancreas develops.
  - ii) Why the pouch of Douglas is clinically important.
  - iii) Why pain is referred around the umbilicus in acute appendicitis.

### GROUP-B

8. Give an account of the origin, course, and distribution of the left coronary artery.  
Explain why coronary arteries are called functional end arteries.
9. Draw and label the right bronchial tree.  
Name the different parts of the parietal pleura. Give their nerve supply.
10. Mention the origin, nerve supply, and development of the diaphragm.
11. Give the origin, insertion, and nerve supply of the following muscles:
  - i) Brachialis
  - ii) External intercostal
12. Describe the venous drainage of the upper limb, mentioning the clinical importance of veins in the upper limb.  
Mention the supply of the long thoracic nerve and the effect of a lesion of this nerve.
13. Give the formation of radio-ulnar joints with their types. Mention the muscles responsible for different movements of the radio-ulnar joint.
14. Explain from your knowledge of anatomy:
  - i) How ribs play an important role in inspiration.
  - ii) Why the brachial artery is clinically important.
  - iii) Why the right and left atrium communicate throughout intrauterine life.



## Examination of May 2022

### GROUP-A

1. Give an account of the formation and contents of the rectus sheath. Write the importance of the pectinate line.
2. Write down the mode of artery supply of the kidney. Mention the derivatives of the paramesonephric duct.
3. Draw and label the microscopic structure of:
  - i) Tongue
  - ii) Seminiferous tubule
4. Draw and label the dermatome of the lower limb. Mention the muscles producing flexion and extension of the hip joint.
5. Mention the formation and maintenance of the medial longitudinal arch. Give the functions of the arches of the foot.
6. Explain from your knowledge of anatomy, why:
  - i) Stomach is supplied by the coeliac trunk.
  - ii) An enlarged prostate causes difficulty in micturition.
  - iii) Females are more prone to urinary tract infection.
7. Write briefly on:
  - i) The mesentery - its extension and contents
  - ii) Inguinal ligament - formation and attachment

### GROUP-B

8. Draw and label a typical intercostal nerve. Mention the types and functions of cells of alveoli.
9. Define bronchopulmonary segment. Draw and label the bronchopulmonary segments of the right lung.
10. Describe the interior of the right atrium. Name the structures that contribute to the formation of the interatrial septum.
11. Describe the lymphatic drainage of the breast, mentioning its clinical importance.
12. Give the origin, insertion, nerve supply, and actions of the following muscles in a tabulated form:
  - i) Biceps brachii
  - ii) Serratus anterior
13. Explain from your knowledge of anatomy, why:
  - i) The venacaval opening is located in the tendinous part of the diaphragm.
  - ii) Ulnar nerve palsy leads to ulnar claw hand.
  - iii) The median cubital vein is clinically important.
14. Write briefly on:
  - i) Thoracic duct - beginning, termination, and function.
  - ii) Anatomical snuff box - boundaries and importance.

## Examination of November 2021

### GROUP-A

1. Describe the process of development of the ovary. Explain why undescended testes cause infertility.
2. Write down the steps of dissection of the kidney from the back. What is 'renal lobe' and 'renal lobule'?
3. Draw and label the microscopic structure of:
  - i) Urinary bladder
  - ii) Pancreas
4. Give the venous drainage of the lower limb. Name the factors responsible for venous return from the lower limb.
5. Write in tabulated form the origin, insertion, and action of:
  - i) Psoas major
  - ii) Tibialis anterior
6. Explain from your knowledge of anatomy, why/how:
  - i) Portal obstruction may cause hemorrhage per anus.
  - ii) Mucous membrane of the GIT provides an extensive surface area for absorption.
  - iii) In the secretory phase, the uterine glands are highly coiled.
7. Write briefly on:
  - i) Relations of the right lateral surface of the liver with clinical importance.
  - ii) Rectouterine pouch of Douglas - formation and clinical importance.

### GROUP-B

8. Give an account of the histological structure of the trachea. Mention the characteristic features and clinical importance of bronchopulmonary segments.
9. State the sources of development of the interventricular septum of the heart. Mention the locations and artery supply of the conducting system of the heart.
10. Give the origin, nerve supply, and actions of the diaphragm.
11. Write down the boundaries of the axilla. Name the axillary groups of lymph nodes, mentioning their area of drainage.
12. Give the origin, course, and distribution of the radial nerve. What is wrist drop?
13. Explain from your knowledge of anatomy, why/how:
  - i) Foramen ovale closes at birth.
  - ii) Manubrium sternum is the preferred site for bone marrow aspiration.
  - iii) Normal lung appears radiolucent in a chest X-ray P/A view.
14. Write briefly on:
  - i) Pericardium - layers, nerve supply, and importance.
  - ii) Divisions and lining epithelium of the right bronchial tree.

## Examination of May 2021

### GROUP-A

1. Describe the interior of the anal canal. Why are external hemorrhoids so painful?
2. Describe the mode of artery supply of the kidney. Why does the kidney ascend during its development?
3. Draw and label the microscopic structure of:
  - i) Hepatic lobule
  - ii) Testes
4. Give an account of the lymphatic drainage of the lower limb. Mention the effects of the lesion of the deep peroneal nerve.
5. Give the formation of the longitudinal arches of the foot. Mention the functional importance of the arches of the foot.
6. Explain from your knowledge of anatomy, why:
  - i) An enlarged prostate causes difficulty in micturition.
  - ii) Femoral hernia is common in females.
  - iii) The 2nd part of the duodenum is important.
7. Write briefly on:
  - i) Artery supply of a developing long bone.
  - ii) Inguinal ligament.

### GROUP-B

8. Describe the process of development of the interatrial septum of the heart. Mention the importance of the transverse sinus.
9. Give an account of the venous drainage of the posterior thoracic wall. Draw and label the histological structure of the lung.
10. Draw and label the bronchopulmonary segments of the right lung. Mention the clinical importance of the bronchopulmonary segments.
11. Give origin, insertion, and nerve supply of the following muscles in a tabulated form:
  - i) Biceps brachii
  - ii) Pectoralis major.
12. Write down the formation, course, and distribution of the median nerve. What is claw hand?
13. Explain anatomically:
  - i) How different diameters of the thoracic cage are increased during inspiration.
  - ii) Why the brachial artery is clinically important.
  - iii) Why axillary nerve injury causes loss of abduction of the shoulder joint.
14. Write briefly on:
  - i) Superior mediastinum - boundaries and contents.
  - ii) Flexor retinaculum.

## Examination of May & November 2020

### GROUP-A

1. Give an account of the lymphatic drainage of the stomach. Discuss the process of development of the collecting part of the kidney.
2. What is an indifferent gonad? What are the locations where testes may be arrested during their descent? Name the cells present in testes, mentioning their functions.
3. Draw and label the microscopic structure of:
  - i) Spleen
  - ii) Prostate
4. Discuss the boundaries and contents of the femoral triangle. Mention the formation and contents of the femoral sheath.
5. Give the origin, insertion, nerve supply, and actions of the following muscles:
  - i) Gluteus maximus
  - ii) Sartorius
6. Explain from your knowledge of anatomy why/how:
  - i) The female pelvis is called a short section of a long cone.
  - ii) Annular pancreas develops.
  - iii) Running is impossible in a cut injury of the tendon Achilles.
7. Write briefly on:
  - i) Adductor tubercle
  - ii) Rotation of midgut

### GROUP-B

8. Outline the different stages of maturation of the lung. Mention the types and functions of cells in the alveoli.
9. Draw and label a typical intercostal nerve. Mention the formation, termination, and drainage of the thoracic duct.
10. How is the primitive heart tube formed? Describe the interior of the left ventricle of the heart.
11. What are axial lines and what is their importance? Draw and label the dermatome of the upper limb.
12. Describe the lymphatic drainage of the mammary gland. Give the clinical importance of its lymphatic drainage.
13. Explain anatomically how:
  - i) Foramen ovale is closed after birth.
  - ii) Polydactyly develops.
  - iii) Injury to the nerve of Bell produces winging of the scapula.
14. Write briefly on:
  - i) Anatomical snuff box - boundaries and contents.
  - ii) Role of ribs in respiration.

## Examination of November 2019

### GROUP-A

1. Write about the formation and contents of the rectus sheath (use diagram). What is linea alba?
2. Describe the arterial supply of the stomach (use diagram). Draw and label the stomach bed.
3. Draw and label the light microscopic structure of:
  - i) Spleen
  - ii) Urinary bladder
4. Mention the steps of dissection, boundaries, and contents of the popliteal fossa.
5. Write in a tabulated form the origin, insertion, nerve supply, and actions of the following muscles:
  - i) Gluteus maximus
  - ii) Tibialis anterior
6. Explain from your knowledge of anatomy, why:
  - i) Pouch of Douglas is clinically important.
  - ii) Femoral hernia is common in females.
  - iii) Pain is felt at the tip of the right shoulder joint in acute cholecystitis.
7. Write briefly on:
  - i) Parts and clinical importance of the fallopian tube.
  - ii) Medial longitudinal arch - its formation and maintenance.

### GROUP-B

8. Outline the boundaries and contents of a typical intercostal space. Draw and label a typical intercostal nerve.
9. Draw and label the bronchopulmonary segments of the right lung. Mention the clinical importance of the segments.
10. Draw and label the different parts of the primitive heart tube. Describe the interior of the right atrium.
11. Write down the venous drainage of the upper limb (use diagram). Mention the clinical importance of the median cubital vein.
12. Describe the lymphatic drainage of the breast. Why is the lymphatic drainage of the breast clinically important?
13. Explain from your knowledge of anatomy, why:
  - i) The lower part of the deltoid muscle is a preferable site for intramuscular injection.
  - ii) The absence of type II pneumocytes causes Respiratory Distress Syndrome (RDS).
  - iii) The clavicle is a modified long bone.
14. Write briefly on:
  - i) Formation, type, and muscles producing movements of the elbow joint.
  - ii) Coronary sinus.

## Examination of May 2019

### GROUP-A

1. Write down the location, extension, boundary, and contents of the inguinal canal. Mention the clinical importance of the inguinal canal.
2. Name the intrahepatic and extrahepatic biliary apparatus. Describe the developmental process of the pancreas, mentioning its congenital anomalies.
3. Draw and label the light microscopic structure of:
  - i) Vermiform appendix
  - ii) Graafian follicle
4. Draw and label the dermatome of the lower limb, showing the axial line. Mention the clinical importance of the dermatome.
5. How are the superficial veins of the lower limb formed? Mention their sites of communication with deep veins.
6. Explain from your knowledge of anatomy why/how:
  - i) The external hemorrhoids are very painful.
  - ii) Constrictions of the ureter are clinically important.
  - iii) The medial meniscus is injured more frequently than the lateral one.
7. Write briefly on:
  - i) Formation and nerve supply of the pyloric sphincter.
  - ii) Formation, movements, and muscles producing the movements of the hip joint.

### GROUP-B

8. Name the parts of the respiratory tract. Mention the structural and functional differences between conducting and respiratory zones of the respiratory tract. What is the bronchovascular unit?
9. Mention the developmental process of the formation of the interatrial septum (use diagram). What is the probe patency test?
10. Describe the boundary and contents of the posterior mediastinum. Mention the pericardial sinuses with their clinical importance.
11. Write down the origin, insertion, nerve supply, and actions of the following muscles:
  - i) Brachialis
  - ii) Lumbricals
12. Draw and label the brachial plexus. How does carpal tunnel syndrome occur?
13. Explain from your knowledge of anatomy why/how:
  - i) Left predominance of the heart is worse than right predominance.
  - ii) Irritation of mediastinal pleura causes referred pain in the lower neck and shoulder tip.
  - iii) The surgical neck of the humerus is clinically important.
14. Write briefly on:
  - i) Superficial palmar arch.
  - ii) Major openings of the diaphragm.

## Examination of November 2018

### GROUP-A

1. Draw and label the different regions of the abdomen. Mention the importance of these regions.
2. Give an account of the lymphatic drainage of the stomach. Why is the lesser curvature susceptible to gastric ulcer?
3. Draw and label:
  - i) Histological structure of testes
  - ii) Posterior relations of the right kidney
4. Write down the mode of artery supply of the uterus. What is anteflexion and anteversion?
5. Give the formation and maintenance of the longitudinal arches of the foot. Mention the advantages of the arches of the foot.
6. Explain anatomically, why:
  - i) Duodenum is supplied by branches from the celiac trunk and superior mesenteric artery.
  - ii) Adductor tubercle is medico-legally important.
  - iii) Veins of the leg are provided with valves.
7. Write briefly on:
  - i) Constrictions of the ureter - sites and clinical importance.
  - ii) Tendoachillis.

