

Rajiv Gandhi University of Health Sciences, Karnataka

MBBS Phase – I (CBME) Degree Examination - 25-Aug-2026

Time: Three Hours

Max. Marks: 100

ANATOMY – PAPER - I (RS-4, RS-5 & RS-6)

Q.P. CODE: 1020

(QP Contains two pages)

Your answers should be specific to the questions asked

Draw neat, labeled diagrams wherever necessary

LONG ESSAYS

2 x 10 = 20 Marks

1. A 45 year old female visited the Gynaecology OPD with history of pain in the mammary gland. On examination of the patient they found the nipple to be retracted and the mammary gland was fixed and could not be moved. Describe the structure, blood supply and lymphatic drainage of mammary gland. Explain the anatomical basis of retraction of nipple and fixation of gland.
2. Describe the boundaries, contents and applied anatomy of the middle ear.

SHORT ESSAYS

8 x 5 = 40 Marks

3. A person complained of pain in the shoulder region after sudden overhead abduction. He was diagnosed with inferior dislocation of shoulder joint. Describe the boundaries & contents of quadrangular space. Explain the effect of inferior dislocation of shoulder joint on this space.
- 4.1. Define bronchopulmonary segment. Name them. Describe its features and applied anatomy
5. Enumerate the boundaries and contents of posterior mediastinum
6. Describe the formation, termination and tributaries of internal jugular vein.
7. Draw and label the transverse section of cervical spinal cord showing the ascending and descending tracts
8. Describe the formation and fate of somites
9. Describe the microscopic structure of thymus – diagram & features
10. Describe the parts, relations, connections and applied anatomy of corpus callosum.

SHORT ANSWERS

10 x 3 = 30 Marks

11. Explain carpal tunnel syndrome.
12. Enumerate the openings in the right atrium.
13. Enumerate the contents of typical intercostal space.
14. Explain the nerve supply of tongue.
15. Enumerate the contents of digastric triangle.
16. Name the dangerous layer of scalp and explain its anatomical basis.
17. Draw and label diagram of floor of 4th ventricle showing its features.
18. Mention two features and function of sesamoid bone. Give two examples.
19. Name any three connective tissue cells and mention their function.
20. Mention three effects of fertilization.

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Multiple Choice Questions

10 x 1 = 10 Marks

- 21 i) Dorsal tubercle of Lister is grooved on its medial side by the tendon of
A. Abductor pollicis longus
B. Extensor pollicis longus
C. Abductor pollicis brevis
D. Extensor pollicis brevis
- 21 ii) Formation of the following structure marks the beginning of gastrulation
A. Prochordal plate
B. Yolk sac
C. Morula
D. Primitive streak
- 21 iii) Following is an example for white fibrocartilage
A. Auricle
B. Thyroid cartilage
C. Symphysis pubis
D. Epiglottis
- 21 iv) Coracoid process of scapula is an example for
A. Atavistic epiphysis
B. Aberrant epiphysis
C. Pressure epiphysis
D. Traction epiphysis
- 21 v) Left bronchus crosses oesophagus at the following level from the incisor teeth
A. 6 inches
B. 9 inches
C. 11 inches
D. 15 inches
- 22 i) Following muscle depresses the mandible
A. Medial pterygoid
B. Lateral pterygoid
C. Temporalis
D. Masseter
- 22 ii) Functional component of optic nerve fibres is
A. Special somatic afferent
B. Special visceral afferent
C. General visceral afferent
D. General somatic afferent
- 22 iii) Secretion is released by exocytosis in the following type of gland
A. Cytocrine
B. Apocrine
C. Holocrine
D. Merocrine
- 22 iv) 7th cervical vertebra is called as vertebra prominens because of
A. Large vertebral body
B. Long spinous process
C. Large transverse process
D. Thick and strong laminae
- 22 v) Following are true about the right crus of the diaphragm **EXCEPT**
A. Larger and stronger than the left crus
B. Medial margin is continuous with Median Arcuate ligament
C. Lateral margin is continuous with Medial lumbocostal arch
D. Arises from the upper two lumbar vertebrae

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MBBS Phase – I (CBME) Degree Examination - 27-Aug-2026

Time: Three Hours

Max. Marks: 100

ANATOMY – PAPER - II (RS-4, RS-5 & RS-6)

Q.P. CODE: 1021

(QP contains two pages)

Your answers should be specific to the questions asked

Draw neat, labeled diagrams wherever necessary

LONG ESSAYS

2 x 10 = 20 Marks

1. During a sports event, a 35-year-old athlete sustains an injury to the back of his thigh while running. Upon examination, it is found that the athlete has strained muscles in this region. Name the muscles of back of the thigh. Explain their attachments, nerve supply and action.
2. Describe the Urinary bladder under the subheadings
 - a) Parts
 - b) Visceral and peritoneal relations
 - c) Ligaments
 - d) Blood supply and nerve supply

