P0105

RAN-2406000101010501

RAN-2406000101010501 / 2506000101012501

First Year M.B.B.S. Examination August - 2025

Human Anatomy (Paper - I) New

(Effective From 2023-24) Level - 1

Time: 3 Hours] **[Total Marks: 100**

સૂચના : / Instructions

(1) નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fill up strictly the details of ☛ signs on your answer book

Name of the Examination:

☛ First Year M.B.B.S.

Name of the Subject :

☛ Human Anatomy (Paper - I) New (Effective From 2023-24) Level - 1

Subject Code No.: 2506000101012501 / 2406000101010501

Seat No.:

Student's Signature

(2) Write each section in separate answer sheet.
(3) Draw neat and labelled diagrams wherever necessary.
(4) Figure to the right indicates maximum marks.
(5) In section A, all MCQs are compulsory; only one answer will be accepted, no Negative marking & answers will be marked with blue/black pen on OMR sheet & must be submitted within 30 minutes.

Section - A - MCQ (1×20=20)

1. A 50-year-old patient complained of double vision. On physical examination, the ophthalmologist found that his right eye, when at rest, was turned medially and when he was asked to turn it laterally, he failed to do so. Identify which cranial nerve is involved-
   [a] Right abducent nerve [b] Left abducent nerve
   [c] Right occulomotor nerve [d] Left occulomotor nerve

2. All the following muscles are supplied by ansa cervicalis except:
   [a] Sternothyroid [b] Omohyoid
   [c] Sternohyoid [d] Geniohyoid

3. Paralysis of which muscle causes ptosis in Horner syndrome :

[a] Superior tarsal muscle
[b] Orbitalis
[c] Levator palpebrae superioris
[d] Orbicularis oculi

4. Which of the following causes the opening of auditory tube?

[a] Tensor veli palatini
[b] Levatorveli palatini
[c] Palatoglossus
[d] Musculus uvulae

5. Which of the following reflexes tests the integrity of the nucleus ambiguous?

[a] Corneal reflex
[b] Gag reflex
[c] Stapedial reflex
[d] Jaw reflex

6. Occlusion of branches of which of following arteries can lead to loss of voluntary control of micturition & defaecation?

[a] Anterior cerebral artery
[b] Middle cerebral artery
[c] Posterior cerebral artery
[d] Anterior choroidal artery

7. Lesion of which component of visual pathway lead to bitemporal hemianopia?

[a] Optic nerve
[b] Optic tract
[c] Optic chiasma
[d] Optic cortex

8. Fasciculus gracilis & fasciculus cuneatus contain fibres of _____ order neuron formed by efferents of _____ .

[a] 1st, dorsal root ganglion
[b] 1st, nucleus gracilis & cuneatus
[c] 2nd, dorsal root ganglion
[d] 2nd, nucleus gracilis & cuneatus

9. Stria terminalis is efferent fibres of:

[a] Globus pallidus
[b] Amygdaloid body
[c] Claustrum
[d] Caudate nucleus

10. Froment's sign tests the integrity of which of the following muscles?

[a] Flexor pollicis brevis
[b] Abductor pollicis brevis
[c] Opponens pollicis
[d] Adductor pollicis

11. Skin over axilla is supplied by:

[a] Radial nerve
[b] Musculocutaneous nerve
[c] Intercosto-brachial nerve
[d] Median nerve

12. A deep laceration on the radial side of the wrist as in suicide attempt may cut the following structures from lateral to medial side:

[a] Radial artery, Median nerve, Tendon of flexor carpi radialis, Tendon of palmaris longus, Tendon of flexor digitorum superficialis
[b] Radial artery, Tendon of flexor carpi radialis, Median nerve, Tendon of palmaris longus, Tendon of flexor digitorum superficialis
[c] Radial artery, Tendon of flexor carpi radialis, Tendon of palmaris longus, Median nerve, Tendon of flexor digitorum superficialis
[d] Median nerve, Radial artery, Tendon of flexor carpi radialis, Tendon of palmaris longus, Tendon of flexor digitorum superficialis

13. Which of the following does not form the boundary of quadrangular space?

[a] Surgical neck of humerus
[b] Long head of triceps
[c] Teres major
[d] Long head of biceps

14. In patient having Golfer's elbow or medial epicondylitis, which of the following muscles is not affected?

[a] Flexor pollicis longus
[b] Flexor carpi radialis
[c] Pronator teres
[d] Palmaris longus

15. Which of the following is not a portal circulation:

[a] Hypophyseal
[b] Hepatic circulation
[c] Renal circulation
[d] Pulmonary circulation

16. Match the following muscle pairs with regard to type of muscle fibres:

1. Rectus femoris	a. Multipennate fibres
2. Deltoid	b. Unipennate fibres
3. Tibialis anterior	c. Bipennate muscle
4. Palmar interossei	d. Circumpennate

[a] 1-b, 2-d, 3-a, 4-c
[b] 1-c, 2-a, 3-d, 4-b
[c] l-d, 2-a, 3-b, 4-c
[d] 1-c, 2-d, 3-a, 4-b

17. Intervillous spaces of placenta contains:
[a] Maternal blood [b] Foetal blood
[c] Amniotic fluid [d] Both maternal & foetal blood

18. All the following neuroglial cells develop from ectoderm except:
[a] Astrocyte [b] Oligodendrocyte
[c] Microglia [d] Ependymal cell

19. All statements regarding histology of cornea are true except:
[a] Lined by stratified columnar epithelium
[b] Stroma contain collagen fibres
[c] Rich nerve supply
[d] Avascular structure

20. Which of the following cells constitute Hassall's corpuscles:
[a] Macrophages [b] B Lymphocytes
[c] Epithelial reticular cells [d] T Lymphocytes

Section - B

Q. 2. **Long essay question -** **(1×10=10)**

Describe in detail about the structures seen in the transverse section of midbrain at the level of inferior colliculus. Mention the arterial supply of midbrain. Explain the anatomical basis of the symptoms of the weber's syndrome.