### GROUP-B

8. How is the thoracic inlet formed? Name the structures passing through it. Mention the distribution of a typical intercostal nerve.
9. Name the major openings of the diaphragm, mentioning the structures passing through them.  
State the nerve supply of the diaphragm.
10. Mention the course, branches, and distribution of the coronary artery. What do you mean by a right-predominant person?
11. Write down in a tabulated form the origin, insertion, nerve supply, and actions of the following muscles:
  - i) Pectoralis major
  - ii) Biceps brachii
12. Define axial line. Draw and label the dermatome of the upper limb.
13. Explain anatomically, why:
  - i) The lung continues to mature in postnatal life.
  - ii) The median cubital vein is preferred for intravenous infusion.
  - iii) The coracoid process of the scapula is an atavistic epiphysis.
14. Write briefly on:
  - i) Thoracic duct - beginning and area of drainage.
  - ii) Elbow joint - bony components, type, and movements produced by it.

## Examination of May 2018

### GROUP-A

1. Write about the formation of the rectus sheath (use diagram). State the functions of anterolateral abdominal muscles.
2. Mention the developmental sources of the liver with its functions in intrauterine life. State the anterior relations of the left kidney (use diagram).
3. Draw and label the light microscopic features of:
  - i) Ovary
  - ii) Spleen
4. Mention the steps of dissection and contents of the femoral triangle. Why is femoral hernia common in females?
5. Write down the proximal and distal attachment, nerve supply, and action of the following muscles:
  - i) Psoas major
  - ii) Soleus
6. Explain anatomically, why:
  - i) The venacaval opening is located in the tendinous part of the diaphragm.
  - ii) The hindgut is supplied by the branches of the inferior mesenteric artery.
  - iii) The lesser trochanter is an example of traction epiphysis.
7. Write briefly on:
  - i) Abdominal aorta - its histological type and branches.
  - ii) Medial longitudinal arch - its formation and maintenance.

### GROUP-B

8. Define broncho-pulmonary segment. Draw the bronchopulmonary segments of both lungs.
9. Describe the developmental process of the interatrial septum. Name the remnants of the left horn of the sinus venosus.
10. Write down the venous drainage of the posterior thoracic wall. Mention the clinical importance of the radial artery.
11. Draw and label the brachial plexus. What is Erb's palsy?
12. Mention the formation, movements, and muscles producing the movements of the shoulder joint. Why is the joint unstable?
13. Explain anatomically, why:
  - i) Coronary arteries are called functional end arteries.
  - ii) During aspiration of pleural fluid, the needle is preferably placed along the upper border of the lower rib of an intercostal space.
  - iii) The junction between the medial 2/3 and lateral 1/3 of the clavicular shaft is the common site of fracture.
14. Write briefly on:
  - i) Posterior mediastinum - its boundary and contents.
  - ii) Axillary group of lymph nodes.



# Physiology

## Paper I

**Ganglyon**

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## Examination of May 2024

### GROUP-A

1. Define homeostasis "Negative feedback mechanism is beneficial to our body" - explain with example.
2. List the active transport processes across the cell membrane with an example of each. Write in short about  $\text{Na}^+\text{-K}^+$  pump mechanism with its importance.
3. Write down the functions of platelet. What is purpura? Name the tests to be done in a case of bleeding disorder.
4. Name the classical blood group system. Discuss the hazards of mismatched blood transfusion.
5. What are the basic movements of GIT? Write about pharyngeal stage of deglutition.
6. A Rh negative female married a Rh positive male. Her first pregnancy was uneventful. During her second pregnancy the baby developed jaundice, anemia and edema after birth.
  - a) What is the clinical condition developed here in this baby?
  - b) How does it occur?
  - c) How to prevent it?
7. Discuss the blood coagulation mentioning the definition, basic steps of coagulation and an outline of intrinsic pathway of prothrombin activator formation.  
**Or**, Discuss how resting membrane potential is generated in a large nerve fibre mentioning the role of ions in its different phases with diagram and mention the RMP of large nerve fibre, skeletal muscle, smooth muscle and SA nodal fibre.

### GROUP-B

8. Define stroke volume and cardiac output. Discuss the factors regulating cardiac output.
9. Define cardiac cycle. What are the physiological changes that take place during cardiac cycle? Write about the isovolumetric contraction period.
10. Draw and label a spirogram showing different lung volumes and capacities with their normal value.
11. Enumerate the respiratory centers with their location and function. What is inspiratory ramp signal?
12. Define hypoxia and classify it with causes. Why is  $\text{O}_2$  therapy not effective in histotoxic hypoxia?
13. A baby was born at 26<sup>th</sup> week of gestation with tachypnea, nasal flaring and bluish coloration of skin.
  - a) What is the underlying clinical condition in this baby?
  - b) What is the cause of this abnormality?
  - c) Name the layers of respiratory membrane with diagram.
14. Briefly describe about mechanism of respiration showing pressure and volume changes during different phases in a diagram.  
**Or**, Mention the name of different mechanisms of blood pressure regulation and discuss the renin-angiotensin-aldosterone mechanism for regulation of blood pressure.

## Examination of November 2023

### GROUP-A

1. Draw and label a typical cell. Name the three membranous organelles of a cell with two functions of each.
2. Write down the normal range of resting membrane potential of skeletal muscle, smooth muscle, ventricular muscle and large nerve fibre. Give an outline of generation of resting membrane potential in a large nerve fibre.
3. Write down the differential count of WBC. Mention functions of agranulocytes.
4. Define hemostasis. Mention the events of hemostasis. Why blood does not clot intravascularly?
5. State the regulation of stomach emptying.
6. A 30-year-old lady came to a doctor with the history of tiredness and palpitation on exertion. Her hematological report revealed mean corpuscular volume (MCV) 50 fl, mean corpuscular hemoglobin (MCH) 20 pg and mean corpuscular hemoglobin concentration (MCHC) 25 g/dl.
  - a) What type of anaemia occurs in this case?
  - b) What are the most likely causes of this condition?
  - c) Give the etiological classification of anaemia with example.
7. "Positive feedback can be useful and sometimes causes vicious cycle" - explain it with example.  
**Or,** Discuss erythropoiesis mentioning definition, stages of erythropoiesis with diagram and the nutritional factors influencing erythropoiesis.

### GROUP-B

8. Define cardiac cycle and cardiac cycle time. Discuss the left ventricular pressure changes during cardiac cycle with diagram.
9. Give the functional classification of blood vessels. List the factors directly and inversely related to blood flow.
10. Name different types of blood pressure with their normal ranges. How baroreceptor feedback mechanism regulates blood pressure, when blood pressure rises?
11. What are the major functional events of respiration? Write about anatomical and physiological dead space with their physiological importance.
12. State about chemical regulation of respiration.
13. A 50-year-old patient came with difficulty in breathing with previous history of smoking for 30 years. His  $FEV_1/FVC\%$  is less than 70%. What is the possibility of disease? How could you differentiate obstructive from restrictive lung disease by  $FEV_1/FVC\%$  showing with diagram?
14. Discuss the conductive system of heart mentioning the components of conductive system and conduction of cardiac impulse throughout the heart with diagram.  
**Or,** Describe the oxygen transport from lungs to tissue and show the relationship between  $PO_2$  and percentage saturation of hemoglobin in a diagram.

## Examination of May 2023

### GROUP-A

1. Extracellular fluid is termed as the internal environment - explain. How does negative feedback mechanism help in homeostasis?
2. Draw and label a typical cell membrane. Write down the functions of cell membrane protein and carbohydrate.
3. Define erythropoiesis. Mention its stages. Write down the changes that occur during erythropoiesis.
4. What are the varieties and functions of hemoglobin? Describe briefly the steps of synthesis of hemoglobin.
5. Define blood coagulation. What are the basic steps of coagulation? Give the intrinsic pathway of blood coagulation in a flow chart.
6. Name the basic movements of GIT. Write down the functions of any two of them.
7. List the local hormones of GIT. Write down the functions of any two of them.
8. Write short notes on:
  - i) Rh incompatibility
  - ii) Passive transport

### GROUP-B

9. Enumerate the properties of cardiac muscle. Write about refractory period and Frank Starling law with significance.
10. Mention different blood pressure regulatory mechanisms. Write down the renin-angiotensin-aldosterone mechanism for regulation of blood pressure.
11. Define cardiac output. State the factors that influence cardiac output. What is cardiac index?
12. Define shock. Classify shock with example. Write down the compensatory mechanism of hypovolemic shock.
13. Write about the mechanism of respiration showing different pressure changes in a diagram.
14. How is oxygen transported from lungs to tissues?
15. Draw and label respiratory membrane. Discuss about the factors affecting gas diffusion through this membrane.
16. Write short notes on:
  - i) Pulse
  - ii) Hypoxia

## Examination of November 2022

### GROUP-A

1. What are the types of membrane protein? Enumerate their functions. "Mitochondria is the power house of the cell" - explain it.
2. Write down the normal level of resting membrane potential of skeletal muscle, smooth muscle, ventricular muscle and large nerve fiber. Give an outline of generation of resting membrane potential in a large nerve fiber.
3. Write down the absolute values of WBC. Enumerate the properties of WBC. Write about phagocytosis.
4. State the morphology of platelet. Explain its role in platelet plug formation.
5. What is Landsteiner's law? Write down the mechanism of acute renal failure following mismatched blood transfusion.
6. What are the functions of large intestine? What is law of gut?
7. What are the basic movements of GIT? Briefly discuss about deglutition.
8. Write short notes on:
  - i) Primary active transport
  - ii) Morphological classification of anemia

### GROUP-B

9. Name the junctional tissues of the heart. Write briefly the conduction of cardiac impulse in heart.
10. Define cardiac cycle and cardiac cycle time. Draw the volume changes that occur in left ventricle during cardiac cycle.
11. List the agents in circulation. Mention the effects of calcium and potassium ion on heart.
12. Name the different types of blood pressure with their normal values. How baroreceptor reflex mechanism regulates blood pressure when blood pressure rises.
13. What are the major functional events of respiration? Write about anatomical and physiological dead space with their importance.
14. Draw and label oxy-hemoglobin dissociation curve. Write the importance of the different parts of the curve.
15. State the chemical regulation of respiration.
16. Write short notes on:
  - i) Cardiac output
  - ii) Surfactant

## Examination of May 2022

### GROUP-A

1. Enumerate the membrane transport processes with examples. Write down the differences between active transport and passive transport.
2. Define resting membrane potential and action potential. Draw and label a typical action potential.
3. Define erythropoiesis and mention its stages. What are the changes that occur during erythropoiesis?
4. Name the ABO and Rh blood groups. What is erythroblastosis foetalis? How can it be prevented?
5. Define hemostasis. What are the events of hemostasis? Write about the mechanism of platelet plug formation.
6. What are the basic movements of GIT? Briefly discuss segmentation contraction.
7. Write about enteric nervous system mentioning its role on movements of GIT.
8. Write short notes on:
  - i) Plasma protein
  - ii) Homeostasis

### GROUP-B

9. How is cardiac impulse transmitted through the heart? What is AV nodal delay?
10. Mention the different types of blood pressure regulating mechanism. Write in short about renin-angiotensin-aldosterone mechanism for regulation of blood pressure.
11. Give the normal value of heart rate at different ages. Write down the effects of sympathetic and parasympathetic stimulation on heart.
12. What is peripheral resistance? Mention the factors affecting peripheral resistance.
13. Name the muscles of respiration. How does inspiration occur?
14. Draw and label the respiratory membrane. Discuss the factors which influence gaseous exchange across the respiratory membrane.
15. Draw a spirogram showing different lung volumes and capacities.
16. Write short notes on:
  - i) Heart sound
  - ii) Respiratory centers

## Examination of November 2021

### GROUP-A

1. Define homeostasis. Write about the negative feedback mechanism of our body with example.
2. Name the contractile elements of muscle. State the molecular mechanism of skeletal muscle contraction.
3. Define hemostasis. Mention the stages of hemostasis. Give an outline of extrinsic pathway of prothrombin activator formation.
4. Name the important plasma proteins with their normal value. Enumerate the functions of plasma proteins.
5. Name the different blood groups of ABO and Rh systems with their corresponding antigens and antibodies. State the Landsteiner's law. Why does mismatched recipient's RBC not agglutinate?
6. List the movements of different segments of GIT. Write about the defecation reflex.
7. Name the gastrointestinal hormones. State the functions of any two of them.
8. Write short notes on:
  - i)  $\text{Na}^+ - \text{K}^+$  pump
  - ii) Functions of platelet

### GROUP-B

9. Mention the changes that occur in a cardiac cycle. Write down the left ventricular pressure changes during the cardiac cycle with diagram.
10. Name the junctional tissues of the heart. What are the significances of AV nodal delay and prolonged refractory period? Why is SA node the pacemaker of the heart?
11. Mention the sites of baroreceptors. State the role of baroreceptor feedback mechanism in regulation of blood pressure.
12. Draw and label a spirogram. Define residual volume and give its importance.
13. Enumerate the properties of cardiac muscle. Explain any two of them.
14. Name the forms by which  $\text{CO}_2$  is transported through blood. Discuss chloride shift mechanism.
15. Enumerate the respiratory centers with their locations and functions. What is inspiratory ramp signal?
16. Write short notes on:
  - i) Hypoxia
  - ii) 1st and 2nd heart sound