SHORT ESSAYS

8 x 5 = 40 Marks

- 3.1. A 35-year-old patient presents with pain and tenderness on the anterior aspect of upper 1/3rds of the thigh. Upon examination, it is found that the patient has tenderness along the course of a nerve located in the femoral triangle.
 - a) What is the name of this nerve?
 - b) Explain its formation, branches and area of distribution
- 4.2. Describe the origin, relations, branches and termination of Abdominal Aorta
5. Compare and contrast anterior relations of right and left kidney
6. Describe the attachments and contents of ligaments of Stomach
7. Explain the formation, relations, branches and termination of Portal Vein. List the sites of Portocaval anastomosis.
8. Explain Autosomal dominant inheritance with examples
9. Describe the microscopic structure of liver
10. Describe the skeletal and muscular derivatives of pharyngeal arches

SHORT ANSWERS

10 x 3 = 30 Marks

11. Enumerate the intracapsular structures of Knee joint
12. Name the positions of appendix
13. Explain Harris Dictum
14. Draw a neat labelled diagram showing peritoneal reflections of male and female pelvis
15. Explain the normal position of uterus
16. Give three examples for numerical chromosomal abnormalities
17. List the histological differences between small intestine and large intestine
18. Draw a neat labelled diagram of microscopic structure of Thyroid gland
19. Mention the formation and fate of Urorectal septum
20. Enumerate six derivatives of foregut

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Multiple Choice Questions

10 x 1 = 10 Marks

- 21 i) Which of the following tarsal bones is devoid of muscular attachments
A. Calcaneum
B. Cuboid
C. Navicular bone
D. Talus
- 21 ii) Which of the following peritoneal ligaments is called as blood less fold of Treves
A. Superior Ileocaecal fold
B. Inferior Ileocaecal fold
C. Superior duodenal fold
D. Inferior duodenal fold
- 21 iii) Lymphatics from lateral angle of the Uterus drain into which of the following lymph nodes
A. External Iliac nodes
B. Internal Iliac nodes
C. Superficial inguinal nodes
D. Deep inguinal nodes
- 21 iv) Which of the following cells produce Testosterone
A. Sertoli cells
B. Interstitial cells of Leydig
C. Follicular cells
D. Peg cells
- 21 v) Ligamentum teres is the embryonic remnant of _____
A. Left umbilical vein
B. Right umbilical vein
C. Left umbilical artery
D. Right umbilical artery
- 22 i) Colour blindness is an example for _____
A. Autosomal dominant inheritance
B. Autosomal recessive inheritance
C. X linked dominant inheritance
D. X linked recessive inheritance
- 22 ii) Great Saphenous vein pierces the following fascia
A. Cribriform fascia
B. Fascia iliaca
C. Fascia transversalis
D. Scarpa's fascia
- 22 iii) Which of the following structure is posteriorly related to apex of sigmoid mesocolon
A. Left Vas deferens
B. Right Vas deferens
C. Right Ureter
D. Left Ureter
- 22 iv) Referred pain to inner thigh in pelvic inflammatory disease is due to irritation of which of the following nerves.
A. Vagus nerve
B. Obturator nerve
C. Femoral nerve
D. Sciatic nerve
- 22 v) Which of the following parts of Gastrointestinal tract is lined by stratified squamous nonkeratinized epithelium
A. Oesophagus
B. Stomach
C. Duodenum
D. Appendix

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MBBS Phase – I (CBME) Degree Examination - 29-Aug-2026

Time: Three Hours

Max. Marks: 100

PHYSIOLOGY – PAPER - I (RS-4, RS-5 & RS-6)**Q.P. CODE: 1022****(QP contains three pages)**

Your answers should be specific to the questions asked

Draw neat, labeled diagrams wherever necessary

LONG ESSAYS**2 x 10 = 20 Marks**

1. Describe the intrinsic pathway of blood coagulation. List the factors which prevent coagulation of blood within the blood vessels
2. List the phases of the cardiac cycle with their normal duration. With the help of a graph, describe the pressure volume changes and mechanical events that occur in the heart during the phases of ventricular systole

SHORT ESSAYS**8 x 5 = 40 Marks**

3. A 50-year-old male patient, who is a chronic smoker, presented with complaints of cough and difficulty in breathing, for 3 days. He had such similar episodes earlier. His respiratory rate was found to be high, and breaths were shallow. On lung function testing, his forced vital capacity (FVC), forced expiratory volume in 1st second (FEV₁), and FEV₁/FVC were all found to be decreased.
 - a) What is the type of respiratory disorder he is likely to be suffering from?
 - b) Define FVC and FEV₁
 - c) Explain how the values of the above change in different type of lung disorders
4. With a labelled diagram, describe the phases of the oxygen-haemoglobin dissociation curve. List the factors that shift the curve to the right
5. Define renal "Clearance." Write the formula to calculate Inulin clearance. Explain why Inulin clearance is used to estimate glomerular filtration rate
6. Draw a diagram depicting the cystometrogram, and describe its phases and their basis
7. With a diagram, describe the cellular mechanism of secretion of Hydrochloric acid by the parietal cells of the stomach
8. Explain the role of bile in digestion and absorption of lipids from the intestine. Why is a patient of obstructive jaundice likely to develop deficiency of vitamins D and K?
9. Describe the role of B lymphocytes in immune response
10. Explain the reflex mechanism that prevents postural hypotension when a person rises from supine to standing posture