Q. 3. **Give the Anatomical/Embryological Reason of any 5 -** **(5×3=15)**

1. A 24 years old soldier was brought to the emergency with a recent history of bullet injury in the back region. On examination doctor noticed ipsilateral upper motor neuron paralysis below the level of the lesion with ipsilateral loss of proprioceptive sensations & contralateral loss of pain, temperature & touch sensation. He was diagnosed a case of Brown-Sequard syndrome. Explain anatomical reason of presenting symptoms.
2. Define goitre. Explain the anatomical basis of pressure symptoms produced by goitre.
3. Define ulnar paradox. Explain its anatomical basis.
4. Which carpel bone is most likely to fracture? Explain the anatomical basis of most common complication of fracture of this bone.
5. Explain the anatomical basis of presenting symptoms of cavernous sinus thrombosis.
6. Explain the anatomical basis of Zenker's diverticulum.

Q. 4. **Write short notes on any 3 -** **(3×5=15)**

1. Layers of scalp.
2. Muscles of mastication
3. Posterior interosseous nerve.
4. Histology of Retina.

Section - C

Q. 5. **Applied aspect -** **(4×5=20)**

1. Hoarseness of voice.
2. Enumerate the modifications of deep fascia of the palm. Explain the anatomical basis of Dupuytren's contracture
3. Anencephaly.
4. Nerve supply of tongue with its embryological basis.

Q. 6. **Write short notes on** **(4×5=20)**

1. Metaphysis & its clinical significance **or** Classification of nerve injury
2. Anomalies of placenta
3. Difference between Histological features of elastic artery & muscular artery.
4. Role of human cadaveric dissection in anatomy.

P0107

RAN-2406000101010502

RAN-2406000101010502 / 2506000101012502

First Year M.B.B.S. Examination September - 2025

Human Anatomy (Paper - II) New

(Effective From 2023-24) Level - 1

Time: 3 Hours] **[Total Marks: 100**

સૂચના : / Instructions

(1) નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fill up strictly the details of ☛ signs on your answer book

Name of the Examination:

☛ First Year M.B.B.S.

Name of the Subject :

☛ Human Anatomy (Paper - II) New (Effective From 2023-24) Level - 1

Subject Code No.: 2406000101010502 / 2506000101012502

Seat No.:

Student's Signature

(2) Write each section in separate answer sheet.
(3) Draw neat and labelled diagrams wherever necessary.
(4) Figure to the right indicates maximum marks.
(5) In section A, all MCQs are compulsory; only one answer will be accepted, no Negative marking & answers will be marked with blue/black pen on OMR sheet & must be submitted within 30 minutes.

Section - A (1×20=20)

1. Ligation of common hepatic artery will impair the blood supply in:
   [a] Right gastric & left gastric artery
   [b] Right gastric & right gastroepiploic artery
   [c] Right gastroepiploic & short gastric vessels
   [d] Right gastric & short gastric vessels

2. Correct statement regarding urinary bladder is:
   [a] Space of Retzius is present behind external trigone
   [b] Apex provide attachment to medial umbilical ligament
   [c] Uvula vesicae is part of internal urethral orifice
   [d] Sphincter urethra surrounds the neck of bladder

3. Which of the following arteries pass in front of uncinate process of pancreas?

[a] Superior mesenteric artery
[b] Inferior mesenteric artery
[c] Coeliac trunk
[d] Splenic artery

4. Cremasteric fascia around spermatic cord is derived from:

[a] Internal oblique
[b] Transverse abdominis
[c] Cremaster
[d] Fascia transversalis

5. All statements are correct about psoas major muscle except:

[a] It contains the lumber plexus within the substance
[b] It is pierced by the genitofemoral nerve
[c] It arises from all the lumbar vertebraelnguinal
[d] It is the chief extensor of the hip joint

6. Which of the following nerves are called as typical intercostal nerves?

[a] 1, 2, 3, 4
[b] 2, 3, 4, 5
[c] 3, 4, 5, 6
[d] 4, 5, 6, 7

7. All the following joints of thorax are synovial joints except:

[a] Interchondral joint
[b] Costochondral joint
[c] Costovertebral joint
[d] Costotransverse joint

8. All the following are present in the right ventricle except:

[a] Supra-ventricular crest
[b] Tendon of Todaro
[c] Chordae tendinea
[d] Papillary muscle

9. All the following structures produce constrictions of oesophagus except:

[a] Arch of azygos vein
[b] Arch of aorta
[c] Left principal bronchus
[d] Upper oesophageal sphincter

10. Cardiac notch present in the _____ lung extends from _____ costal cartilages.

[a] Left, 2^{nd} to 5^{th}
[b] Right, 2^{nd} to 5^{th}
[c] Left, 4^{th} to 6^{th}
[d] Right, 4^{th} to 6^{th}

11. A patient with tarsal tunnel syndrome presents with complaints of pain over the heel. Compression of which nerve can cause this syndrome -

[a] Tibial nerve
[b] Common peroneal nerve
[c] Grear saphenous nerve
[d] Short saphenous nerve

12. Oblique popliteal ligament is expansion from the tendon of ____ muscle.

[a] Biceps femoris
[b] Adductor magnus
[c] Semitendinosus
[d] Semimembranosus

13. Positive Trendelenburg sign is seen in injury of:

[a] Gluteus medius & minimus
[b] Gluteus maximus
[c] Quadriceps femoris
[d] Soleus

14. Line of gravity passes posterior to:

[a] Sacrum
[b] Knee joint
[c] Hip joint
[d] Ankle joint

15. Example of Y-linked inheritance is:

[a] Hairy pinna
[b] Leber's hereditary optic neuropathy
[c] Alkaptonuria
[d] Duchenne muscular dystrophy

16. A family pedigree shows that a genetic disorder affects every generation without skipping. Both males & females are equally affected. Onset of symptoms occurs later in life. Which inheritance pattern is most likely:

[a] Autosomal dominant
[b] Autosomal recessive
[c] X-linked recessive
[d] Y-linked inheritance

17. Uterus develop from:

[a] Ureteric bud
[b] Metanephros
[c] Mesonephric duct
[d] Para-mesonephric duct

18. All the following act as shunts to divert the blood flow during foetal circulation except:

[a] Foramen ovale
[b] Conus cordis
[c] Ductus arteriosus
[d] Ductus venosus

19. While observing the histology slide of lung, a student identifies Clara cells, which of the following airways was observed by the student -

[a] Bronchiole [b] Alveoli

[c] Alveolar duct [d] Alveolar sac

20. Microvilli are absent in:

[a] Ileum [b] Duodenum

[c] Stomach [d] Jejunum

Section - B

Q. 2. Long essay question - (1×10=10)

Describe rectus sheath in detail under following headings -

a. Its formation

b. contents and function

c. Write a note on rectus abdominis muscle with the functional importance of tendinous intersection of rectus abdominis muscle.