## Examination of May 2021

### GROUP-A

1. What are the functions of cell membrane protein? How does active transport differ from passive transport?
2. Draw and label a typical cell. Write down the functions of endoplasmic reticulum.
3. Define blood coagulation. What are the steps of it? State the intrinsic mechanism of blood coagulation.
4. Define erythropoiesis. Write in short about the fate of RBC.
5. Give the normal count of platelet. Write down the functions of platelet. What is purpura?
6. Name the movements of different segments of alimentary tract. Write down the pharyngeal phase of swallowing.
7. List the local hormones of GIT. Write down the functions of gastrin and secretin.
8. Write short notes on:
  - i) Functions of WBC
  - ii) Peristalsis

### GROUP-B

9. Define blood pressure. How is blood pressure regulated by renin-angiotensin-aldosterone mechanism?
10. Name the junctional tissues of the heart. Write down the conduction of cardiac impulse throughout the heart with diagram.
11. Enumerate the properties of cardiac muscle. Explain any two of them.
12. Name the different types of blood pressure with their normal ranges. Write down the effects of sympathetic and parasympathetic stimulation on heart.
13. Draw a spirogram showing different lung volumes and capacities with their normal values. What are the significance of FEV<sub>1</sub>?
14. Define and classify hypoxia with examples. What is apnoea?
15. Draw and label the respiratory membrane. Write about the factors determining gas diffusion through this membrane.
16. Write short notes on:
  - i) Bohr effect
  - ii) Chloride shift mechanism



## Examination of May & November 2020

### GROUP-A

1. Define homeostasis. Write about the negative feedback mechanism with example.
2. Write down the normal ranges of resting membrane potential of skeletal muscle, smooth muscle, ventricular muscle and large nerve fiber. Give an outline of generation of resting membrane potential in a large nerve fiber.
3. Name the important plasma proteins with their normal value. List the functions of plasma proteins.
4. Name the different blood groups of ABO and Rh systems with their corresponding antigens and antibodies. State the hazards of mismatched blood transfusion.
5. Define hemostasis. What are the events of hemostasis? Write about the mechanism of platelet plug formation.
6. Name the basic movements of GIT. Write about the defecation reflex.
7. Write about the enteric nervous system mentioning its role on movement of GIT.
8. Write short notes on:
  - i) Primary active transport
  - ii) Prothrombin activator formation

### GROUP-B

9. Give the normal value of heart rate at different ages, write down the regulation of heart rate.
10. Define peripheral resistance. State the Poiseuille's law. List the factors which are directly and inversely related to the blood flow.
11. Mention the different types of blood pressure regulation mechanisms. How does the baroreceptor mechanism control blood pressure?
12. Define cardiac cycle. What are the changes that occur during cardiac cycle? Draw and label the normal ECG with its interpretation.
13. Draw and label oxy-hemoglobin dissociation curve. Give the importance of the steep part of the curve.
14. Enumerate the respiratory centers with their locations and functions. Write about the inspiratory ramp signal.
15. Name the forms in which CO<sub>2</sub> is transported in blood. How is it transported from the tissues to lungs?
16. Write short notes on:
  - i) Systemic capillary fluid exchange mechanism
  - ii) Hypoxia

## Examination of November 2019

### GROUP-A

1. Name the membranous organelles mentioning the functions of any two of them. What are the functions of cell membrane proteins?
2. Classify membrane transport processes with examples. How does active transport differ from passive transport?
3. What are the changes that occur during the maturation of RBC? Write in short about the fate of RBC.
4. Write down the functions of platelet. What is purpura? Name the tests that should be done in a case of bleeding disorder.
5. Name the blood groups of ABO system with their corresponding agglutinogens and agglutinins. Mention the hazards of mismatched blood transfusion.
6. Name the plexuses of enteric nervous system. Give their role in secretion and movement of GIT.
7. Name the movements of different parts of alimentary tract. List the factors stimulating and inhibiting gastric emptying.
8. Write short notes on:
  - i) Functions of plasma proteins
  - ii) Negative feedback mechanism

### GROUP-B

9. Enumerate the properties of cardiac muscle. Explain any two of them.
10. Name the junctional tissues of the heart. Write down the conduction of cardiac impulse throughout the heart with diagram.
11. Define cardiac output. State the factors that influence cardiac output. What is cardiac index?
12. Name the different types of blood pressure with their normal ranges. Write down the renin-angiotensin-aldosterone mechanism for regulation of blood pressure.
13. Write about the mechanism of respiration showing different pressure changes in a diagram.
14. How is oxygen transported from lungs to tissues?
15. Give an outline of chemical regulation of respiration.
16. Write short notes on:
  - i) Respiratory membrane
  - ii) Types of hypoxia

## Examination of May 2019

### GROUP-A

1. Define homeostasis. "Positive feedback mechanism is usually harmful to our body" - explain it with example. What is gain?
2. Write down the normal range of resting membrane potential of skeletal muscle, smooth muscle, ventricular muscle and large nerve fiber. Give an outline of generation of resting membrane potential in a large nerve fiber.
3. Give the differential count of WBC. Mention the functions of each type. Write about phagocytosis with diagram.
4. Define coagulation. Write down the basic steps of coagulation. Give an outline of intrinsic pathway of prothrombin activator formation.
5. State Landsteiner's law. What is erythroblastosis foetalis? How can it be prevented?
6. Give an outline of pharyngeal phase of swallowing. What is the basic electrical rhythm in GIT?
7. Name the gastrointestinal hormones. State the functions and regulation of secretion of any two of them.
8. Write short notes on:
  - i) Compare the active transport and facilitated diffusion.
  - ii) Motor functions of stomach

### GROUP-B

9. What are the significances of A-V nodal delay and prolonged refractory period? Why is S-A node termed as the pacemaker of the heart?
10. What are the changes associated with cardiac cycle? Write down the left ventricular pressure changes during cardiac cycle with diagram.
11. What are the baroreceptors? Mention their sites. Write their role in maintenance of normal blood pressure.
12. Define peripheral resistance. State the Poiseuille's law. List the factors which are directly and inversely related to the blood flow.
13. Draw a spirogram showing different lung volumes and capacities with their normal value. What is the importance of residual volume?
14. Give an outline of neural regulation of respiration.

## Examination of November 2018

### GROUP-A

1. Draw and label a typical human cell. Name the membranous organelles mentioning the functions of any three of them.
2. List the membrane transport processes with example. Mention the importance of Na<sup>+</sup>-K<sup>+</sup> pump.
3. Define erythropoiesis. Mention its stages. Write down the changes that occur during the maturation of RBC.
4. Define haemostasis. Mention the events of haemostasis. Why blood does not clot intravascularly?
5. Name the important plasma proteins with their normal value. Write down the functions of plasma proteins.
6. Write down the functions of platelet. What is purpura? Name the tests that should be done in a bleeding disorder case.
7. Name the basic movements of GIT. Write about the defecation reflex.
8. Write short notes on:
  - i) Positive feedback mechanism
  - ii) Functions of secretin and CCK-PZ

### GROUP-B

9. Name the junctional tissues of the heart. Write down the conduction of cardiac impulse throughout the heart with diagram.
10. Define cardiac output. State the factors that influence cardiac output. What is cardiac index?
11. Name the different types of blood pressure with their normal ranges. Write down the renin-angiotensin-aldosterone mechanism for regulation of blood pressure.
12. Give the normal value of heart rate at different ages. Write down the effects of sympathetic and parasympathetic stimulation on heart.
13. Draw and label the respiratory membrane. Discuss the factors affecting gas diffusion through this membrane.
14. Define vital capacity with its normal value. Write about the factors affecting vital capacity. What is FEV<sub>1</sub>?
15. Give an outline of chemical regulation of respiration.
16. Write short notes on:
  - i) 1st and 2nd heart sound
  - ii) Chloride shift

## Examination of May 2018

### GROUP-A

1. Define homeostasis. Write about the negative feedback mechanism with example.
2. Draw and label a typical cell membrane. Write down the functions of cell membrane protein and carbohydrate.
3. Enumerate the functions of WBC. Describe the mechanism of phagocytosis with diagram.
4. Define coagulation. What are the basic steps of coagulation? Give the intrinsic pathway of coagulation in a flow chart.
5. Name the different blood groups of ABO and Rh system with their corresponding antigens and antibodies. Write about the acute renal shut down due to mismatched blood transfusion.
6. Enumerate the movements of alimentary tract. Describe the pharyngeal phase of swallowing.
7. Name the gastrointestinal hormones. State the functions and regulation of secretion of any two of them.
8. Write short notes on:
  - i) Compare the primary active transport and facilitated diffusion
  - ii) Functions of plasma protein

### GROUP-B

9. Define cardiac cycle and enumerate the changes that occur in heart during cardiac cycle. Write about the left ventricular pressure changes during cardiac cycle with a diagram.
10. Draw and label a normal ECG. Write down the interpretations of different types of waves of an ECG.
11. Give the functional classification of blood vessel with examples. List the factors affecting peripheral resistance. State the Poiseuille's law.
12. Give an outline of neural regulation of respiration.
13. Name the different types of blood pressure with their normal ranges. Write in short the baroreceptor feedback mechanism for blood pressure regulation.
14. Draw and label a spirogram showing different lung volumes and capacities with their normal values. What is the importance of residual volume?
15. Define and classify hypoxia with examples. What is apnea?
16. Write short notes on:
  - i) Systemic capillary fluid exchange mechanism
  - ii) AV-nodal delay

# Physiology

## Paper II

**Ganglyon**

[www.ganglyon.com](http://www.ganglyon.com)

## Examination of May 2024

### GROUP-A

1. Define GFR. What are the determinants of GFR? Calculate net filtration pressure.
2. Draw and label a typical nephron. Write down three differentiating points between cortical and juxtamedullary nephrons.
3. Write down the locations for the different types of hormone receptors with examples. Give an account of the mechanism of action of steroid hormone.
4. State the steps of biosynthesis of thyroid hormones with a diagram. Write down the features of myxedema.
5. Define puberty. Write down the functions of testosterone.
6. A 15-year-old boy came to the physician with the complaints of frequent urination, increased hunger, extreme fatigue, and weight loss. His blood glucose level was high.
  - a) What is the likely diagnosis?
  - b) Which hormone is responsible for the above-mentioned complaints?
  - c) Mention the metabolic effects of the hormone on carbohydrate metabolism.
7. Write about ovulation mentioning the definition, mechanism in a flow chart, and role of LH surge with a diagram.

Or, Discuss the mechanism of action of protein hormones by the second messenger system.

### GROUP-B

8. Draw and label a typical neuron. Write down three differentiating features of upper motor and lower motor neuron lesion.
9. Define synapse. State the mechanism of impulse transmission through a chemical synapse.
10. Define and classify sensory receptors. Explain any two properties of receptors.
11. State the vegetative functions of the hypothalamus. How is body temperature maintained in a hot climate?
12. Name the special senses with their receptors. Trace the visual pathway.
13. A 25-year-old male came to OPD with complaints of difficulty in seeing distant objects clearly:
  - a) What is the likely underlying refractive error?
  - b) What are the possible causes of this condition?
  - c) How can this be corrected?
14. a) Define reflex and reflex arc.
  - b) What are the components of the reflex arc?
  - c) Trace the reflex arc of the knee jerk with its clinical importance.

Or, Write about the pyramidal tract mentioning its function, effect of lesion, and pathway with a diagram.