SHORT ANSWERS**10 x 3 = 30 Marks**

11. Explain negative feedback mechanism with an example
12. Explain the pathophysiology of erythroblastosis fetalis
13. Why is a newborn delivered prematurely at 26 weeks of gestation, likely to suffer respiratory distress?
14. Draw a labelled diagram of Electrocardiogram recorded from lead II, showing the waves and

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intervals

15. Mention the mechanisms that ensure passage of bolus only into the oesophagus, during pharyngeal phase of deglutition
16. Explain the importance of vasa recta in maintaining hyperosmolarity of renal medulla
17. Explain how decrease in plasma proteins can lead to oedema
18. Explain the pathophysiology of 'decompression sickness'
19. Explain the feedback control of erythropoiesis
20. What are Wind Kessel vessels? What is their importance in circulation?

Multiple Choice Questions

10 x 1 = 10 Marks

- 21 i)1. Haematocrit of 45% means that in the sample of blood analysed,
 - A. 45% of haemoglobin is in the plasma
 - B. 45% of total blood volume is made up of plasma
 - C. 45% of total blood volume is made up of blood cells
 - D. 45% of haemoglobin is in the red blood cells
- 21 ii) Which of the following changes is seen in blood stored in blood bank?
 - A. Increased potassium ions
 - B. Increased pH
 - C. Increased platelet number
 - D. Increased ATP production
- 21 iii) Which of the following is a property of cardiac muscle?
 - A. Fatiguability
 - B. Tetanizability
 - C. Short refractory period
 - D. Autorhythmicity
- 21 iv) Which of the following is a metabolic function of the kidneys?
 - A. Conversion of Angiotensin I to Angiotensin II
 - B. Conversion of Vitamin D into its active form
 - C. Conjugation of bilirubin
 - D. Synthesis of Protein C and S
- 21 v) Maximum reabsorption of glucose occurs in which part of the nephron?
 - A. Proximal convoluted tubule
 - B. Loop of Henle
 - C. Distal convoluted tubule
 - D. Collecting tubule
- 22 i)21. Which of the following factors increases diffusion of gases across alveo-capillary membrane?
 - A. Increased thickness of membrane
 - B. Greater lipid solubility of the gas
 - C. Decreased surface area of the membrane
 - D. Low pressure gradient for the gas across the membrane
- 22 ii) Which is **TRUE** statement regarding Auerbach's plexus of GIT?
 - A. Located in the submucosal layer

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- B. Located between longitudinal and circular muscle layers
 - C. Primarily concerned with intestinal secretion
 - D. Has no role in intestinal motility
- 22 iii) Which of the following is the function of Secretin?
- A. Increases bicarbonate rich pancreatic secretion
 - B. Increases gastric motility
 - C. Increases gastric secretion
 - D. Inhibits bile secretion from liver
- 22 iv) Which of the following is a feature of secondary active transport?
- A. Does not involve energy expenditure
 - B. Uses energy directly from hydrolysis of ATP
 - C. Uses energy indirectly from concentration gradients
 - D. Does not require a transport protein
- 22 v) Identify **TRUE** statement regarding intercellular connections
- A. Hemidesmosome attach two neighbouring cells to each other
 - B. Desmosome attach a cell to basal lamina
 - C. Tight junctions attach a cell to basal lamina
 - D. Gap junctions allow passage of substances between cells

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MBBS Phase – I (CBME) Degree Examination - 31-Aug-2026

Time: Three Hours

Max. Marks: 100

PHYSIOLOGY – PAPER - II (RS-4, RS-5 & RS-6)

Q.P. CODE: 1023

(QP contains three pages)

Your answers should be specific to the questions asked

Draw neat, labeled diagrams wherever necessary

LONG ESSAYS

2 x 10 = 20 Marks

1. Describe the mechanisms by which insulin and glucagon maintain blood glucose homeostasis. List the other hormones that affect blood glucose levels
2. With a neat labelled diagram, describe the origin, course, and termination of the pathway for fine touch sensation from the right foot. List the other sensations carried by the same pathway

SHORT ESSAYS

8 x 5 = 40 Marks

3. Two children A and B, both aged 7 years, attend paediatric endocrinology OPD. Both are short statured for their age. Child A appears to have normal body proportions, and mental milestones. Child B has pot belly, and mental milestones are delayed.
 - i. What are the likely hormone deficiencies in child A and child B?
 - ii. What are the distinguishing features between the above cases?
 - iii. In child B, what is the role of the concerned hormone in mental development?
4. With suitable graph, explain the length-tension relationship in a skeletal muscle
5. Describe the steps of spermatogenesis. List the factors affecting it
6. With a schematic diagram, explain the mechanism of inverse stretch reflex
7. Describe the functions of basal ganglia
8. What changes occur in the eye when a person focuses on a nearby object? Describe the pathway for this mechanism
9. Explain how Rinne's and Weber's test can be used together, to differentiate conductive and sensorineural hearing loss
10. Describe the adaptive changes that occur in the body when a person is exposed to cold environment