Q. 3. Give the Anatomical/ Embryological Reason of any 5 - (5×3=15)

1. A young executive complained of pain in abdomen in the epigastric region. He was always in hurry, gets worried very often & loves to eat spicy foods. What will be the cause of pain & why the pain referred to epigastric region?
2. A 15-year-old (riding a bicycle) got an accident. He was hit in the perineum with a sharp object. He did not pass urine after the trauma. During examination, the urethra was crushed against the edge of the pubic bones. The urine reaches deep to the anterior abdominal wall but not into the thigh. Give its anatomical reason.
3. Explain the anatomical basis of Myocardial infarction
4. Give the anatomical basis of Congenital dislocation of hip joint
5. Explain the embryological basis of patent ductus arteriosus
6. What is an anatomical reason of Anterior leg syndrome

Q. 4. Write short notes on any 3 - (3×5=15)

1. Posterior relations of kidney
2. Lobes of prostate & their clinical significance
3. Factors helping the venous drainage of lower limb
4. Histology of Pancreas

Section - C

Q. 5. **Applied aspect - attempt all -** **(4×5=20)**

1. Acute appendicitis
2. Bursae situated around the knee joint & their applied aspect
3. Ectopia vesicae
4. Pleural effusion

Q. 6. **Write short notes on -** **(4×5=20)**

1. Autosomal dominant & recessive inheritance **or** Trisomy 21
2. Histology of Placenta
3. Tubal pregnancy & methods to assess tubal patency
4. Name the factors that can facilitate effective communication in doctor-patient relationships.

P0109

RAN 2406000101020601

RAN-2406000101020601/2506000101022601

First Year M.B.B.S. Examination September - 2025

Physiology (Paper - I) (New)

(Effective From 2023-24) Level - 2

Time: 3 Hours] **[Total Marks: 100**

સૂચના : / Instructions

(1) નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
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Name of the Examination:

☛ **First Year M.B.B.S.**

Name of the Subject :

☛ **Physiology (Paper - I) (New) (Effective From 2023-24) Level - 2**

Subject Code No.: **2406000101020601/2506000101022601**

Seat No.:

Student's Signature

SECTION "A" Multiple Choice Question (MCQ)

Instructions : Select one of the most appropriate choice out of four options in each Multiple Choice Question.

Q. 1. MCQ Based **1×20=20**

1. Iron deficiency anaemia is :
   a) Normocytic normochronic
   b) Normocytic hypochromic
   c) Microcytic hypochromic
   d) Macrocytic hypochromic
2. Erythroblastosis foetalis is :
   a) Destruction of RBCs of mother by foetal Rh antibodies
   b) Haemolysis in foetus due to maternal Rh antibodies
   c) Haemolysis in foetes due to maternal ABO antibodies
   d) Destruction of RBCs of mother by foetal ABO antibodies
3. Presentation of antigen on major histocompatibility complex (MHC)-I by a cell will result in which of the following?
   a) Generation of antibodies
   b) Activation of cytotoxic T cells
   c) Increase in phagocytosis
   d) Release of histamine by mast cells

4. Immunoglobulins that provides localized protection :

a) IgG b) IgA

c) IgM d) IgD

5. Peripheral resistance falls by :

a) Increase in mean arterial pressure

b) Increase in temperature

c) Decrease in cardiac output

d) Increase in mean arterial pressure and cardiac output

6. Range of operation of baroreceptors is between :

a) 0-60 mmHg b) 0-200 mmHg

c) 60-200 mmHg d) 150-200 mmHg

7. Sudden death may occur in an individual following a massive heart attack due to activation of:

a) Bainbridge reflex

b) Cushing reflex

c) Bezold Jarisch reflex

d) Hering-Breurer reflex

8. According to Frank-Starling Law, cardiac output is increased by :

a) Increased end-systolic volume

b) Increased end-diastolic volume

c) Increased heart rate

d) Catecholamines

9. Which of the following has the maximum oxygen consumption (ml/min) at rest :

a) Brain

b) Skeletal muscle

c) Heart muscle

d) Kidneys

10. Which molecule has the greatest effect in controlling lung ventilation?

a) Oxygen in the blood

b) Hydrogen ions in the blood

c) Carbon dioxide in the blood

d) Oxygen in the cerebrospinal fluid

11. In which form is the majority of CO2 transported in the blood?
    a) As a dissolved solute
    b) Bound to plasma proteins
    c) As carbonic acid molecules
    d) As bicarbonate (HCO3–) ions
12. What are the cells that produce surfactant called?
    a) Mucus cells
    b) Ciliated cells
    c) Alveolar macrophages
    d) Type II pneumocytes
13. With regard to the respiratory centre, which of the following is TRUE?
    a) Blood oxygen concentration affects the respiratory centre.
    b) Anaesthetics don't affect respiration.
    c) Raised intracranial pressure increases ventilation.
    d) Narcotic drugs may depress ventilation.
14. Given that the lung contains a residual air volume of ~1.2 L and has an expiratory reserve volume of ~1.2 L and the dead space is about 150 ml, while resting tidal volume is about 500 ml, approximately what percentage of the volume of air in the lung is turned over during one normal tidal inhalation at rest?
    a) 5% b) 15%
    c) 60% d) 90%
15. Which of the following does NOT contribute to increasing the surface area of the small intestine?
    a) The brush border b) Plicae circulars
    c) Intestinal crypts d) D. Villi
16. A 65-year-old man eats a healthy meal. Approximately 40 minutes later the ileocecal sphincter relaxes and chyme moves into the cecum. Gastric distention leads to relaxation of the ileocecal sphincter by way of which reflex?
    a) Enterogastric
    b) Gastroileal
    c) Gastrocolic
    d) Intestino-intestinal