## Examination of November 2023

### GROUP-A

1. Write down the peculiarities of renal circulation with their functional significance.
2. Name two hormones acting on the renal tubule with their site of actions and functions. State the mechanism of water reabsorption in different parts of the renal tubule.
3. How is calcium homeostasis maintained?
4. List the hormones secreted from different layers of the adrenal gland. Write about the role of cortisol in inflammation and stress.
5. Define spermatogenesis. Give the hormonal regulation of spermatogenesis.
6. A 30-year-old female came to the emergency department with complaints of weight loss despite overeating, heat intolerance, palpitations, and protrusion of the eyeball. What will be the possible diagnosis of these features? Write down the mechanism of weight loss and protrusion of the eyeball.
7. Describe the endometrial cycle mentioning different phases with hormonal control in a diagram.  
*Or, Discuss the autoregulation of renal blood flow.*

### GROUP-B

8. What are the major levels of CNS function? List the functions of any two of them.
9. Define reflex. Write about occlusion and subliminal fringe.
10. Name the sensory tracts of the spinal cord. Write the effects of hemisection of the spinal cord below the level of the lesion.
11. What is basal ganglia? Write down the differences between cerebellar lesion and basal ganglia lesion.
12. What are the changes that take place in the eye during accommodation? What is Argyl Robertson pupil?
13. A 50-year-old man employed as a road construction worker for about 20 years came to a doctor and reported that he recently began experiencing difficulty hearing in normal conversation. On examination, sound is louder in the left ear than the right ear. What type of deafness occurs here? Which ear is affected and what test was done? What is masking effect?
14. "Hypothalamus acts as a thermostat" - explain it.  
*Or, Discuss the light reflex mentioning its definition, types, and pathway with a diagram.*



## Examination of May 2023

### GROUP-A

1. Name four hormones acting on the kidney with their site of action and functions.
2. How is dilute urine formed?
3. Draw and label a typical nephron. Mention three differentiating points of two types of nephron.
4. Classify hormones according to site of action and chemical nature with examples. What is a tropic hormone?
5. Write in short about the actions of thyroid hormone on CVS and the nervous system. What is cretinism?
6. Name the posterior pituitary hormones. Write about the milk ejection reflex.
7. Mention the sources of testosterone. State the functions of testosterone during fetal life and puberty.
8. Write short notes on:
  - i) LH surge
  - ii) Gigantism

### GROUP-B

9. Define synapse. State the mechanism of impulse across the synapse.
10. Define reflex and reflex arc. Draw and label a reflex arc. Mention two superficial and two deep reflexes.
11. Name the motor tracts of the spinal cord. Trace the corticospinal tract.
12. Define upper motor neuron and lower motor neuron. Mention four features of upper motor neuron lesion and lower motor neuron lesion. What is the release phenomenon?
13. Define shell and core temperature. How is body temperature maintained in hot climates?
14. What are the modalities of taste sensation? Trace the pathway of taste sensation.
15. Name the common errors of refraction with their causes. How are they corrected?
16. Write short notes on:
  - i) Neuron
  - ii) Neurotransmitter

## Examination of November 2022

### GROUP-A

1. Draw and label a glomerular membrane. How is net filtration pressure calculated?
2. What are the basic requirements for formation of concentrated urine? How is hyperosmolar medullary interstitium created?
3. Discuss the mechanism of reabsorption of water at different parts of renal tubules.
4. Write the locations of hormone receptors with example. Briefly discuss the mechanism of action of steroid hormone.
5. Name the hormones of adrenal cortex. Write the extra-metabolic functions of cortisol.
6. What are the hormones secreted from islets of Langerhans of pancreas. What are the consequences of insulin lack in our body?
7. Draw the diagram of plasma concentration of gonadotropins and ovarian hormones during normal female sexual cycle. What is anovulatory cycle?
8. Write short notes on:
  - i) Juxtaglomerular apparatus
  - ii) Sex determination and sex differentiation

### GROUP-B

9. Classify nerve fibers according to diameter and conduction velocity. Write about accommodation and properties of nerve fiber.
10. Define sensory receptor. Give the functional classification of sensory receptors. What do you mean by specificity of a receptor?
11. Name the motor tracts of spinal cord. Give the functions of extra pyramidal tracts. What is Brown-Séquard syndrome?
12. List the functions of cerebellum. Give an outline of the error control mechanism of cerebellum.
13. Give the normal range of body temperature. Briefly discuss the mechanisms of heat loss from our body. What is set point?
14. Explain the mechanism of hearing. Mention some common causes of deafness.
15. Define and classify light reflex. Trace the pathway of light reflex.
16. Write short notes on:
  - i) Accommodation reaction
  - ii) Release phenomenon

## Examination of May 2022

### GROUP-A

1. Mention the functions of kidneys. Calculate the net filtration pressure in the glomeruli.
2. What are the basic mechanisms of urine formation? Write in short the mechanism of dilute urine formation.
3. Give an account of micturition reflex.
4. Name the hormones of Islets of Langerhans of pancreas. List the hormones that increase the blood glucose level.  
What is renal threshold for glucose?
5. Give an outline of biosynthesis of thyroid hormone with diagram. Mention its actions on the cardiovascular system.
6. Give the functions of calcium in our body. How is blood  $Ca^{++}$  level maintained by parathormone?
7. Define spermatogenesis. Give the hormonal regulation of spermatogenesis.
8. Write short notes on:
  - i) Gigantism
  - ii) Functions of placenta

### GROUP-B

9. Name the major levels of CNS functions. List the functions of any two of them.
10. Classify nerve fiber on the basis of diameter and conduction velocity. Mention the properties of nerve fiber.
11. Name the ascending tracts. Trace the pain pathway from periphery to center.
12. Define upper motor neuron and lower motor neuron. Mention the features of upper motor neuron lesion and lower motor neuron lesion.
13. Give the normal body temperature. How is body temperature maintained in hot climate?
14. Name the common error of refraction with their causes. How are they corrected?
15. Name the special senses with their receptors. Describe the auditory pathway.
16. Write short notes on:
  - i) Light reflex
  - ii) Neurotransmitter

## Examination of November 2021

### GROUP-A

1. Draw and label a nephron. Differentiate cortical nephron from juxtamedullary nephron.
2. List the fluid compartments of our body with their normal value. How can extracellular fluid be measured?
3. Write down the peculiarities of renal circulation with their functional significance.
4. Name the endocrine glands. Write down the functions and regulation of secretion of aldosterone.
5. Define and classify hormones according to chemical nature with example. State briefly the Adenyl cyclase cAMP second messenger system.
6. State the functions of growth hormone on bone and cartilage. What is gigantism?
7. Describe the different phases of endometrial cycle with hormonal control and diagram.
8. Write short notes on:
  - i) Tetany
  - ii) Milk let down reflex

### GROUP-B

9. Define reflex. Draw and label a reflex arc. What is the clinical importance of knee jerk?
10. Define synapse. State the mechanism of impulse transmission across the synapse.
11. Give the normal range of body temperature. State the mechanism of heat gain and heat loss in our body.
12. Give the functions of cerebellum and list the signs of cerebellar lesion.
13. Name the motor tracts of spinal cord. Trace the Corticospinal tract. Give its functions.
14. Name the primary sensations of taste with their locations. Give the pathway of taste sensation with diagram.
15. Name the receptors of special senses. Trace the visual pathway.
16. Write short notes on:
  - i) Vegetative function of hypothalamus
  - ii) EPSP & IPSP

## Examination of May 2021

### GROUP-A

1. Define GFR. Mention the factors determining GFR. Calculate net filtration pressure.
2. What are the basic steps of mechanism of urine formation? List the substances that are completely reabsorbed in proximal tubule.
3. State the mechanism of dilute urine formation.
4. Name the hormones secreted from different layers of adrenal cortex. Briefly discuss the anti-inflammatory function of cortisol.
5. What is the role of parathormone in maintaining calcium homeostasis? What is tetany?
6. Define spermatogenesis. State the stages of spermatogenesis with their hormonal regulation.
7. Define hormone. Classify hormones chemically. Give locations of different hormone receptors with examples.
8. Write short notes on:
  - i) Cretinism
  - ii) L-H surge

### GROUP-B

9. Name the ascending tracts of spinal cord. Trace the pathway of pain sensation from periphery to center.
10. Define upper motor neurone and lower motor neurone. Compare the features of their lesions.
11. Define sensory receptor. Give its functional classification. What are EPSP and IPSP?
12. Define and classify neurotransmitters. What is synaptic delay?
13. Give the normal range of body temperature. How is body temperature maintained in hot environment?
14. Name the common errors of refraction with their causes. How are they corrected?
15. Name the special senses with their receptors. Trace the light reflex pathway.
16. Write short notes on:
  - i) Brown Sequard syndrome
  - ii) Deafness

## Examination of May & November 2020

### GROUP-A

1. Mention the functions of kidneys. Calculate the net filtration pressure in the glomeruli.
2. What do you mean by renal threshold and transport maximum of glucose?  
Calculate tubular load of glucose when blood glucose level is 200 mg/dl and GFR is 127 ml/min.
3. Give the account of micturition reflex. What are atonic and neurogenic bladder?
4. Name the hormones secreted from islets of Langerhans of pancreas. State the pathophysiology of insulin lack on carbohydrate and protein metabolism.
5. Write down the functions and regulation of secretion of aldosterone. What is aldosterone escape?
6. Give an outline of biosynthesis of thyroid hormone with diagram.  
Mention the actions of it on cardiovascular system.
7. Briefly discuss the different phases of endometrial cycle with its hormonal control.
8. Write short notes on:
  - i) Action of cortisol during stress
  - ii) Hormonal control of spermatogenesis

### GROUP-B

9. Define synapse. State the mechanism of impulse transmission across the synapse.
10. Draw and label a reflex arc. Describe any two properties of reflex action.
11. Name the descending tracts. Write down the effects of hemisection of spinal cord.
12. Define muscle tone. State how it is maintained.
13. What do you mean by core and shell temperature? How is body temperature regulated in cold climate?
14. What are the modalities of taste sensation? Trace the pathway of taste sensation.
15. Name the common error of refraction with their causes. How are they corrected?
16. Write short notes on:
  - i) Accommodation reaction
  - ii) Retrograde degeneration

## Examination of November 2019

### GROUP-A

1. Draw and label the different parts of a nephron. Calculate the net filtration pressure in glomeruli.
2. Mention the basic mechanisms of urine formation. Write in short the mechanism of dilute urine formation.
3. Give an account of micturition reflex. What is atonic bladder?
4. Classify hormones according to chemical nature with example. What is trophic hormone?
5. Give the functions of calcium in our body. How is blood  $Ca^{++}$  level regulated by parathormone?
6. Define spermatogenesis. Give the hormonal regulation of spermatogenesis.
7. Define menstrual cycle. Give an account of different phases of endometrial cycle with their hormonal control.
8. Write short notes on:
  - i) Puberty
  - ii) Milk let down reflex

### GROUP-B

9. Give the functional classification of sensory receptor with example. Define EPSP and IPSP.
10. Define reflex. Draw and label the different components of a reflex arc. Explain any two properties of reflex.
11. Name the ascending tracts of spinal cord. Trace the pain pathway from periphery to center.
12. Give an outline of the error control mechanism of cerebellum. Mention the effects of cerebellar lesion.
13. What do you mean by core and shell temperature? How is body temperature regulated in a cold climate?
14. Compare the features of upper and lower motor neuron lesions. What is release phenomenon?
15. Name the common errors of refraction with their causes. How are they corrected?
16. Write short notes on:
  - i) Neurotransmitter
  - ii) Modalities of taste sensation

## Examination of May 2019

### GROUP-A

1. Mention the functions of kidney. How is GFR autoregulated?
2. Write about the peculiarities of renal circulation with their functional significance.
3. State the hypothesis of countercurrent mechanism. How is hyperosmotic medullary interstitium formed?
4. Name the hormones that act through cell membrane receptors. Write down the mechanism of action of hormones by adenylyl cyclase - cAMP second messenger system.
5. Name the hormones secreted from islets of Langerhans of pancreas. State the pathophysiology of insulin lack on carbohydrate and protein metabolism.
6. Name the hormones secreted from adrenal gland. Enumerate the nonmetabolic functions of cortisol. State the anti-inflammatory action of cortisol.
7. What are the sources of female sex hormone? Write down the changes that occur in each phase of ovarian cycle with a diagram mentioning the influencing hormones.
8. Write short notes on:
  - i) Functions of estrogen on uterus, breast and skin
  - ii) Functions of placenta

### GROUP-B

9. What are the major levels of CNS functions? List the functions of any two of them.
10. Classify nerve fibers on the basis of diameter and conduction velocity. What is Bell Magendie law?
11. Name the motor tracts of spinal cord. Trace the corticospinal tract and mention its functions.
12. Define sensory receptor. Mention the properties of receptor and explain any two of them.
13. Give the normal temperature of our body. How is body temperature maintained in hot climate? What is set point?
14. Write down the mechanism of sound transmission in the ear.
15. Name the photoreceptors. Trace the visual pathway.
16. Write short notes on:
  - i) Cerebellar lesion
  - ii) Modalities of taste sensation



## Examination of November 2018

### GROUP-A

1. Define GFR. Mention the factors influencing GFR. Calculate the net filtration pressure in the glomeruli.
2. Name the hormones acting on kidney. If the renal plasma flow is 650 ml/min and GFR is 125 ml/min, then what will be the filtration fraction? Give an account of micturition reflex.
3. Define hormone. Classify hormone chemically. Give the locations of hormone receptors with example.
4. State the steps of biosynthesis of thyroid hormones with diagram. What are the features of cretinism?
5. Give the functions of calcium in our body. How is blood  $\text{Ca}^{++}$  level maintained by parathormone?
6. Define spermatogenesis. Write down the different stages of spermatogenesis with their hormonal regulation.
7. Write short notes on:
  - i) Acromegaly
  - ii) Ovulation

### GROUP-B

8. Define synapse. State the mechanism of impulse transmission across the synapse.
9. Define reflex. Draw and label a reflex arc. What is the clinical importance of testing the knee jerk?
10. Name the ascending tracts of spinal cord. Trace the pathway of touch sensation from periphery to center.
11. List the functions of cerebellum. Give an outline of the error control mechanism of voluntary movement of cerebellum.
12. Define upper motor neuron and lower motor neuron. Compare the features of their lesions.
13. What do you mean by core and shell temperature? How is body temperature regulated in cold climate?
14. Name the common errors of refraction with their causes. How are they corrected?
15. Write short notes on:
  - i) Neurotransmitter
  - ii) EPSP and IPSP