SHORT ANSWERS

10 x 3 = 30 Marks

11. Type A-alpha fibres are seen in neural pathways that require rapid conduction, while type C fibres are seen in pathways that require slow conduction. Justify this observation with reference to factors affecting velocity of impulse conduction in neurons
12. Explain the pathophysiology of myasthenia gravis
13. What are the actions by which parathyroid hormone maintains blood calcium level?
14. Describe the fate of ovarian follicle after ovulation
15. Explain the mechanism of action of combined oral contraceptive pill

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16. Explain the basis for 'phantom limb' phenomenon
17. Compare the features of Wernicke's and Broca's aphasia
18. Explain why features of cerebellar lesion manifest on the same side of the body
19. What is the role of y chromosome in gonadal development in the foetus?
20. List three differences in the manifestations of upper motor neuron and lower motor neuron lesion

Multiple Choice Questions

10 x 1 = 10 Marks

- 21 i) Tissue N has shorter chronaxie than Tissue M, means
 - A. Tissue N is more excitable than M
 - B. Tissue M is more excitable than N
 - C. Tissue N remains excited for shorter time than M
 - D. Tissue M remains excited for shorter time than N
- 21 ii) Which of the following stimulates secretion of Aldosterone?
 - A. High plasma sodium levels
 - B. High plasma potassium levels
 - C. Low levels of ACTH
 - D. Low levels of Renin
- 21 iii) Which is the primary site of synthesis of Oxytocin?
 - A. Supraoptic nucleus of Hypothalamus
 - B. Paraventricular nucleus of Hypothalamus
 - C. Suprachiasmatic nucleus of Hypothalamus
 - D. Preoptic nucleus of Hypothalamus
- 21 iv) Phenotype in Klinefelter syndrome is
 - A. 46, XYY
 - B. 46, XXY
 - C. 47, XYY
 - D. 47, XXY
- 21 v) **TRUE statement related to respiratory adaptation to exercise is**
 - A. Lower Breathing reserve**
 - B. Lower Diffusion capacity for oxygen across alveo-capillary membrane**
 - C. Lower P_{50} in the oxygen-Haemoglobin dissociation curve**
 - D. Lower arterial-Venous Oxygen difference**
- 22 i) Which of the following is **NOT** a phenomenon seen in the synapses?
 - A. Subliminal fringe
 - B. Reverberation
 - C. Specific nerve energies
 - D. Occlusion

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- 22 ii) In Brown-Sequard syndrome, below the level of the lesion
- A. Fine touch sensation is lost on the opposite side
 - B. Pain sensation is lost on the opposite side
 - C. Crude touch sensation is lost on the same side
 - D. Thermal sensation is lost on the same side
- 22 iii) Which of the following is a function of the dominant cerebral hemisphere?
- A. Logical and Mathematical ability
 - B. Spatial orientation
 - C. Abstract thinking
 - D. Music perception
- 22 iv) Taste sensation from the posterior one-third of the tongue is carried by
- A. Facial nerve
 - B. Vagus nerve
 - C. Hypoglossal nerve
 - D. Glossopharyngeal nerve
- 22 v) K complexes and Sleep spindles are typical EEG feature of
- A. Stage 1 NREM sleep
 - B. Stage 2 NREM sleep
 - C. Stage 3 NREM sleep
 - D. REM sleep

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MBBS Phase – I (CBME) Degree Examination - 02-Sep-2026

Time: Three Hours**Max. Marks: 100****BIOCHEMISTRY – PAPER I (RS-4, RS-5 & RS-6)****QP Code: 1024****(QP contains three pages)**

Your answers should be specific to the questions asked
Draw neat labeled diagrams wherever necessary

LONG ESSAYS**2 x 10 = 20 Marks**

1. A 45 year old obese male had a tooth infection. Prior to tooth extraction, he was advised to have a routine blood and urine examination. Following are his laboratory findings. – Random blood glucose: 268 mg/dl, blood urea: 24 mg/dl, serum creatinine: 1.0 mg/dl, Urine sugar: orange precipitate and urine ketone bodies: nil.
 - a) What is your probable diagnosis?
 - b) What is glycated haemoglobin? Mention its application in the above case.
 - c) Explain homeostasis of blood glucose.
2. Describe Vitamin A under following headings:
 - a) Chemistry and Sources
 - b) Biochemical functions
 - c) Recommended dietary allowance
 - d) Deficiency manifestations

SHORT ESSAYS**8 x 5 = 40 Marks**

3. A 10 year old girl presented with muscle pain and cramps, tingling sensation of hand and feet, recurrent carpopedal spasms. She was a strict vegetarian who did not consume milk or milk products. On examination, Trousseau's sign was positive. Serum total calcium was 7.0 mg/dl.
 - a) What is your probable diagnosis?
 - b) Explain homeostasis of blood calcium
4. A 55 year old male was operated for intestinal obstruction and had continuous gastric aspiration for 3 days. His laboratory findings are as follows. Blood pH: 7.55, pCO₂: 50 mm Hg, plasma bicarbonate: 30 mEq/L, serum sodium: 130 mmol/L, serum potassium: 2.9 mmol/L, serum chloride: 95 mmol/L.
 - a) Mention the acid base disorder in this case.
 - b) Explain the role of lungs in maintenance of acid base balance.
5. What are enzymes? Write the diagnostic importance of enzymes giving four examples
6. List five mucopolysaccharides. Write their composition and functions.
7. Explain the role of complex V in oxidative phosphorylation and mention two inhibitors of oxidative phosphorylation.
8. Describe the transport mechanisms across the cell membrane.
9. Name the bile acids. Describe their formation from cholesterol.
10. Describe the metabolic changes in starvation.