17. Which change would you expect to find in a patient consuming a high-sodium diet (200 mEq/day) compared with the same patient on a normal-sodium diet (100 mEq/day), assuming steady-state conditions?

a) Increased plasma aldosterone concentration

b) Increased urinary potassium excretion

c) Decreased plasma renin activity

d) Decreased plasma atrial natriuretic peptide

18. Which hormone causes an increase in permeability to water in the collecting ducts of the kidney?

a) Antidiuretic hormone b) Aldosterone

c) Angiotensin II d) Atrial natriuretic hormone

19. What effect does aldosterone have?

a) Increases the absorption of Na+ from the kidney tubules

b) Makes the kidney tubules more permeable to water

c) Catalyses the formation of angiotensin I

d) D. Blocks the release of ADH

20. The resting potential of a myelinated nerve fiber is primarily dependent on the concentration gradient of which of the following ions?

a) Ca++ b) Cl –

c) K+ d) Na+

SECTION "B"

Q. 2. Define Blood Pressure. Describe mechanism of short term regulation of Blood Pressure & add a note on primary hypertension. **1+6+3=10**

Q. 3. **Short notes- Reasoning type (5 out of 6)(3 marks each)** **3×5=15**

a) Why excitability is lost during absolute refractory period?

b) Why muscles get stiff after death?

c) How AV Nodal delay helps in sufficient ventricular filling?

d) How Rh incompatibility leads to erythroblastosis foetalis?

e) Why there is joint pain after deep see diving?

f) How trypsin inhibitor prevents autodigestion of pancrease?

Q. 4. Short Notes (any 3 out of 4) **3×5=15**

a. Regulation of Cardiac Output

b. Intrinsic pathway of coagulation.

c. Glomerular Filtration Rate.

d. Oxy-Haemoglobin dissociation curve.

SECTION "C"

Q. 5. Short notes (any 4 out of 5) (5 marks each) **4×5=20**

a. Juxta Glomerular Apparatus.

b. Myasthenia Gravis

c. Functions of RBC

d. Resting membrane potential.

e. Surfactant.

Q. 6. Short notes (any 4 out of 5) (5 marks each) **4×5=20**

a. Iron deficiency Anaemia.

b. What is empathy in clinical practice?

c. Cardiovascular responses to exercise.

d. Timed vital Capacity & its significance.

e. Diuretics & its clinical uses.

P0111

RAN-2406000101020602

RAN-2406000101020602 / 2506000101022602

First Year M.B.B.S. Examination September - 2025

Physiology (Paper - II) New

(Effective From 2023-24) Level - 2

Time: 3 Hours] **[Total Marks: 100**

સૂચના : / Instructions

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Name of the Examination:

☛ First Year M.B.B.S.

Name of the Subject :

☛ Physiology (Paper - II) New (Effective From 2023-24) Level - 2

Subject Code No.: 2406000101020602 / 2506000101022602

Seat No.:

Student's Signature

Section - "A" Multiple Choice Question (MCQ)

Instructions: Select one of the most appropriate choice out of four options in each Multiple Choice Question.

Q. 1. MCQ Based **(1×20=20)**

1. A 76-year-old man has a stroke that severely impairs his speech. Which area of his brain is most likely damaged?
   a) Primary motor cortex
   b) Premotor area
   c) Broca's area
   d) Cerebellum

2. Afferent signals from the periphery of the body travel to the cerebellum in which nerve tract?
   a) Ventral spinocerebellar
   b) Vestibulocerebellar
   c) Reticulocerebellar
   d) Dorsal spinocerebellar

3. Which cells receive direct synaptic input from Golgi tendon organs?
   a) Type la inhibitory interneurons
   b) Dynamic gamma motor neurons
   c) Alpha motor neurons
   d) Type lb inhibitory interneurons

4. Retrograde amnesia is the inability to recall long-term memories. Damage to which brain region leads to retrograde amnesia?

a) Hippocampus
b) Dentate gyrus
c) Amygdaloid complex
d) Thalamus

5. In an otherwise normal person, dysfunction of which brain area will lead to behavior that is not appropriate for the given social occasion?

a) Ventromedial nuclei of hypothalamus
b) Amygdala
c) Corpus callosum
d) Fornix

6. Which structure serves as an "alternative pathway" for signals from the motor cortex to the spinal cord?

a) Red nucleus
b) Basilar pontine nuclei
c) Caudate nucleus
d) Thalamus

7. Which part of the brain allows us to control skilled voluntary muscle movements?

a) Basal nuclei
b) Cerebellum
c) Precentral Gyrus
d) Thalamus

8. Which part of the brain subconsciously provides precise timing for the movements of learned skeletal muscle contraction?

a) Cerebrum
b) Diencephalon
c) Brainstem
d) Cerebellum

9. What is the likely result of an injury that severs the spinal cord between C5 and C6?

a) Respiratory failure and death
b) Paraplegia
c) Hemiplegia
d) Quadriplegia

10. What is the function of the reticular formation (or reticular activating system) of the brain?
    a) It is the emotional or affective part of the brain.
    b) It allows emotion to override logic and vice versa.
    c) It controls our circadian rhythm.
    d) It receives and integrates all incoming sensory input.

11. Which one of the following is a primary sex characteristic of a male human?
    a) Spermiogenesis
    b) The prostate
    c) Comparatively deep voice
    d) Body hair

12. Spermatozoa are capacitated by mixing with the secretions of "peg" cells. Where are these cells located?
    a) In the seminal vesicles
    b) In the prostate gland
    c) In the epididymis
    d) In the fallopian tubes

13. After menopause, hormone replacement therapy with estrogen-like compounds is effective in preventing the progression of osteoporosis. What is the mechanism of their protective effect?
    a) They stimulate the activity of osteoblasts
    b) They increase absorption of calcium from the gastrointestinal tract
    c) They stimulate calcium reabsorption by the renal tubules
    d) They stimulate parathyroid hormone (PTH) secretion by the parathyroid gland

14. Which one of the following is NOT part of the endocrine system?
    a) The islets of Langerhans (pancreatic islets)
    b) The thyroid gland
    c) The acini cells of the pancreas
    d) The parathyroid glands

15. Which of the following statements about corticosteroids is true?
    a) They may also act as neurotransmitters.
    b) They are transported dissolved in blood.
    c) They are produced by the adrenal gland.
    d) They are amino acid derivatives.