## Examination of May 2018

### GROUP-A

1. State the basic mechanism of urine formation. Write in short the mechanism of glucose and HCO<sub>3</sub> reabsorption in the renal tubule.
2. Write about the peculiarities of renal circulation with their functional significance.
3. State the countercurrent hypothesis. How is hyperosmolarity of medullary interstitium generated?
4. Name the hormones secreted from pituitary gland. Write down the mechanism of action of protein hormone by adenylyl cyclase mechanism.
5. State the different phases of ovarian cycle with diagram and give its hormonal control.
6. Name the hormones secreted from adrenal gland. Write down the anti-inflammatory and anti-stress effects of cortisol.
7. Mention the sources of testosterone. State the functions of testosterone during fetal life and puberty.
8. Write short notes on:
  - i) Milk let-down reflex
  - ii) Tubular load & filtration fraction

### GROUP-B

9. What are the major levels of central nervous system functions? Write down the functions of any two of them.
10. Define sensory receptor and give its functional classification with examples. What do you mean by specificity of a receptor?
11. Give the normal range of body temperature. How is body temperature regulated in hot climate?
12. Name the special senses with their specific receptors. Define light reflex and trace the pathway of it.
13. Define muscle tone. State how it is maintained.
14. Name the descending tracts. Give the functions of extra pyramidal tracts. What is Brown-Séquard syndrome?
15. What are the modalities of taste sensation? Trace the pathway of taste sensation.
16. Write short notes on:
  - i) Cerebellar lesion
  - ii) Deafness

# Biochemistry

## Paper I



**Ganglyon**

[www.ganglyon.com](http://www.ganglyon.com)

## Examination of May 2024

### GROUP-A

1. a) Define pH and buffer? Deduce the Henderson-Hasselbalch equation using the law of mass action.  
b) Why is the bicarbonate buffer called the most important to maintain blood pH?
2. a) Define and classify carbohydrates with an example.  
b) Give the biomedical importance of glucose and ribose.
3. a) What do you mean by polypeptide and protein? How is the peptide bond formed?  
b) Mention different levels of structural organization of proteins.
4. a) Name the hazards in a biochemistry laboratory. What is a biohazard?  
b) How can biohazards be prevented?
5. a) Define and classify lipids. What is a simple lipid?  
b) Mention the biomedical importance of Ecosanoids.
6. A 55-year-old obese woman with diabetes mellitus presents to a physician with high blood pressure, high total plasma cholesterol level, and elevated LDLc.  
a) Is there any risk of developing atherosclerosis? If so, for which of the abnormalities mentioned above?  
b) Mention the steps of metabolism of LDLc.
7. Enzymes are usually proteins, but there are examples of enzymes that are not. Some enzymes require cofactors for their activity, while others do not.  
a) Give an example of an enzyme that is unusual in that it is not a protein.  
b) Classify enzymes with one example of each.  
c) Describe the effect of temperature and pH on enzyme activity.  
d) Define co-enzyme and co-factor with examples.

Or, regarding free fatty acids and their digestion:

- a) Name the dietary lipids.
- b) What are the end products of lipid digestion?
- c) What is emulsification? Mention the role of bile salt in fat digestion and absorption.
- d) What is steatorrhea?

### GROUP-B

8. a) Name the digestive juices with their pH values.  
b) Discuss carbohydrate digestion and absorption.
9. a) Enumerate the lipoproteins with their site of origin.  
b) Show the urea cycle with a diagram.
10. a) Why is the TCA cycle called an amphibolic pathway?  
b) What is gluconeogenesis? Mention its biomedical importance.

11. a) Define transamination and oxidative deamination with examples.  
b) Write the sources and fates of acetyl CoA in our body.
12. a) Name the ketone bodies. How are they synthesized in the body?  
b) Why does ketoacidosis occur in uncontrolled diabetes mellitus?
13. a) Why does ketoacidosis occur in uncontrolled diabetes mellitus?  
b) A 4-year-old child was brought to a doctor with complaints of abdominal pain, cramps, diarrhea, and flatulence, which were aggravated after taking milk and milk products.
  - i) What is the probable diagnosis of this condition?
  - ii) What is the biochemical defect, and explain the mechanism of causing diarrhea in this child?
14. Diabetes mellitus (DM) is the most common endocrine disorder characterized by an elevated blood glucose level caused by a relative or absolute deficiency in insulin.
  - a) Write down the important differences between type I and type II DM.
  - b) How will you diagnose a patient of DM according to WHO?
  - c) Mention the procedure and diagnostic interpretation of OGTT.
  - d) Briefly discuss the biochemical basis of dyslipidemia in DM.

Or, Metabolism of carbohydrates usually begins with and ends in glucose. Finally, glucose is broken down to  $\text{CO}_2$  and  $\text{H}_2\text{O}$ . During this process, the energy released by breaking the bonds between atoms of glucose is captured in the form of ATP or NADH. Alternatively, glucose can be metabolized in the pentose phosphate pathway.

- a) Mention the metabolic pathways or steps that a molecule of glucose must traverse to be completely catabolized to  $\text{CO}_2$  and  $\text{H}_2\text{O}$ . Mention the number of ATP yield by the process of glycolysis when it happens in erythrocytes.
- b) What are the fates of pyruvate produced in glycolysis?
- c) What would be the products if glucose is alternatively catabolized in the pentose phosphate pathway, and what are the utilities of those products?

## Examination of November 2023

### GROUP-A

- Define pH and buffer. Name three important body fluid buffers with their conjugate bases.
  - Explain why the bicarbonate buffer system is the most important buffer system.
- Define and classify polysaccharides with examples.
  - Name the GAGs (Glycosaminoglycans). Give their importance.
- Define and classify lipids with examples. What is a simple lipid?
  - Write down the biomedical importance of cholesterol.
- Enumerate common biochemical thyroid function tests.
  - Mention the biochemical findings of primary and secondary hypothyroidism.
- What is dialysis? Write its importance in medical practice.
  - Classify isotopes. State the clinical importance of isotopes.
- A 58-year-old diabetic and hypertensive patient came to the hospital emergency with the sudden onset of severe chest pain that radiated to the left arm along with respiratory distress. Two hours have passed since the onset of chest pain.
  - What is the probable diagnosis?
  - Name the biochemical marker you would look into to evaluate the condition. Of the markers, which one is most important in clinical decision-making in this particular case and why?
- Proteins perform diverse functions in our body, including catalysis, formation of cellular structure, transport, and storage of substances.
  - Classify proteins according to their functions with one example of each.
  - Enumerate the levels of structural organizations of proteins and name the forces that stabilize those structures.
  - Classify enzymes according to IUBMB, giving one example of each.
  - Explain the effect of pH and temperature on enzyme activities.

OR, Jaundice is a clinical condition characterized by yellow discoloration of the skin, sclera, and mucous membranes due to increased bilirubin concentration in body fluid:

- Write down the reference level of serum bilirubin.
- What do you mean by clinical and latent jaundice?
- Classify jaundice. Mention two important causes of each type of jaundice.
- Differentiate types of jaundice on the basis of biochemical findings.

### GROUP-B

- Name the digestive juices with their pH values.
  - Write down the sources and fates of acetyl CoA.
- Define gluconeogenesis and name the substrate for it.
  - Mention the biomedical importance of gluconeogenesis.

10. a) Enumerate the intermediary metabolic pathways of lipids.  
b) How many ATPs are generated from the complete oxidation of an 18-carbon saturated fatty acid?
11. a) Enumerate the apoproteins and state their functions.  
b) Write briefly about the metabolism of chylomicrons.
12. a) Name the ketone bodies.  
b) Write down the biosynthesis and utilization of ketone bodies in the body.
13. A ten-year-old girl presented with spongy bleeding gums and loose teeth. Parents mentioned that she was never interested in eating fresh fruits.  
a) Name the disease the girl is suffering from and state the cause of this disease.  
b) Write the biochemical basis of this disease.
14. Digestion of lipids in the intestine requires emulsification. After being digested, the end products are absorbed, enter the circulation, and are finally metabolized.  
a) Name the dietary lipids with their end products of digestion.  
b) What happens in the process of emulsification, and how does it help in lipid digestion?  
c) How are the end products of lipid digestion absorbed from the GIT?  
d) Enumerate the lipases present in our body.

OR, Insulin and its counter-regulatory hormones are important for maintaining blood glucose concentration. A deficiency or defective function of insulin leads to diabetes mellitus.

- a) Name the counter-regulatory hormones of insulin and write the metabolic functions of insulin.
- b) Classify diabetes mellitus. Write the pathophysiology of diabetic ketoacidosis.
- c) Write the steps and interpretation of OGTT (Oral Glucose Tolerance Test) according to WHO.
- d) Write the acute and chronic complications of diabetes mellitus.

## Examination of May 2023

### GROUP-A

1. a) What is buffer? Name the buffer system of our body with examples.  
b) Which buffer is most important and why?
2. a) Define and classify monosaccharides with examples.  
b) Give the biomedical importance of glucose.
3. a) Define protein and classify it functionally with examples.  
b) What is peptide bond? How is a peptide bond formed?
4. a) What are colloids? Write five important properties of colloids.  
b) State the clinical importance of isotopes.
5. a) Define and classify lipids. What is steroid and sterol?  
b) Write down the biomedical importance of eicosanoids.
6. a) What is OGTT? Write down the procedure of OGTT.  
b) Interpret the results of OGTT. What is HbA1c?
7. a) Define enzyme. Name auxiliary substances for enzyme activity.  
b) Write on IUBMB classification of enzymes with examples.
8. Write short notes on:
  - i) Liver function tests
  - ii) Neutral fat

### GROUP-B

9. a) Mention the four major components of gastric juice with their functions.  
b) State briefly digestion of protein in GIT.
10. a) Mention the sites of ATP synthesis and inhibitors of the electron transport chain.  
b) Why is the TCA cycle called a common metabolic pathway? Explain.
11. a) What is gluconeogenesis? Write down its importance.  
b) Differentiate between muscle glycogen and liver glycogen.
12. a) Define transamination and oxidative deamination with examples.  
b) Write down the sources and fates of ammonia in our body.
13. a) How many ATPs are generated from complete oxidation of an 18-C fatty acid?  
b) Write in brief about LDL metabolism.
14. a) Name the ketone bodies.  
b) Write down the biosynthesis and utilization of ketone bodies in our body.
15. Write down the importance of the HMP shunt pathway.
16. a) Give the kinetic behavior of cardiac markers following acute myocardial infarction.  
b) Write short notes on:
  - i) Cori cycle
  - ii) Laboratory hazards



## Examination of November 2022

### GROUP-A

1. a) Define acidic pH, alkaline pH, acidosis, and alkalosis.  
b) Deduce Henderson-Hasselbalch equation. Give its importance.
2. a) Define cofactor, holoenzyme, apoenzyme, and prosthetic group with examples.  
b) Name the factors affecting reaction velocity. How does substrate concentration affect the rate of an enzyme-catalyzed reaction?
3. a) What do you mean by atomic number, mass number, isotopes, and radioactive decay? Classify isotopes with examples.  
b) Mention the biomedical importance and hazards of radioactive isotopes.
4. a) Define and classify polysaccharides with examples.  
b) Differentiate among starch, cellulose, and glycogen.
5. a) Name the organizational levels of complexity of protein structure. Mention the interactions stabilizing tertiary protein structure.  
b) What is denaturation of protein? Give the features of a denatured protein.
6. a) Define and classify fatty acids with examples.  
b) Write down the importance of phospholipids in our body.
7. a) State Beer-Lambert law with equation.  
b) What is colorimetry and colorimeter? Draw and label the pathways of a photoelectric colorimeter.
8. Write short notes on:  
a) Eicosanoids                      b) Indication and interpretation of OGTT

### GROUP-B

9. a) Define local hormones of GIT. Classify them with examples.  
b) Give the functions of gastrin and secretin.
10. a) Name the sources and fates of acetyl CoA.  
b) TCA cycle is an amphibolic pathway of metabolism - explain.
11. a) Define high-energy and very high-energy compounds with examples.  
b) Show in an illustration the components, arrangements, and sites of ATP synthesis in the respiratory chain.
12. a) What is the urea cycle? Draw and label the urea cycle.  
b) What is ammonium intoxication? Mention its importance.
13. a) Name the common dietary carbohydrates with their end products of digestion.  
b) Write down their digestion in succus entericus and absorption in the intestine.
14. a) Justify bile as a digestive juice.  
b) Name the end products of lipid digestion. How are they absorbed in the small intestine and transported to the liver?
15. a) Enumerate the catabolic pathways of carbohydrate metabolism.  
b) Write down the importance of anaerobic glycolysis and gluconeogenesis.
16. Write short notes on:  
a) Carnitine shuttle                      b) Lipid profile