SHORT ANSWERS**10 x 3 = 30 Marks**

11. Write the structure of collagen.
12. List three clinical conditions associated with hyperkalemia.
13. Name the blood buffers and give their significance.
14. Mention the reference range for serum electrolytes.

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15. Write the biochemical role of dipalmitoyl lecithin. Mention the disorder associated with its deficiency.
16. Write the clinical applications of isoenzymes of creatine kinase.
17. LDL – cholesterol is considered to be a bad cholesterol- give reason.
18. Mention the factors affecting basal metabolic rate.
19. Write two biochemical functions of copper and mention a disorder associated with copper metabolism.
20. What is folate trap?

Multiple Choice Questions

10 x 1 = 10 Marks

- 21 i) Enzymes which are synthesized in inactive form are called
 - A. Coenzymes
 - B. Apoenzymes
 - C. Lysozymes
 - D. Proenzymes
- 21 ii) Serum alkaline phosphatase is increased in
 - A. Hypothyroidism
 - B. Prehepatic jaundice
 - C. Bone diseases
 - D. Myocardial Infarction
- 21 iii) Electron transport chain is located in the
 - A. Outer mitochondrial membrane
 - B. Inner mitochondrial membrane
 - C. Mitochondrial matrix
 - D. Nucleus
- 21 iv) McArdle's syndrome is due to the deficiency of
 - A. Glucose 6 phosphatase
 - B. Glucose 6 phosphate dehydrogenase
 - C. Muscle glycogen phosphorylase
 - D. Liver glycogen phosphorylase
- 21 v) Cardiolipin
 - A. Contains choline
 - B. Is diphosphotidylglycerol
 - C. Is part of sphingolipid
 - D. Is found in endoplasmic reticulum
- 22 i) Refsum disease is due to lack of enzymes of
 - A. Alpha oxidation
 - B. Beta oxidation
 - C. Gamma oxidation
 - D. Delta oxidation
- 22 ii) Function of HDL is the transport of
 - A. Triglyceride from intestine to adipose tissue
 - B. Cholesterol from liver to peripheral tissues
 - C. Cholesterol from peripheral tissues to liver
 - D. Free fatty acids from adipose tissue
- 22 iii) The micromineral present in teeth is
 - A. Calcium
 - B. Iodine
 - C. Manganese
 - D. Fluoride
- 22 iv) Which of the following is a poor source of Iron

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- A. Meat
- B. Jaggery
- C. Leafy vegetables
- D. Milk

22 v) Negative nitrogen balance is observed in

- A. Pregnancy
- B. Chronic fever
- C. Convalescence
- D. Growth period

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MBBS Phase – I (CBME) Degree Examination - 04-Sep-2026

Time: Three Hours

Max. Marks: 100

BIOCHEMISTRY – PAPER II (RS-4, RS-5 & RS-6)

Q.P. CODE: 1025

(QP contains three pages)

Your answers should be specific to the questions asked

Draw neat, labeled diagrams wherever necessary

LONG ESSAYS

2 x 10 = 20 Marks

1. A 45-year-old male presented to medicine OPD with mild fever, pain abdomen and generalized itching. On examination showed yellowish discoloration of skin and sclera. Following are his laboratory findings:
Total bilirubin: 11 mg/dl, direct bilirubin: 5.0 mg/dl and indirect bilirubin: 6.0 mg/dl, AST: 250 IU/L, ALT: 270IU/L, ALP: 100 IU/L, Total protein: 6.0 gm/L, albumin: 2.5 gm/L, urine bile salt: negative and bile pigment: positive (+++), urobilinogen: positive.
 - a) Interpret the above laboratory report.
 - b) Mention the type of jaundice in the above case.
 - c) Explain the pathway for formation of bilirubin.
 - d) Explain van Den Bergh test.
2. Define translation. Describe translation in eukaryotes under following headings -
 - a) Steps involved
 - b) Post-translational modifications
 - c) Inhibitors

SHORT ESSAYS

8 x 5 = 40 Marks

3. One year old girl was brought to the OPD with history of delayed milestones, areas of hypo pigmentation on her skin and hair. On examination girl was noted to have muscle hypotonia and microcephaly. Urine collected was found to have mousy odour.
 - a) What is your probable diagnosis?
 - b) Explain the biochemical basis for the hypo pigmented skin and hair.
 - c) What are the biochemical tests that can be done for evaluation of the above condition?
4. A four year old boy presented with hypotonia, developmental delay, irritability, and self mutilating behavior. On examination, there was testicular atrophy and hematuria. His serum uric acid level was 11.0 mg/dl. The provisional diagnosis of Lesch Nyhan syndrome was made.
 - a) Write the biochemical defect in Lesch Nyhan syndrome
 - b) Explain the purine salvage pathway.
5. Classify renal function tests. Explain creatinine clearance.
6. Describe the primary and secondary structural organization of proteins.
7. Describe the Immunoglobulins with respect to their structure and functions.
8. Explain Watson and crick model of DNA structure with a neat diagram.
9. Describe formation of uric acid. Add a note on its clinical relevance.
10. List different blotting techniques. Describe one blotting technique with its application.