16. Which hormones are soluble in blood?
    a) Steroid hormones
    b) Hormones produced by the adrenal cortex
    c) The sex hormones
    d) Those released by the pituitary gland

17. Iodine is an essential component of which hormone?
    a) Thyroid hormones
    b) Aldosterone
    c) Thyroid-stimulating hormones
    d) Parathyroid hormone.

18. Complete the sentence correctly. Parathyroid hormone:
    a) Is produced by the parafollicular cells of the thyroid gland
    b) Decreases the concentration of Ca++ in the blood
    c) Releases Ca++ from the sarcoplasmic reticulum
    d) Increases the concentration of Ca++ in the blood

19. Which neurons are unipolar?
    a) Neurons in the central nervous system
    b) Neurons in the retina
    c) Sensory neurons
    d) Motor neurons

20. Which of the following would conduct an action potential with the greatest speed?
    a) Myelinated, large diameter fibres
    b) Myelinated, small diameter fibres
    c) Unmyelinated, large diameter fibres
    d) Unmyelinated, small diameter fibres

Section - "B"

Q. 2. Enumerate the steps of Thyroid Hormone synthesis. Describe in detail the Causes, Clinical features & Management of Hyperthyroidism. **(4+6=10)**

Q. 3. **Short notes - Reasoning type (5 out of 6) (3 marks each)** **(3×5=15)**

1. Why microglial cells are called scavenger cells?
2. Why damage to Wernicke's area causes fluent aphasia?
3. Why hypoparathroidism causes Tetany?
4. Why lesion in basal ganglia causes Parkinsonism?
5. Why long distance air travel leads to "Jet lag" phenomena?
6. How Oral Contraceptive pills prevent the pregnancy?

Q. 4. **Short notes (any 3 out of 4) (5 marks each)** **(5×3=15)**

1. Functions of Autonomic Nervous System
2. Menstrual cycle
3. Organ of Corti
4. Functions of Hypothalamus

Section - "C"

Q. 5. **Short notes:- (any 4 out of 5) (5 marks each)** **(5×4=20)**

1. Functions of Thalamus.
2. Functions of Cerebellum
3. Myopia
4. Mechanisms of Heat Loss
5. Wallerian Degeneration

Q. 6. **Short Notes:- (4 out of 5) (5 marks each)** **(5×4=20)**

1. Clinical features of Diabetes Mellitus
2. Empathy in the Doctor-Patient relationship
3. Consequences of sedentary life style.
4. Management of hearing loss.
5. EEG changes during NREM sleep

P0114

RAN-2506000101032701

RAN-2506000101032701/2406000101030701

First Year M.B.B.S. Examination September - 2025

Biochemistry (Paper - I) Level - 3

Time: 3 Hours] **[Total Marks: 100**

સૂચના : / Instructions

(1) નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fill up strictly the details of ☛ signs on your answer book

Name of the Examination:

☛ **First Year M.B.B.S.**

Name of the Subject :

☛ **Biochemistry (Paper - I) Level - 3**

Subject Code No.: **2506000101032701/2406000101030701**

Seat No.:

Student's Signature

Instructions for Section A:

(2) All questions are compulsory.
(3) Each MCQ has only one correct answer.
(4) One Mark for correct answer. No negative marking.

SECTION : A **(1 × 20 = 20)**

1. If blood for glucose estimation is collected in a tube without fluoride, what error may occur?
   a. Falsely high glucose due to hemolysis
   b. Falsely low glucose due to ongoing glycolysis
   c. No change in glucose level
   d. Falsely elevated sodium level
2. A 7-day-old male neonate is brought to the emergency room with bleeding from the umbilical stump and fresh blood in stools. There is no family history of bleeding disorders. On examination, the baby is pale, irritable, and has mild hepatomegaly. Laboratory findings reveal Prolonged prothrombin time and, low levels of clotting factors II, VII, IX, and X. Which of the following deficiency leads to this condition?
   a. Vitamin A
   b. Vitamin D
   c. Vitamin E
   d. Vitamin K

3. Gaucher's disease is due to deficiency of the enzyme:
   a. Sphingomyelinase
   b. Glucocerebrosidase
   c. α-Galactosidase
   d. β-Galactosidase
4. A 32-year-old female working in a laboratory accidentally ingests cyanide and is rushed to the hospital. She is declared dead upon reaching the hospital. Which complex of the electron transport chain is most likely inhibited by cyanide?
   a. Complex I (NADH dehydrogenase)
   b. Complex II (Succinate dehydrogenase)
   c. Complex III (Cytochrome bc_1 complex)
   d. Complex IV (Cytochrome c oxidase)
5. Which one of the following molecules act as a donor in detoxification by Conjugation.
   a. S-Adenosine Methionine (SAM)
   b. Glutathione (GSH)
   c. Phospho-adenosine phosphosulphate (PAPS)
   d. All the above
6. All the following are detoxifying agents except:
   a. Glycine
   b. Glutathione
   c. Glucuronic Acid
   d. Glycogen
7. Which vitamin is required for transamination reactions?
   a. Biotin
   b. Pyridoxine (Vitamin B6)
   c. Vitamin K
   d. Thiamine (Vitamin B1)
8. The most important extracellular buffer is:
   a. Carbonic acid-bicarbonate buffer
   b. Phosphate buffer
   c. Haemoglobin buffer
   d. None of the above

9. A 15-year-old girl from a hilly village presents with a gradually enlarging swelling in the front of her neck over the past year. On examination, the thyroid is diffusely enlarged but non-tender. She has no signs of hyperthyroidism or hypothyroidism. Her diet mainly consists of locally grown vegetables and has limited access to iodized salt. Which of the following mineral deficiency is associated with this condition?