## Examination of May 2022

### GROUP-A

1. a) Define pH and buffer. Classify body buffers with examples.  
b) How does bicarbonate buffer act in our body?
2. a) Define enzyme, coenzyme, and cofactors with examples.  
b) Write down the IUBMB classification of enzymes with examples.
3. a) Define crystalloid and colloid with examples.  
b) Differentiate between crystalloids and colloids.
4. a) Classify monosaccharides with examples.  
b) Give the importance of glucose, galactose, and fructose.
5. a) Define and draw a peptide bond.  
b) Give the functional classification of proteins with examples.
6. a) Define lipid. Classify simple lipids with examples.  
b) Write down the importance of cholesterol in our body.
7. a) Enumerate the synthetic liver function tests with reference values.  
b) Differentiate biochemically the different types of jaundice on blood tests.
8. Write short notes on:
  - a) SI unit
  - b) Laboratory biohazards

### GROUP-B

9. a) Mention sites of origin and functions of the amylolytic enzymes of GIT.  
b) What is lactose intolerance?
10. a) Name the four major components of gastric juice with their functions.  
b) State briefly protein digestion in the small intestine.
11. a) What are the metabolic pathways that occur in the cytoplasm?  
b) Write down the importance of the HMP shunt pathway.
12. a) What is oxidative deamination? Give examples.  
b) Mention the sources and fates of ammonia in our body.
13. a) Define ketonemia, ketonuria, ketosis, and ketoacidosis.  
b) Write down the biochemical basis of ketoacidosis in uncontrolled DM.
14. a) What is  $\beta$ -oxidation? Elaborate on the net ATP generation from  $\beta$ -oxidation of a 14-carbon saturated fatty acid.
15. a) Enumerate the lipoproteins with their site of origin.  
b) Write in brief about LDL metabolism.
16. Write short notes on:
  - a) Micelle
  - b) Glucostatic function of the liver

## Examination of November 2021

### GROUP-A

1. a) Define and classify polysaccharides with examples.  
b) Give the importance of mucopolysaccharides.
2. a) Define enzyme, cofactor, and isoenzyme with examples.  
b) State the effect of pH and temperature on enzyme activity.
3. a) State briefly the structures of protein.  
b) What is denaturation of protein?
4. a) Classify phospholipids with examples.  
b) Give the functions of phospholipids in our body.
5. a) Give the indications, preparation, and procedure of OGTT in an adult.  
b) Give the interpretation of OGTT in an adult.
6. a) What is proteinuria? Enumerate its causes.  
b) Mention the blood tests with their reference ranges which are done to assess renal function.
7. a) State the photometric laws.  
b) Draw and label the components of a colorimeter.
8. Write short notes on:
  - a) Eicosanoids
  - b) Bicarbonate buffer system

### GROUP-B

9. a) Name the dietary carbohydrates.  
b) State briefly digestion and absorption of starch.
10. a) What is oxidative phosphorylation?  
b) Draw and label a respiratory chain showing the sites of ATP generation.
11. a) Name the bile salts.  
b) Briefly discuss the role of bile salts in fat digestion and absorption.
12. a) Define transamination with examples. State its importance.  
b) State briefly about ammonia intoxication.
13. a) Name the ketone bodies.  
b) Write down the biosynthesis and utilization of ketone bodies in our body.
14. a) Enumerate components of lipid profile with reference range.  
b) Write in brief about HDL metabolism.
15. a) Define glycolysis.  
b) Show the glycolytic pathway with a flowchart.
16. Write short notes on:
  - a) Carnitine shuttle
  - b) Lactose intolerance

## Examination of May 2021

### GROUP-A

1. a) Define enzyme, coenzyme, and isoenzyme with examples.  
b) How does temperature affect enzyme activity?
2. a) Define pH and buffer. Classify blood buffers with examples.  
b) How does bicarbonate buffer play a very important role in our body?
3. a) Classify polysaccharides with examples.  
b) What is mucopolysaccharide? Give its importance.
4. a) Define peptide, polypeptide, and protein. Give examples.  
b) Name the various structures of protein.
5. a) Define lipids. Classify simple lipids.  
b) Write down the biomedical importance of phospholipids.
6. a) What is dialysis? Write its importance in medical practice.  
b) Classify and state the clinical importance of isotopes.
7. a) Enumerate the liver function tests.  
b) Differentiate biochemically the different types of jaundice.
8. Write short notes on:
  - a) Cardiac markers
  - b) Principle of photometry

### GROUP-B

9. a) Mention the four major components of gastric juice with their functions.  
b) State briefly protein digestion in the GIT.
10. a) Define transamination and oxidative deamination with examples.  
b) Write down the source of acetyl CoA in our body.
11. a) Name the digestive juices with their pH values.  
b) How does bile act as a digestive juice?
12. a) Why is the TCA cycle called a common pathway?  
b) What is anaerobic glycolysis? Write down its importance.
13. a) Name the ketone bodies.  
b) Write down the biosynthesis and uses of ketone bodies in the body.
14. a) Draw and label the components of the respiratory chain.  
b) Name the inhibitors of the respiratory chain.
15. a) Enumerate components of the lipid profile with normal reference ranges.  
b) Write in brief about HDL metabolism.
16. Write short notes on:
  - a) Cori cycle
  - b) Amino acid pool

## Examination of May & November 2020

### GROUP-A

1. a) Define crystalloid and colloid with examples.  
b) Mention the properties of colloids.
2. a) Define enzyme, coenzyme, and isoenzyme with examples.  
b) Write down the IUBMB classification of enzymes with examples.
3. a) Define and classify monosaccharides with examples.  
b) Give the importance of glucose and fructose.
4. a) What do you mean by S.I. units? Classify them with examples.  
b) Mention the biomedical importance of isotopes.
5. a) Define and draw a peptide bond.  
b) Give the functional classification of proteins with examples.
6. a) Mention the biochemical renal function tests.  
b) Name the tests for detection of abnormal constituents of urine.
7. a) Name the blood buffer systems with their chemical components.  
b) Which blood buffer system is most potent and why? What is alkali reserve?
8. Write short notes on:
  - a) pH scale
  - b) Laboratory biohazards

### GROUP-B

9. a) Name the proteolytic enzymes of GIT with their site of origin.  
b) How is protein digested and absorbed from the GIT?
10. a) Name the dietary lipids with their end products of digestion.  
b) Mention the role of bile in emulsification and micelle formation.
11. a) Name the metabolic pathways of carbohydrate.  
b) Write down the importance of the HMP shunt pathway.
12. a) What are the sources and fates of ammonia in our body?  
b) State the urea cycle in brief.
13. a) What is  $\beta$ -oxidation? Enumerate the steps of  $\beta$ -oxidation.  
b) Show the net ATP generation from  $\beta$ -oxidation of a 16-carbon fatty acid.
14. a) Enumerate the lipoproteins with their site of origin.  
b) Write in brief about LDL metabolism.
15. a) Enumerate the local hormones of GIT with the functions of any two of them.  
b) State the composition and functions of saliva.
16. Write short notes on:
  - a) Glucostatic function of liver
  - b) TCA cycle

## Examination of November 2019

### GROUP-A

1. a) Define pH, pK, and buffer. How does a buffer act?  
b) Why is the bicarbonate buffer system very important in our body?
2. a) Define and classify polysaccharides with examples.  
b) What are the types of GAGs? Give their functions.
3. a) Define and classify fatty acids with examples.  
b) Define and write about eicosanoids.
4. a) Write down the procedure of OGTT with its interpretation.  
b) What is IFG and IGT?
5. a) Differentiate between crystalloid and colloid.  
b) What is dialysis? Write its importance in medical practice.
6. a) Define enzyme, co-enzyme, and cofactor with examples of each.  
b) How does pH affect enzyme activity?
7. a) What is photometry? Mention the principle of a colorimeter.  
b) What are the precautions to be taken during blood sample collection?
8. Write short notes on:
  - i) Peptide bond
  - ii) Lipid profiles

### GROUP-B

9. a) Name the digestive juices with their pH values.  
b) Name four major components of gastric juice with their functions.
10. a) What do you mean by emulsification of fat? What is a micelle?  
b) Briefly state the fat absorption in the GIT.
11. a) Name the metabolic pathways that occur in the mitochondria.  
b) Show the glycolytic pathway in a flowchart.
12. a) Differentiate between hydrolytic and cecolic secretions of the pancreas.  
b) Briefly discuss transamination and oxidative deamination with examples.
13. a) Enumerate the lipoproteins.  
b) State the metabolism of HDL cholesterol.
14. a) Name the ketone bodies.  
b) Write down the synthesis and utilization of ketone bodies in our body.
15. a) What is oxidative phosphorylation? Show the components, arrangements, and site of ATP synthesis in the respiratory chain in a flowchart.  
b) Write on the carnitine shuttle mechanism.
16. Write short notes on:
  - i) Amino acid pool
  - ii) Liver function tests

## Examination of May 2019

### GROUP-A

1. a) Define and classify blood buffers with examples.  
b) Show the relationship between Henderson-Hasselbalch Equation (HHE) and buffers.
2. a) Define and classify monosaccharides with examples.  
b) Mention the biomedical importance of glucose and pentose.
3. a) What are the samples commonly analyzed in a clinical laboratory? What precautions should be taken during sample collection?  
b) What are the differences between serum and plasma?
4. a) What do you mean by plasma non-functional enzymes? Why are they used for diagnosis of disease?  
b) Show the pattern of cardiac markers following myocardial infarction.
5. a) Define amino acid. Demonstrate a peptide bond by a diagram.  
b) Write down the functional classification of proteins.
6. a) Define and classify lipids with examples.  
b) Why is phospholipid important for us?
7. a) Define and classify isotopes.  
b) Mention three biomedical importances and three hazards of radioactive isotopes.
8. Write short notes on:
  - i) Biohazard
  - ii) Dialysis

### GROUP-B

9. a) Enumerate the local hormones of GIT.  
b) State the functions of gastrin and secretin.
10. a) Define and classify glycolysis.  
b) State the irreversible steps in glycolysis. Write down the importance of anaerobic glycolysis.
11. a) Name the proteolytic enzymes of GIT.  
b) State the functions of gastric HCl and intrinsic factor of Castle.
12. a) What is the respiratory chain?  
b) Show the components, arrangement, and site of ATP production in the respiratory chain in a flowchart.
13. a) The TCA cycle is an amphibolic pathway of metabolism – explain.  
b) Write about the sources and fates of ammonia.
14. a) Name the end products of triacylglycerol and starch digestion.  
b) Write about emulsification and micelle formation in GIT.
15. a) Define and classify lipoproteins. Give the origin of different types of lipoproteins.  
b) Why is LDL-C bad for health?
16. Write short notes on:
  - i) Transamination
  - ii)  $\beta$ -oxidation of fatty acid

## Examination of November 2018

### GROUP-A

1. a) Define pH and buffer. Name the buffer systems in our body with examples.  
b) Write the basic mechanism of buffer action.
2. a) Define enzyme and co-enzyme. Classify enzymes with examples.  
b) Write the properties of enzymes. What is a co-factor?
3. a) Classify isotopes and mention the clinical use of isotopes.  
b) Draw and label the basic parts of a photoelectric colorimeter.
4. a) Define and classify polysaccharides with examples.  
b) Write the names and importance of GAGs.
5. a) Enumerate the functional proteins with examples.  
b) What is a peptide bond and how is it formed?
6. a) What do you mean by lipid profile? Give its normal value.  
b) Write the functions of cholesterol. What are the causes of hypercholesterolemia?
7. a) What is proteinuria? Mention the causes of proteinuria.  
b) Name the biochemical tests for the assessment of renal function with their normal values.
8. Write short notes on:
  - i) Biological hazards
  - ii) SI unit

### GROUP-B

9. a) Enumerate the digestive juices with their pH.  
b) Name the four major components of gastric juice and give their functions.
10. a) The TCA cycle is an amphibolic pathway of metabolism – explain.  
b) Discuss the glucostatic function of the liver.
11. a) Name the end products of carbohydrate, protein, and lipid digestion.  
b) State how the end products of fat digestion are absorbed from the GIT.
12. a) Mention the irreversible steps of glycolysis.  
b) Write the sources and fates of acetyl CoA.
13. a) Define transamination and deamination with examples.  
b) Name the substrate and importance of gluconeogenesis.
14. a) What do you mean by IFG and IGT?  
b) How is ketosis developed in uncontrolled diabetes mellitus?
15. a) Discuss in short about local hormones of GIT.  
b) What is lactose intolerance?
16. Write short notes on:
  - i) Lipoprotein
  - ii) HMP shunt