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SHORT ANSWERS

10 x 3 = 30 Marks

11. Clinical applications of Polymerase Chain Reaction (PCR).
12. Define tumour markers. Enumerate four tumour markers and their clinical importance.
13. What are free radicals? Classify antioxidants with one example each.
14. What is Transmethylation reaction? Give two examples.
15. Write the importance of Human genome project.
16. Name three anticancer drugs with their biochemical basis.
17. Define and classify acute phase reactants with example.
18. What are preanalytical variables? Mention two biochemical parameters affected by hemolysis.
19. What is mutation? Mention the types of mutation.
20. Mention three examples of detoxification by conjugation.

Multiple Choice Questions

10 x 1 = 10 Marks

- 21 i) Which of the following is an example of phase one detoxification?
 - A. Sulfation
 - B. Acetylation
 - C. Methylation
 - D. Oxidation
- 21 ii) The urine of a patient with homocystinuria will be positive for
 - A. Benedict`s test
 - B. Ferric chloride test
 - C. Rothera`s test
 - D. Cyanide-nitroprusside test
- 21 iii) Albinism is due to deficiency of the enzyme
 - A. Phenylalanine hydroxylase
 - B. Tyrosinase
 - C. Para hydroxy phenyl pyruvate oxidase
 - D. Tyrosine dehydrogenase
- 21 iv) Unusual nucleotide bases are found in significant quantities in
 - A. mRNA
 - B. tRNA
 - C. rRNA
 - D. snRNA
- 21 v) Which enzyme protects DNA from ageing?
 - A. DNA polymerase
 - B. Topoisomerase
 - C. Deoxyribonuclease
 - D. Telomerase
- 22 i) Alpha feto protein level in serum is increased in
 - A. Prostatic cancer
 - B. Hepatoma
 - C. Cancer lungs
 - D. Renal cell carcinoma
- 22 ii) Conjugated hyperbilirubinemia with raised alkaline phosphatase levels and clay coloured stools are characteristic features of
 - A. Obstructive jaundice
 - B. Haemolytic jaundice
 - C. Hepatic jaundice

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D. Physiological jaundice

- 22 iii) Which is an inhibitor of transcription in eukaryotes?
- A. Rifampicin
 - B. Chloramphenicol
 - C. Alpha amanitin
 - D. Streptomycin
- 22 iv) Which of the following enzymes produce a free radical in macrophages?
- A. Superoxide Dismutase
 - B. Catalase
 - C. Glutathione peroxidase
 - D. Nitric oxide Synthase
- 22 v) The chief product of catabolism of purines in human beings is
- A. Urea
 - B. Uric acid
 - C. Hypoxanthine
 - D. Beta amino iso butyrate

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MBBS Phase – I Degree Examination - 15-Apr-2026

Time: Three Hours

Max. Marks: 100 Marks

ANATOMY – PAPER - I (RS3)

Q.P. CODE: 1075

Your answers should be specific to the questions asked.
Draw neat, labeled diagrams wherever necessary.

LONG ESSAYS

2 x 10 = 20 Marks

1. Describe the extra cranial course of facial nerve. Add a note on its applied anatomy.
2. Describe the shoulder joint and discuss the movements of shoulder joint.

SHORT ESSAYS

10 x 5 = 50 Marks

3. Pericardium of heart
4. Notochord
5. Cubital Fossa
6. Microscopic structure of thin skin
7. Transverse section of medulla at the pyramidal decussation
8. Bronchopulmonary segments
9. Azygos vein
10. Maxillary air sinus
11. Interossei of hand
12. Corpus callosum

SHORT ANSWERS

10 x 3 = 30 Marks

13. Enumerate six derivatives of endoderm.
14. Sesamoid bones
15. Cricothyroid muscle
16. Root of lung.
17. Enumerate the extraocular muscles of eyeball.
18. Wrist drop
19. **Enumerate structures attached to styloid process**
20. Enumerate the components of basal ganglia.
21. Buccinator
22. Palmar aponeurosis.