a. Iodine
b. Iron
c. Zinc
d. Magnesium

10. A 28-year-old woman with a history of chronic vomiting due to a gastric outlet obstruction presents with weakness and muscle cramps. ABG reveals: pH = 7.50, HCO_3- = 32 mEq/L, $PaCO_2$ = 48 mmHg, K^+ = 2.9mEq/L, Cl^- = 91 mEq/L. What is the most likely acid-base disorder?

a. Respiratory acidosis
b. Metabolic acidosis with respiratory compensation
c. Metabolic alkalosis with respiratory compensation
d. Mixed acid-base disorder

11. A 35-year male was brought to emergency in an unconscious state. He was a habitual drinker. When his blood sample was analyzed, blood glucose levels were found to be low (48mg/dl). Blood glucose levels were low due to:

a. Increase in the catabolism of blood glucose
b. Increased availability of NAD+
c. Decreased availability of pyruvate and oxaloacetate
d. Increased availability of NADPH

12. Which of the following amino acids can act as anaplerotic sources by conversion into TCA cycle intermediates?

a. Leucine and lysine
b. Glutamate and aspartate
c. Tyrosine and phenylalanine
d.. Tryptophan and histidine

13. A medical student has been studying for exams, and neglects to eat anything for 12 hours. At this point, the student opens a large packet of potato chips and eats every one of them in a short period. Which one of the following is elevated in his plasma?

a. Chylomicrons
b. Glucagon
c. Acetolactate
d. Free fatty acids

14. All of the following serve as cofactors for enzymes of TCA cycle, except:
    a. Biotin
    b. Pantothenic Acid
    c. Riboflavin
    d. Niacin
15. A hypochromic microcytic anemia with increased iron stores in the bone marrow may be
    a. Iron responsive
    b. Pyridoxine responsive
    c. Vitamin B12 responsive
    d. Folate responsive
16. A person with Type 1 diabetes went on a trip and ran out of insulin, after 4 days she felt lethargic, nauseous, and had difficulty standing. After appropriate treatment, which one of the following liver enzymes would be reduced in activity as compared to before treatment?
    a. Phosphofructokinase - 2
    b. Pyruvate dehydrogenase
    c. Pyruvate kinase
    d. Fructose 1, 6 - bisphosphatase
17. Ribosomes are primarily involved in which of the following processes?
    a. Lipid synthesis
    b. Protein synthesis
    c. DNA replication
    d. Detoxification
18. A 3-month-old girl is developing cataracts. Other than not having a social smile or being able to track objects visually, all other aspects of the girl's examination are normal. Tests on the baby's urine are positive for reducing sugar but negative for glucose, which enzyme is most likely deficient in this girl?
    a. Aldolase B
    b. Fructokinase
    c. Galactokinase
    d. Galactose 1-phosphate uridylyltransferase
19. Superoxide dismutase protects the cell by converting superoxide radicals into:
    a. Oxygen and water
    b. Nitric oxide
    c. Hydrogen peroxide
    d. Hydroxyl radicals

20. A 32-year-old poorly controlled diabetic pregnant lady is undergoing amniocentesis at 36 weeks for fetal lung maturity prior to having a caesarean delivery. Which of the following laboratory tests results on the amniotic fluid would best indicate that the Fetal lungs are mature?

a. Phosphatidylglycerol is present

b. Lecithin/sphingomyelin (L/S) ratio of 1:1

c. Cephalin is present

d. Phosphatidylinositol is present

Instructions for Section B and C:

1) Use Blue/Black Ball-point pen only.
2) The numbers on the right indicates full marks.
3) Draw Labelled diagrams wherever necessary.

SECTION: B

Q. 2. Long Question-Answers. (1 out of 2) **(1×10 =10)**

1. What is glycolysis? What is the importance of glycolysis? Describe the pathway of Glycolysis including energetics and Regulation (1+2+5+1+1)

2 Describe at least six risk factors for Atherosclerosis. Describe LDL-cholesterol metabolism. Describe the causes of primary familial hypercholesterolemia. Explain the basis of using the 'Statin' group of drugs to reduce cholesterol levels. (3+3+2+2)

Q. 3. Justification Questions. (5 out of 6) **(5×3 =15)**

1. Biotin is known as Anti-egg white injury factor
2. Septic shock leads to metabolic acidosis.
3. Liver the primary site for xenobiotic metabolism.
4. Acute respiratory distress syndrome is seen more frequently in premature infants
5. Calcium level in blood is increased by parathyroid hormone. Explain.
6. Eating raw fish causes thiamine deficiency, Explain.

Q. 4. **Short Notes. (3 out of 4)** **(3×5=15)**

1. Describe Protein Energy Malnutrition.
2. Pentose Phosphate Pathway
3. Ketone bodies - synthesis, breakdown and regulation.
4. Describe the sources, requirement and deficiency manifestation of Vitamin A.

SECTION: C

Q. 5. **Clinical Aspects/Cases.** **(4×5 =20)**

1. A 10-year-old girl presented with excessive tiredness, poor appetite, inability to concentrate and tingling sensations. On examination, there was pallor. Laboratory examination revealed a decrease in hemoglobin, ferritin, and MCV. Total iron-binding capacity (TIBC), transferrin, and Red Cell Distribution Width (RDW) were increased. She was diagnosed with iron deficiency anemia.
   a. Explain how iron is conserved in our body. (2)
   b. Explain the role of various proteins in iron absorption. (3)

2. A 4-year-old boy is brought to the paediatric outpatient department by his mother with complaints of bowing of the legs and delayed walking. The child appears underweight for his age. On examination, there is frontal bossing, widening of the wrists, and a "rachitic rosary" along the rib cage. His diet mainly consists of cereal-based meals, and he rarely plays outside. A chest X-ray reveals cupping and fraying at the metaphyseal ends of long bones. Blood tests report was a below,
   Serum Calcium: 7.5 mg/dl (Reference range 8.5 – 10.5 mg/dl)
   Serum Phosphate: 2.7 mg/dl (Reference range: 3.5 – 4.5 mg/dl)
   Vitamin D3: 20 ng/ml (Reference range: 30-50 ng/ml)
   a. What is the most likely diagnosis and which clinical signs point towards it? (2)
   b. Explain the role of Vitamin D in calcium and phosphate metabolism. (2)
   c. What are the dietary and non-dietary measures to prevent Vitamin D deficiency in children? (1)