## Examination of May 2018

### GROUP-A

1. a) Define pH, pK, and buffer. How buffer acts?  
b) Classify blood buffer systems with their composition.
2. a) Name the samples used for biochemical analysis. What are the changes that may occur in blood samples during delayed processing?  
b) Mention the hazards that may occur in a clinical laboratory.
3. a) Write down the IUBMB classification of enzymes with examples.  
b) State the role of pH and substrate concentration on enzyme activity.
4. a) Enumerate some important plasma colloids. State the differences between colloid and crystalloid.  
b) What is dialysis?
5. a) Define and classify fatty acids with examples.  
b) State the importance of phospholipids.
6. a) What do you mean by oxidative phosphorylation? Name the enzymes of biological oxidation.  
b) Diagrammatically show the different components of ETC.
7. a) What is photometry? Write down the principle of colorimetry.  
b) Define accuracy, precision, sensitivity, and specificity.
8. Write short notes on:
  - i) Isotopes
  - ii) Renal function tests

### GROUP-B

9. a) Name the proteolytic enzymes of the GIT tract.  
b) How is protein digested and absorbed from the GIT?
10. a) What is intermediary metabolism?  
b) How is normal blood glucose maintained?
11. a) Enumerate the lipoproteins.  
b) State the metabolism of HDL-cholesterol.
12. a) Name the metabolic pathways occurring in the cytosol.  
b) How are pyruvate and lactate formed from glucose?
13. a) What is  $\beta$ -oxidation of fatty acid?  
b) Describe the carnitine shuttle mechanism with a figure.
14. a) How is ammonia formed and transported in the body?  
b) Diagrammatically show the reactions of the urea cycle.
15. a) Name the ketone bodies. What is ketosis?  
b) Write down the synthesis and utilization of ketone bodies.
16. Write short notes on:
  - i) Local hormones
  - ii) Lipid profile

# Biochemistry

## Paper II



**Ganglyon**

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## Examination of May 2024

### GROUP-A

- Define food, diet, nutrients and balance diet.
  - Enumerate the essential nutrients. Give the importance of dietary fibers.
- Differentiate between fat-soluble vitamins and water-soluble vitamins.
  - Mention the sources, functions and deficiency features of vitamin A.
- Name the routinely measured electrolytes in ECF with their ranges of reference values.
  - Mention the factors maintaining  $\text{Ca}^{2+}$  homeostasis.
- Define BMR and BMI.
  - Mention the factors affecting BMR and prerequisites to measure BMR.
- Mention the total water distribution of a 70 kg adult male.
  - How is body water balance maintained?
- A 50-year-old man presented with the following biochemical findings: serum sodium = 140 mmol/L, serum potassium = 2.5 mmol/L, serum  $[\text{HCO}_3^-]$  = 26 mmol/L, and serum chloride = 105 mmol/L.

  - What is your diagnosis?
  - Write four (4) important causes of the condition with its possible consequences.
- A child of 4 years old child came to a pediatrician with bowing of legs, frontal bossing and abdominal distension. Parents of the child complained that bowing of legs was noticed after the baby started walking.

  - Write the probable diagnosis of this disorder.
  - What is the cause of this disorder?
  - Write the biochemical basis of this disorder.
  - State how this type of disorder can be prevented.

Or

A 60 kg pregnant school teacher comes to the doctor seeking advice regarding her nutrition.

- Enumerate the sectors of energy utilization.
- Calculate the energy required for that pregnant lady.
- Make a diet chart for her.

**GROUP-B**

8. a) Enumerate the nitrogenous bases with their end products of catabolism.  
b) Differentiate between DNA and RNA.
9. a) Define gene, genome and genetic code.  
b) What is a nucleotide? Give its importance.
10. a) What is replication?  
b) Write down the requirements and steps of replication of DNA.
11. a) Define transcription and post-transcriptional modification.  
b) Mention different post-transcriptional modifications of mRNA.
12. a) Define and classify mutation.  
b) Mention the effects of point mutation.
13. A pre-term baby developed a bleeding disorder after birth. The physician termed the condition as hemorrhagic disease of the newborn.  
a) State the possible reason for this condition.  
b) State its biochemical basis.
14. A known diabetic patient came to the hospital emergency department in a semiconscious state. His attendant also gave a history of diarrhea for 2 days. His blood report is as follows: pH = 7.2,  $[\text{HCO}_3^-]$  = 15 mmol/L,  $\text{PCO}_2$  = 40 mmHg,  $\text{Cl}^-$  = 130 mmol/L, Glucose = 10 mmol/L, Anion gap = 12 mmol/L, Urine ketone body = Negative.  
a) What is the acid-base abnormality?  
b) What is the important cause behind the disorder in this case?  
c) Justify your answer of question b.  
d) Explain high  $[\text{Cl}^-]$  concentration and normal anion gap in this patient.

Or

In a road traffic accident, many people have died. Identification of some patients is not possible.

- a) Which method will you apply to identify the person?
- b) Mention the other uses of this method.
- c) Mention the temperature change in different steps of this method.

## Examination of November 2023

### GROUP-A

1. a) Define nutrition, nutrient, food, diet, and balanced diet.  
b) Name the essential nutrients.
2. a) Define and classify minerals with examples.  
b) Write the functions and deficiency disorders of three trace elements.
3. a) Classify simple acid-base disorders with their primary defects.  
b) Write down the causes, compensation, and correction of simple metabolic acidosis.
4. a) Classify water-soluble vitamins.  
b) Give the chemical name with their active forms of the water-soluble vitamins.
5. a) Make a chart of daily water intake and output in an adult male.  
b) What is water turnover? Give its importance.
6. A 50-year-old asthmatic male attended the hospital with respiratory distress. His laboratory findings were as follows:  
Serum ( $\text{Na}^+$ ) = 138 mmol/L, Serum ( $\text{K}^+$ ) = 5.5 mmol/L,  $\text{PaCO}_2$  = 60 mmHg, pH = 7.2  
a) Name the acid-base and electrolyte disorder according to laboratory findings.  
b) Explain elevated  $\text{K}^+$  concentration in this particular case.
7. We take nutrients for maintaining our health. Of the nutrients, some are essential while others are non-essential. Some nutrients are energy-yielding and others perform specific biological functions. Now:  
a) Mention the energy yield from 1 gm of each of the nutrients.  
b) Name the vitamins that are synthesized in our body with their deficiency condition.  
c) Enumerate the anthropometric measurements used for assessment of nutritional status with its interpretation.  
d) Define and classify PEM according to WHO.

Or, Kidney performs various functions in the human body, among which the major function is the formation and excretion of urine.

- a) State the basic mechanisms of urine formation.
- b) State the role of the kidney in maintaining acid-base balance in a physiological state.
- c) Name the hormones that act on the kidney and those synthesized and activated in the kidney.
- d) Explain the statement "limiting pH of urine is 4.3" and "obligatory urine volume is about 500 ml/day."

**GROUP-B**

8. a) Write down the chemistry of nucleosides and nucleotides with two examples of each.  
b) What are the functions of nucleotides?
9. a) Define gene, genome, and genetic code.  
b) Mention the characteristics of the genetic code with an explanation.
10. a) What is mutation? Write the cause of mutation.  
b) What is point mutation? Write down the consequences of point mutation.
11. a) Write in brief about post-transcriptional modifications of mRNA.  
b) Define translation and enumerate its requirements.
12. a) What do you mean by recombinant DNA and state how it is created?  
b) Define vector. Enumerate different types of vectors.
13. An 8-year-old female child came to a child specialist with her parent having features such as flat nose, slanted eyes, short neck, and parents complained that she is not interested in studying but very much fond of music. Child specialists suspected it to be a case of Down syndrome and sent her to your molecular diagnostic laboratory.  
a) Name the test you will do to confirm the diagnosis.  
b) What is your expected finding?
14. A molecular biologist wants to produce huge copies of DNA fragments within a short period of time.  
a) Which procedure will be applied to do this?  
b) Name the requirements of this procedure.  
c) Mention steps of the procedure with a figure.  
d) State four important applications of this procedure.

Or, Steps of gene expression include replication, transcription, and translation.

- a) Define replication and enumerate its requirements.
- b) Define transcription with its site and state requirements of transcription.
- c) Enumerate the products of transcription with their functions.

## Examination of May 2023

### GROUP-A

1. a) Define food, nutrition, diet, and balanced diet.  
b) Give the criteria to formulate a balanced diet.
2. a) Name the water-soluble vitamins with their active forms.  
b) Mention the sources, functions, and deficiency disorders of Vitamin B<sub>1</sub>.
3. a) Discuss the body fluid distribution of a 60 kg adult female individual.  
b) Briefly discuss sodium homeostasis.
4. a) Define BMI. Classify nutritional status according to BMI.  
b) What is obesity? Mention the consequences of obesity.
5. a) Classify simple acid-base disorders with their primary defect and compensation.  
b) How is blood calcium level regulated?
6. a) Define micronutrients and macronutrients. Give their examples.  
b) Write the functions and deficiency disorders of Vitamin A.
7. a) What is water turnover? Give its importance.  
b) Write down the causes and consequences of hyperkalemia.
8. Write short notes on:
  - i) BMR
  - ii) Folate trap

### GROUP-B

9. a) Define nucleic acid. Give its function.  
b) How is DNA organized within a cell?
10. a) Define gene, genotype, and phenotype.  
b) Write down the characteristics of the genetic code.
11. a) What is the cell cycle?  
b) Write down the requirements and steps of replication.
12. a) What is central dogma?  
b) Write in brief about post-transcriptional modification of mRNA.
13. a) Mention the types of RNA with functions of each.  
b) Write about that covalent type of post-translational modification of protein.
14. a) Define and classify mutation.  
b) What are the effects of point mutation?
15. a) Define PCR with its importance.  
b) Briefly discuss restriction endonuclease.
16. Write short notes on:
  - i) DNA probe
  - ii) Vector

## Examination of November 2022

### GROUP-A

- What is transcellular fluid? Give its examples, composition, and importance.
  - Make a water intake and output chart of a healthy individual.
- Classify simple acid-base disorders with their primary defect.
  - State the renal handling of acid-base balance.
- Enumerate the major electrolytes in ECF with their reference values.
  - Mention the primary action of the hormones regulating  $\text{Na}^+$  and  $\text{H}_2\text{O}$  balance. Give the mechanism of action of ADH in DCT & CD.
- Define transport maximum ( $T_m$ ) and renal threshold. What is  $T_m$  and the renal threshold of glucose? Why do they differ?
  - What is water intoxication? Give its importance.
- Enumerate the common nutritional disorders of Bangladesh. Classify PEM according to WHO criteria.
  - Differentiate between kwashiorkor and marasmus.
- Define vitamin. Compare and contrast between water-soluble vitamin and fat-soluble vitamin.
  - Write down the dietary source, function, and deficiency disorders of Vitamin  $\text{B}_{12}$ .
- Name the fat-soluble vitamins with their active forms.
  - Vitamin D is a hormone – justify. Give its activation and functions.
- Write short notes on:
  - Anion gap
  - SDA

### GROUP-B

- Define and differentiate DNA and RNA.
  - Draw and label Watson-Crick model of DNA.
- What are the sources of individual atoms in the purine ring?
  - Name the end products of purine and pyrimidine degradation.
  - Mention the disorders of abnormal purine metabolism.
- Define gene, genome, genetic code, and genetics.
  - Classify genetic disorders. Give the karyotypes of normal male, normal female, Down syndrome, and Turner syndrome.
- Write down the requirements and steps of transcription of eukaryotic gene.
  - Differentiate between replication and transcription.
- Define and classify vectors.
  - What is recombinant DNA technology? Differentiate between PCR and biological cloning.