Rajiv Gandhi University of Health Sciences, Karnataka

MBBS Phase – I Degree Examination – 17-Apr-2026

Time: Three Hours

Max. Marks: 100

ANATOMY – PAPER - II (RS-3)

Q.P. CODE: 1076

Your answers should be specific to the questions asked

Draw neat, labeled diagrams wherever necessary

LONG ESSAYS

2 x 10 = 20 Marks

1. Boundaries, contents and applied anatomy of Inguinal canal
2. Describe the ligaments, muscles and actions of Hip joint

SHORT ESSAYS

10 x 5 = 50 Marks

3. Lymphatic drainage of Stomach
4. Superior mesenteric artery
5. Development and congenital anomalies of Kidneys
6. Microscopic structure of suprarenal gland
7. Great saphenous vein
8. Karyotyping
9. Male urethra
10. Interior of anal canal
11. Portal vein
12. Vermiform appendix

SHORT ANSWERS

10 x 3 = 30 Marks

13. Sensory supply of dorsum of foot
14. Draw a neat labeled diagram of visceral surface of liver
15. Spermatic cord
16. Klinefelter's syndrome
17. Perineal membrane
18. Obturator nerve
19. Microscopic structure of testis
20. Arterial supply of Pancreas
21. Barr body
22. Parts of large intestine

Rajiv Gandhi University of Health Sciences, Karnataka

MBBS Phase – I Degree Examination - 21-Apr-2026

Time: Three Hours

Max. Marks: 100 Marks

PHYSIOLOGY – I (RS3)

Q.P. CODE: 1077

Your answers should be specific to the questions asked
Draw neat, labeled diagrams wherever necessary

LONG ESSAYS

2 x 10 = 20 Marks

1. **Name the plasma proteins. Describe the functions of plasma proteins. Add a note on effect of Hypoproteinaemia.**
2. **Name the respiratory centres. Explain the neural regulation of respiration. Add a note on Cheyne-Stokes Respiration**

SHORT ESSAYS

10 x 5 = 50 Marks

3. **Diagrammatically represent a normal lead II ECG. Explain the causes for different waves.**
4. Describe the mechanical events during cardiac cycle.
5. Short term regulation of Blood pressure
6. Describe the composition and functions of bile.
7. Describe the micturition reflex.
8. Surfactant
9. Functions of saliva.
10. Humoral Immunity
11. Defecation Reflex
12. Structure and functions of Juxta Glomerular apparatus.

SHORT ANSWERS

10 x 3 = 30 Marks

13. Uniport, Symport and Antiport
14. Rh incompatibility.
15. What is Timed Vital capacity? Give its significance.
16. Pacemaker potential
17. Mention any three renal function tests.
18. Hemophilia.
19. State the law of Gut. Mention its significance.
20. Define Hypoxia. Classify hypoxia.
21. Mention three properties of cardiac muscle and explain one of them.
22. Mention three factors which regulate the cardiac output.

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MBBS Phase – I Degree Examination - 25-Apr-2026

Time: Three Hours

Max. Marks: 100 Marks

PHYSIOLOGY – II (RS3)

Q.P. CODE: 1078

Your answers should be specific to the questions asked

Draw neat, labeled diagrams wherever necessary

LONG ESSAYS

2 x 10 = 20 Marks

1. Describe the mechanism of transmission of impulse across Neuromuscular junction. Add a note on Myasthenia Gravis.
2. Name the hormones of Thyroid gland. Describe the synthesis, transport and regulation of secretion of Thyroid hormone. Add a note on Cretinism.

SHORT ESSAYS

10 x 5 = 50 Marks

3. Actions of oxytocin
4. Heat Loss mechanism to maintain constant body temperature
5. Tests for Ovulation
6. Difference between REM and NREM sleep.
7. Errors of refraction.
8. Muscle spindle
9. Functions of Hypothalamus
10. Describe the visual pathway.
11. Referred pain
12. Spermatogenesis

SHORT ANSWERS

10 x 3 = 30 Marks

13. Renshaw cell inhibition
14. Name the neuroglia. Mention their functions.
15. Sarcomere
16. Phantom limb.
17. All or none law.
18. List three hormones affecting Plasma calcium level and mention the effect on it.
19. Basis for pregnancy tests
20. Draw and label taste pathway
21. Acromegaly
22. Three actions of cortisol.

Rajiv Gandhi University of Health Sciences, Karnataka

First Phase MBBS Degree Examination – 27-Apr-2026

Time: Three Hours

Max. Marks: 50 Marks

BIOCHEMISTRY – PAPER I (RS3)

Q.P. CODE: 1079

Your answers should be specific to the questions asked

Draw neat labeled diagrams wherever necessary

(Note: Both QP Codes 1079 and 1080 are to be, answered within total duration of three hours)

Use separate answer books for section A and Section B

LONG ESSAYS

1 x 10 = 10 Marks

1. **Give the normal blood glucose levels in fasting and post prandial state. Explain the role of hormones in plasma glucose regulation**

SHORT ESSAYS

5 x 5 = 25 Marks

2. Active transport with example
3. Classification of enzymes with example
4. Urea cycle
5. Glucose tolerance test
6. Formation and utilization of ketone bodies

SHORT ANSWERS

5 x 3 = 15 Marks

7. Beri Beri
8. Explain the biochemical defect and clinical manifestations of
a) Niemann-Pick disease b) Refsum's disease c) Alkaptonuria
9. **Name the phase I detoxification reactions.**
10. Scurvy
11. Fluorosis

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MBBS Phase – I Degree Examination - 27-Apr-2026