3. A 65-year-old man was brought to the hospital in a semiconscious state. The patient displayed a typical hyper ventilatory breathing pattern with fruity smell in his breath. The pulse was feeble and hypotension was noted. The laboratory reports were ordered and were as below:

pH: 7.10	Serum Na^+ : 135.5 mmol/L,
pCO2:39.0 mm of Hg	Serum K^+ : 6.5mmol/L
HCO3 :14.0 mmol/L	Serum Cl^- : 90mmol/L

Random Blood Sugar: 451 mg/dl.

a. Identify the acid base disorder in above case with justification. (1)

b. Calculate Anion Gap. (1)

c. Give any 2 causes of High Anion Gap Metabolic Acidosis. (1)

d. Explain the basis of hyperkalemia in this case. (2)

4. 45-year-old female with Body Mass Index (BMI) of 35 kg/m2 and diagnosis of diabetes mellitus (DM) for 7 years came to Medicine OPD for increased frequency of micturition, tingling and numbness in bilateral palm and soles, diarrhea and history of not taking any treatment for DM for last 3 months. Clinician advised report of random plasma glucose; the result was 332 mg/dl. The clinician advised report of fasting and post prandial plasma glucose; the result was 276 mg/dl and 567 mg/dl respectively.

a. What is a diagnostic criterion for diagnosis of DM based on plasma glucose concentration (WHO criteria)? (2)

b. Why uncontrolled diabetes mellitus leads to ketosis? (1)

c. Write acute and chronic complication of Diabetes mellitus. (2)

Q. 6. Short Notes. **(4×5 =20)**

1. Describe and discuss commitment to lifelong learning as an important part of physician's life.
2. Free radical scavenging system.
3. Inhibitors of Electron Transport Chain.
4. Clinical significance of Phospholipids

P0116

RAN-2506000101032702

RAN-2506000101032702 /2406000101030702

First Year M.B.B.S. Examination September - 2025

Biochemistry (Paper - II) Level - 3

Time: 3 Hours] **[Total Marks: 100**

સૂચના : / Instructions

(1) નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fill up strictly the details of ☛ signs on your answer book

Name of the Examination:

☛ **First Year M.B.B.S.**

Name of the Subject :

☛ **Biochemistry (Paper - II) Level - 3**

Subject Code No.: **2506000101032702 /2406000101030702**

Seat No.:

Student's Signature

Instructions for Section A:

(2) All questions are compulsory.

(3) Each MCQ has only one correct answer.

(4) One Mark for correct answer. No negative marking.

SECTION: A

Q. 1. Multiple Choice Question. **(1 × 20 =20)**

1. A 26-year-old woman is brought to the emergency department with complaints of severe lower abdominal pain, anxiety, muscle weakness, and tingling in her hands and feet. She reports no fever, vomiting, or diarrhea. She mentions starting a new weight-loss diet and took over-the-counter herbal supplements for the past week. She had a similar episode six months ago after recovering from a viral illness. Physical examination reveals mild tachycardia but a soft, non-tender abdomen. Her urine is reddish-brown and turns dark purple upon standing in light. No signs of infection or inflammation are noted. Which of the following is the most likely diagnosis?

   a. Lead poisoning
   b. Acute intermittent porphyria
   c. Crohn's disease
   d. Renal colic

2. A child with short stature, brittle bone and blue sclera is found to have mutation in collagen. Which of the following is the recurring amino acid is the most likely to be altered in mutation that distort collagen molecule?
   a. Glycine
   b. Lysine
   c. Proline
   d. Tryptophan
3. Which of the following is the correct sequence in the degradation of heme?
   a. Heme → Bilirubin → Biliverdin → Urobilinogen
   b. Heme → Biliverdin → Bilirubin → Urobilinogen
   c. Heme → Urobilinogen → Biliverdin → Bilirubin
   d. Heme → Bilirubin → Urobilinogen → Biliverdin
4. Enzyme A digest protein in stomach and Enzyme B digests proteins in small intestine, which of the following is not true?
   a. Enzyme A would be denatured in the small intestine.
   b. Enzyme A works best in acidic conditions.
   c. Enzyme A can also work in the small intestine.
   d. Enzyme A helps in the hydrolysis of proteins
5. A 30-year-old woman presents with low-grade fever, dry cough, and mild chest discomfort for one week. Chest X-ray reveals patchy infiltrates. Laboratory tests and clinical findings suggest atypical pneumonia, most likely due to Mycoplasma pneumoniae. She is started on erythromycin. Erythromycin helps treat this infection by interfering with which one of the following bacterial processes?
   a. DNA replication
   b. Elongation of protein synthesis
   c. Cell wall synthesis
   d. Folate metabolism
6. An operon is best described by:
   a. A constitutively expressed gene system
   b. An unregulated gene system
   c. A co-ordinately regulated gene system
   d. A gene that produces a monocistronic mRNA

7. The role of Taq polymerase in PCR is critical because:
   a. It can synthesize RNA from DNA
   b. It binds to primers during denaturation
   c. It is stable at high temperatures and catalyzes DNA synthesis
   d. It regulates the melting temperature of the DNA template
8. Which of the following chromatographic techniques is based on molecular size?
   a. Gel filtration chromatography
   b. Ion exchange chromatography
   c. Paper chromatography
   d. Affinity chromatography
9. Which specific DNA sequence does the hormone-receptor complex interact with to regulate gene transcription?
   a. TATA box
   b. CAAT box
   c. Hormone response element
   d. Promoter enhancer region
10. Lesch-Nyhan syndromeis due to the lack of:
   a. Adenine Phosphoribosyltransferase
   b. Adenosine deaminase
   c. Hypoxanthine-Guanine Phosphoribosyltransferase
   d. PRPP amidotransferase
11. Which of the following biomarkers is most commonly used to monitor epithelial ovarian cancer?
   a. Beta-human chorionic gonadotropin (β-hCG)
   b. Alpha-fetoprotein (AFP)
   c Cancer antigen 125 (CA-125)
   d. Carcinoembryonic antigen (CEA)
12. Anticancer drug 5′ flurouracil inhibits enzyme:
   a. Thymidylate synthase
   b. Adenosine kinase
   c. PRPP synthetase
   d. Nucleoside phosphorylase