14. a) Classify minerals with examples.  
b) Name the essential trace elements. Give the functions and deficiency disorders of iodine and zinc.
15. a) What is trans-membrane flux of  $K^+$ ? Name the factors affecting  $K^+$  influx.  
b) Write in brief on "hyperkalemia in metabolic acidosis."
16. Write short notes on:
  - a) DNA fingerprinting
  - b) t-RNA

Ganglyon

## Examination of May 2022

### GROUP-A

1. a) Mention the total body water distribution of a 55 kg adult female.  
b) How is body water balance maintained?
2. a) What do you mean by plasma clearance and renal threshold?  
b) A patient having blood pH 7.5,  $p\text{CO}_2 = 40$  mmHg,  $\text{HCO}_3 = 35$  mmol/L. What type of disorder is it? Write down the causes, compensation, and correction of this disorder.
3. a) What is water turnover? Mention its importance.  
b) Briefly discuss the regulation of sodium in ECF.
4. a) What do you mean by micro-minerals? Give examples.  
b) Write about dietary sources, absorption, and functions of iron in our body.
5. a) Define food, diet, nutrients, and balanced diet.  
b) Enumerate essential nutrients. Give the importance of dietary fibers.
6. a) Name the fat-soluble vitamins with their active form.  
b) Give the sources, functions, and deficiency features of Vitamin A.
7. a) Define BMR and BMI.  
b) Mention the factors affecting BMR and prerequisites to measure BMR.
8. Write short notes on:
  - a) Pellagra
  - b) Obligatory urine volume

### GROUP-B

9. a) Define nucleotide and nucleoside. Give their structure.  
b) Mention the importance of nucleoside.
10. a) What are the types of RNA? Mention the functions of each.  
b) Write down the post-transcriptional modification of mRNA.
11. a) Give the requirements and features of replication.  
b) Mention the raw materials of protein synthesis.
12. a) What is genetic code? Give the features of a genetic code.  
b) Define central dogma.
13. a) Differentiate between PCR and biological cloning.  
b) Mention the biomedical importance of PCR.
14. a) Define and classify mutation.  
b) Give a brief description of point mutation.
15. a) What are the requirements for synthesis of purine bases?  
b) Briefly discuss the salvage pathway of purine synthesis.
16. Write short notes on:
  - a) Cell cycle
  - b) cDNA library

## Examination of November 2021

### GROUP-A

- Name the proximate principles of food.
  - Calculate the energy value of a food containing 110 gm of protein, 70 gm of fat, and 300 gm of carbohydrate.
- Enumerate the common nutritional disorders of Bangladesh.
  - Differentiate between kwashiorkor and marasmus.
- Mention the fat-soluble vitamins with their active forms.
  - Write the dietary source, function, and deficiency features of Vitamin A.
- Define micromineral and macromineral with examples.
  - Write down the dietary sources, RDA, functions, and storage forms of iron in our body.
- Name the routinely measured serum electrolytes with their reference ranges.
  - Mention the total body water distribution of a 70 kg adult male. Enumerate the hormones that regulate water balance.
- A patient has the following laboratory results:  
Serum creatinine = 2.5 mg/dl, Urine creatinine = 100 mg/dl, and Urine flow rate = 2 ml/min.  
Calculate the creatinine clearance rate of the patient and comment on the result.
  - Define diuresis. Differentiate between osmotic and water diuresis.
- What is anion gap? Classify anion gap with examples.
  - Write down the primary defect of metabolic alkalosis. How is it being compensated and corrected?
- Write short notes on:
  - Limiting pH
  - Glycemic index

### GROUP-B

- Draw and label the Watson and Crick model of DNA.
  - Write down the differences between DNA and RNA.
- Draw and label a tRNA.
  - Write down the functions of different types of RNA.
- What do you mean by the organization of eukaryotic DNA?
  - How is DNA organized into a chromosome?
- Define genome, gene, genetic code, and codon.
  - Give the types and functions of codon with examples.
- State the differences between replication and transcription.
  - Write down the requirements and steps of replication.
- What is recombinant DNA technology? Write down its importance in medicine.
  - Briefly state the steps of PCR.

15. a) What is translation?  
b) Write in brief about the post-translational modification of mRNA.
16. Write short notes on:
  - a) Reverse transcription
  - b) DNA library

Ganglyon

**Examination of May 2021**

**GROUP-A**

1. a) Name the water-soluble vitamins with their active form.  
b) Mention the sources, functions, and deficiency disorders of Vitamin B1.
2. a) Define a balanced diet. Name the proximate principles of food.  
b) What is BMR? Give its reference value. Name the factors affecting BMR.
3. a) Define PEM. Give the latest WHO classification of PEM.  
b) Differentiate between kwashiorkor and marasmus.
4. a) Name the routinely measured serum electrolytes with their reference ranges.  
b) Write down trans-membrane K-flux.
5. a) Give the body water distribution in a 70 kg male.  
b) What is obligatory urine volume? Give its importance.
6. a) Define trace elements. Give their examples.  
b) Write the functions and deficiency disorders of three trace elements.
7. a) Classify simple acid-base disorders with their primary defects.  
b) Write down the causes and correction of simple respiratory acidosis.
8. Write short notes on:
  - a) Anion gap
  - b) Limiting pH

**GROUP-B**

9. a) Define gene, genome, and genetic code.  
b) What is nucleotide? Give its importance.
10. a) What is nucleic acid? Give its function.  
b) Write down five important differences between DNA and RNA.
11. a) Define transcription and post-transcriptional modification.  
b) Write in brief about post-transcriptional modification of mRNA.
12. a) Name the types of RNA with functions of each.  
b) Draw and label a transfer RNA (tRNA).
13. a) What is replication?  
b) Write down the requirements and steps of replication of a prokaryotic gene.
14. a) What is recombinant DNA technology? Give its importance.  
b) Write about the steps of PCR.
15. a) Define and classify mutation.  
b) Write about the effects of point mutation.
16. Write short notes on:
  - a) Post-translational modification
  - b) Nitrogen base

**Examination of May & November 2020**

**GROUP-A**

1. a) Define food, nutrition, diet, and balanced diet.  
b) What is BMR? Give its reference value. Name the factors affecting BMR.
2. a) Write down the active co-enzyme form of water-soluble vitamins. Differentiate between fat-soluble vitamins and water-soluble vitamins.  
b) Mention the sources, functions, and deficiency disorders of ascorbic acid.
3. a) Name the routinely measured electrolytes in ECF with their reference ranges.  
b) Briefly discuss sodium homeostasis.
4. a) Define PEM. Give the latest WHO classification of PEM.  
b) What is obesity? Mention the consequences of obesity.
5. a) Classify acid-base disorders with examples.  
b) Write down the causes, compensation, and correction of simple metabolic acidosis.
6. a) Define macronutrients and micronutrients. Give their examples.  
b) Write the functions and deficiency disorders of three trace elements.
7. a) Make a chart of daily water intake and output in an adult male.  
b) What is water turnover? Give its importance.
8. Write short notes on:
  - a) Anion gap
  - b) Trans-membrane  $K^+$  flux

**GROUP-B**

9. a) Define nucleoside, nucleotide, and nucleic acid with examples.  
b) Give the structure and functions of nucleotides.
10. a) Define genetic code.  
b) State the properties of a genetic code.
11. a) What is transcription?  
b) Write down the steps of transcription. Write in brief on its initiation process.
12. a) Differentiate between cloning and PCR.  
b) Write about the importance of PCR.
13. a) Write down the requirements and steps of translation.  
b) What is a polysome?
14. a) Define mutagen and mutation.  
b) Write in brief about point mutation.
15. a) What is central dogma? Give its importance and exception.  
b) Enumerate the salient features of replication.
16. Write short notes on:
  - a) Okazaki fragments
  - b) DNA library

**Examination of November 2019**

**GROUP-A**

1. a) Define and classify vitamin.  
b) Write the dietary sources and deficiency features of Vitamin B1 and folic acid.
2. a) Name the proximate principles of food.  
b) Mention the advantages and disadvantages of dietary fibers.
3. a) What are the different forms of calcium in blood?  
b) Briefly describe calcium homeostasis.
4. a) What is an electrolyte? Write the reference value of major electrolytes in ECF.  
b) State the renal regulation of serum  $K^+$ .
5. a) Classify simple acid-base disorders with their primary defects.  
b) Why does ketoacidosis develop in uncontrolled diabetes mellitus?
6. a) Differentiate between water and osmotic diuresis.  
b) What is obligatory urine output and limiting pH of urine?
7. a) Define and classify malnutrition.  
b) Differentiate between marasmus and kwashiorkor.
8. Write short notes on:
  - i) Water turnover
  - ii) BMI

#### GROUP-B

9. a) Define gene and genome.  
b) How is DNA organized into a chromosome?
10. a) What is nucleic acid? Give its functions.  
b) Differentiate between DNA and RNA.
11. a) Define replication.  
b) Write the features and requirements of replication.
12. a) What are the types of RNA? Mention their functions.  
b) Write about post-transcriptional modifications.
13. a) What is a codon and genetic code?  
b) Write in short about protein synthesis.
14. a) Define mutation.  
b) Discuss the types and effects of mutation.
15. a) What do you mean by post-translational modification?  
b) Write about covalent types of post-translational modifications with examples.
16. Write short notes on:
  - i) Cell cycle
  - ii) PCR

**Examination of May 2019**

#### GROUP-A

1. a) Name the proximate principles of food.  
b) Calculate the energy requirement of a female medical student.
2. a) Name the biochemical parameters to assess acid-base disorders.  
b) Write down the causes of respiratory acidosis. How is this condition compensated by the body?
3. a) How is body fluid distributed in different compartments?  
b) What is obligatory urine output and limiting pH of urine?
4. a) How is the normal serum sodium level maintained?  
b) Differentiate between water diuresis and osmotic diuresis.
5. a) Name the hematopoietic vitamins. Why are they called so?  
b) Explain "folate trap" by diagram.
6. a) Name the trace elements.  
b) Write about the dietary sources and functions of iron and iodine.
7. a) What are the different forms of calcium in blood?  
b) How is calcium regulated in our body?
8. Write short notes on:  
i) Visual cycle            ii) Anion gap

### **GROUP-B**

9. a) Define nucleic acid. Give its composition and types.  
b) Differentiate between DNA and RNA.
10. a) What is the central dogma of molecular biology?  
b) Write the requirements and criteria of replication. Why is it called a semi-conservative process?
11. a) Write down the functions of different types of RNA.  
b) Mention the role of vitamins in post-translational modification with examples.
12. a) What is transmembrane  $K^+$  flux? Write down the causes and consequences of hyperkalemia.  
b) Define osmolar gap and water turnover.
13. a) Define PCR with its clinical importance.  
b) What are the differences between PCR and biological cloning?
14. a) Define mutation and mutagens.  
b) Mention the types of mutation and why the effect of mutation sometimes remains silent.
15. a) What is transcription?  
b) How is the primary transcript modified to form a mature mRNA?
16. Write short notes on:  
i) Cell cycle            ii) Restriction endonuclease

## **Examination of November 2018**

### **GROUP-A**



1. a) What do you mean by plasma clearance and renal threshold?  
b) How is alkaline glomerular filtrate converted to acidic urine?
2. a) Make a water intake and output chart of an adult male.  
b) What is water turnover? Mention its importance.
3. a) Classify simple acid-base disorders with their primary defects.  
b) Write the causes and compensation of metabolic acidosis.
4. a) Define hyponatremia with its causes.  
b) Briefly discuss the regulation of sodium in ECF.
5. a) Define food, diet, nutrients, and balanced diet.  
b) Enumerate essential nutrients. Give the importance of dietary fibers.
6. a) Differentiate between fat-soluble and water-soluble vitamins.  
b) State the role of Vitamin A in vision.
7. a) What do you mean by micro-minerals? Enumerate them.  
b) Write about dietary sources, absorption, and functions of iron in our body.
8. Write short notes on:
  - i) Transcellular fluid
  - ii) BMI

### GROUP-B

9. a) Define nucleotide and nucleoside with examples.  
b) Write the names of purine and pyrimidine bases.
10. a) Define transcription and translation.  
b) Write about post-translational modification of a polypeptide chain.
11. a) What is PCR?  
b) Write about the requirements, steps, and importance of PCR.
12. a) Define and classify mutation.  
b) Give a brief description of point mutation.
13. a) Differentiate between DNA and RNA.  
b) Give the features of tRNA.
14. a) Define gene, genome, phenotype, and genotype.  
b) What is a genetic code? Give the characteristics of a genetic code.
15. a) Define central dogma. Write the importance of replication.  
b) State the requirements and features of replication.
16. Write short notes on:
  - i) Restriction enzyme
  - ii) Cell cycle

**Examination of May 2018**

### GROUP-A

1. a) Define trace element.  
b) Enumerate four (4) important micro-minerals with their functions and deficiency disorders.
2. a) Write the chemical name and co-enzyme form of water-soluble vitamins.  
b) What is folate trap?
3. a) Name the antioxidant vitamins.  
b) Mention the functions of different forms of Vitamin A. State deficiency disorders of this vitamin.
4. a) Name the common serum electrolytes with their reference ranges.  
b) How is potassium regulated in our body?
5. a) Classify simple acid-base disorders with their primary defect.  
b) State the role of the kidney in acid-base balance.
6. a) Calculate the distribution of body fluid in different compartments of a 70 kg adult male.  
b) Write in short about transcellular fluid.
7. a) Mention the factors that are considered during formulating a balanced diet for a particular person.  
b) What do you mean by the thermogenic effect of food and glycemic index?
8. Write short notes on:
  - i) Protein-energy malnutrition
  - ii) Anion gap

### GROUP-B

9. a) Enumerate the nitrogenous bases with their end product of metabolism.  
b) Differentiate DNA and RNA.
10. a) Mention different types of mutation with their consequences.  
b) What do you mean by karyotype?
11. a) Define biological cloning. Mention the steps of biological cloning.  
b) Write down the properties of a vector.
12. a) What is meant by RFLP?  
b) State the principle, requirements, and importance of PCR.
13. a) What do you mean by primary transcript?  
b) Write about the post-transcriptional modification of newly synthesized mRNA and tRNA.
14. a) Enumerate different types of RNA with their functions.  
b) What do you mean by central dogma?
15. a) Define chromosome, gene, and genome.  
b) Briefly outline the features of replication.
16. Write short notes on:
  - i) Biotechnology
  - ii) Cell cycle