13. All are oncogene products, except
    a. Growth factors
    b. Tyrosine kinase
    c. Interleukin - 2
    d. Transcription factors
14. The human immunodeficiency virus:
    a. Has two RNA strands as its genetic material
    b. Infection is spread by mosquito
    c Is diagnosed by immune electrophoresis
    d. Provides resistance to the patient against other viral infections
15. Which of the following enzymes is most commonly used in ELISA techniques?
    a. Amylase
    b. Urease
    c. Horseradish peroxidase
    d. DNA polymerase
16. In reversible non-competitive enzyme activity inhibition
    a Inhibitor bears structural resemblance to substrate
    b. Inhibitor lowers the maximum velocity attainable with a given amount of enzyme
    c. Km is increased
    d. Km is decreased
17. HIV primarily targets which of the following cells?
    a. B lymphocytes
    b. CD8+T cells
    c. CD4+ T helper cells
    d. Natural killer cells
18. Enzyme responsible for respiratory burst is:
    a. NADPH Oxidase
    b. Nitric oxide synthase
    c. Glutathione peroxidase
    d. Catalase

19. Plasma differs from serum by the presence of:
    a. Albumin
    b. Globulin
    c. Fibrinogen
    d. Immunoglobulin
20. In Maple syrup urine disease, which of the following compound is accumulated?
    a. Homogentisate
    b. Methylmalonyl-CoA
    c. Branched chain alpha keto acid
    d. Homocysteine

Instructions for Section B and C:

(1) Use Blue/Black Ball-point pen only.
(2) The numbers on the right indicates full marks.
(3) Draw Labelled diagrams wherever necessary.

SECTION- B

Q. 2. Long Question -A Answers. (1 out of 2) **(1 ×10 = 10)**

1. Describe the metabolism of Phenylalanine. Enumerate important biological product synthesized form tyrosine. Add a note on various inborn error of metabolism related to tyrosine (3+2+5)
2. Describe replication of DNA in prokaryotes. Add a note on inhibitors of replication in prokaryotes. (6+4)

Q. 3. Justification Questions (5 out of 6) **(5 × 3 = 15)**

1. Creatinine clearance is considered better than urea clearance.
2. Telomerase are involved in ageing process. Justify
3. Alpha-1 antitrypsin deficiency leads to development of emphysema.
4. Persons with sickle cell are resistant to malaria.
5. Hypoalbuminemia leads to fluid retention in interstitial space.
6. Gout cause pain in first metatarsophalangeal joint pain. Explain.

Q. 4. **Short Notes. (3 out of 4)** **(3 × 5 = 15)**

1. Describe Urea cycle and its regulation
2. Thyroid Function Test
3. Homocysteinuria
4. Heme Catabolism

SECTION: C

Q. 5. **Short Notes & Clinical Aspects** **(4 × 5 = 20)**

1. A 48-year-old male arrives to emergency room with acute-onset chest discomfort and palpitations that began 30 minutes ago while he was at rest. He has no prior cardiac history but admits to frequent fast-food meals and minimal exercise. His blood pressure is low at 90/60 mmHg. ECG shows a new onset left bundle branch block. Laboratory investigations are as given below,

Test	Result	Reference Range
CK-MB (Creatine Kinase-MB)	79 U/L	< 24 U/L
Total CK (Creatine Kinase)	410 U/L	40-200 U/L
LDH (Lactate Dehydrogenase)	730 U/L	140-280 U/L
AST (SGOT)	73 U/L	5-40 U/L
Serum Cholesterol	259 mg/dL	< 200 mg/dL
Random Blood Sugar	197 mg/dL	< 140 mg/dL

   a. What is the provisional diagnosis? (1)

   b. Write significance of different enzymes in the diagnosis of this condition. (3)

   c. Mention two non-enzymatic biomarkers used for detection of this disease. (1)

2. A 6-year-old boy was brought to the hospital with complaints of swelling around the eyes noticed for the past 5 days, which gradually spread to the legs and abdomen. The child also had decreased urine output and frothy urine, but no fever or signs of infection. On examination, there was periodrbital edema, pitting pedal edema, and mild ascites. Blood pressure was normal. Urinalysis showed 3+ proteinuria, and blood tests revealed low serum albumin (2.0 g/dL), high serum cholesterol, and normal renal function tests.

a. What is the most likely diagnosis? (1)

b. Explain the reason for edema formation in this condition. (2)

c. Why is serum cholesterol elevated in nephrotic syndrome? (2)

3. A 52 years old, chronic alcoholic admitted to the hospital in a serious condition. His daughter found him in an unconscious state when she had come to see him in the morning. One and a half empty bottles of alcohol were found in the room. When the alcohol was examined for its contents, it was found to be containing high amount of methanol. Doctors on duty diagnosed that it was a case of methanol intoxication and decided to start the intravenous infusion of ethanol.

   a. Why methanol is toxic? How methanol and ethanol are metabolized in the body? (2)

   b. Write the classification of enzymes. (2)

   c. Why ethanol is given as treatment in methanol poisoning? Write its principle and biochemical basis. (1)

4. A 4-day-old female infant is admitted with progressive yellow discoloration of her skin and sclera, noticed by her mother since the second day of life. She was born at term by vaginal delivery, birth weight 3.1 kg. There are no antenatal or perinatal complications. On examination, she is feeding well and active. Laboratory tests show:

   Serum Total Bilirubin: 13.3 mg/dL

   Direct (Conjugated) Bilirubin: 0.4 mg/dL

   Indirect (Unconjugated) Bilirubin: 12.9 mg/dL

   Phototherapy was started, and daily bilirubin monitoring was advised. Diagnosis: uncomplicated physiological jaundice

   a. What is the diagnosis? Why do many neonates suffer from jaundice? (1)

   b. Enumerate the site & steps of bilirubin synthesis in the body. (3)

   c. How is phototherapy helpful in this condition? (1)

Q.6. Short Notes. **(4 × 5 = 20)**

1. Role of Physician in Healthcare
2. DNA Repair Mechanism
3. Recombinant DNA Technology
4. Enzymes inhibition