Time: Three Hours

Max. Marks: 50 Marks

BIOCHEMISTRY – PAPER II (RS3)

Q.P. CODE: 1080

Your answers should be specific to the questions asked

Draw neat, labeled diagrams wherever necessary

(Note: Both QP Codes 1079 and 1080 are to be, answered within total duration of three hours)

(Use separate Answer books for QP Code 1079 & 1080)

LONG ESSAYS

1 x 10 = 10 Marks

1. Describe the phases of activation, initiation, elongation and termination of biosynthesis of proteins.

SHORT ESSAYS

5 x 5 = 25 Marks

2. Liver Function tests.
3. Role of kidney in acid base balance.
4. Immunoglobulins.
5. Dietary fibre.
6. Basal Metabolic Rate

SHORT ANSWERS

5 x 3 = 15 Marks

7. Lesch – Nyhan syndrome
8. Oncogene.
9. Free radicals.
10. Clearance tests
11. t-RNA

Rajiv Gandhi University of Health Sciences, Karnataka

MBBS Phase – I (CBME) Degree Examination - 25-Aug-2026

Time: Three Hours

Max. Marks: 100

ANATOMY – PAPER – I (RS-7)

Q.P. CODE: 5501

(QP Contains Four Pages)

Your answers should be specific to the questions asked

Draw neat, labeled diagrams wherever necessary

LONG ESSAY

1 x 10 = 10 Marks

1. Describe the broncho-pulmonary segment and its clinical anatomy. Mention the nerve supply, blood supply and lymphatic drainage of lungs

Reasoning questions (Short Answer)

5 x 3 = 15 Marks

2. Why does scalp injury bleed profusely? Mention the arteries supplying the scalp
3. Why a palpable axillary lymph node in women should be properly evaluated? List the axillary group of lymph nodes?
4. Explain why infections are more common in the metaphysis of a growing long bone?
5. Name the components of basal ganglia. Explain the anatomical basis of Parkinson's disease
6. Give reason why infection around upper lip can lead to severe headache.

SHORT NOTES

4 x 5 = 20 Marks

7. A 70-year-old diabetic patient developed epistaxis. Explain the anatomical basis for epistaxis. Describe the formation and nerve supply of nasal septum
8. Name the intracerebellar nuclei. Mention the tracts passing through inferior cerebellar peduncle and its clinical relevance
9. Describe the origin, course and branches of left coronary artery. Add a note on applied anatomy
10. Describe the formation, structure and the derivatives of somites. Explain its clinical significance

SHORT NOTES

7 x 5 = 35 Marks

11. Describe the boundaries and contents of cubital fossa
12. Describe the interior of larynx. Mention its nerve supply
13. Compare and contrast the histology of hyaline cartilage with elastic cartilage with neat labelled diagrams
14. Describe the attachments of constrictors of the pharynx and mention the structures passing between them
15. Describe attachments, structures passing superficial and deep to Flexor retinaculum of hand
16. Draw a neat labelled diagram of cross section of thorax at T4 level
17. "Cadaver is our first teacher" justify

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Multiple Choice Questions (All scenario based)

20 x 1 = 20 Marks

- 18 A 45-year-old patient undergoes CT scan of head and neck region following a road traffic accident
- 18 (i) Which plane in the CT scan describes the midline structures present in the brain?
- A. Sagittal
 - B. Horizontal
 - C. Coronal
 - D. Oblique
- 18 (ii) Which plane divides the body into anterior and posterior halves?
- A. Midsagittal
 - B. Parasagittal
 - C. Transverse
 - D. Coronal
- 19 A 4-week-old embryo has just undergone gastrulation, during which the three primary germ layers are formed
- 19 (i) What are the names of these three germ layers?
- A. Epiblast, Trophoblast, Hypoblast
 - B. Epiblast, Mesoblast, Hypoblast
 - C. Ectoderm, Extraembryonic mesoderm, Endoderm
 - D. Ectoderm, Intraembryonic mesoderm, Endoderm
- 19 (ii) Which of the following structures develops from all the three germ layers?
- A. Tympanic membrane
 - B. Perineal membrane
 - C. Urogenital diaphragm
 - D. Pelvic diaphragm
- 20 A 40-year-old female presents with weak flexion of forearm after a knife injury in cubital fossa. However, supination of forearm is still partially possible
- 20 (i) Which hybrid muscle is most likely involved in this injury?
- A. Flexor digitorum profundus
 - B. Flexor digitorum superficialis
 - C. Biceps Brachii
 - D. Brachialis
- 20 (ii) Which of the following nerves supply the above hybrid muscle?
- A. Musculocutaneous and radial
 - B. Musculocutaneous and median
 - C. Median and ulnar
 - D. Ulnar and radial
- 21 A 25-year-old medical student accidentally hits the inner side of his elbow on the edge of a table. He experiences a sudden tingling sensation and numbness radiating to the medial side of the hand
- 21 (i) Which nerve is most likely to be involved in this injury?
- A. Radial nerve
 - B. Median nerve
 - C. Ulnar nerve
 - D. Musculocutaneous nerve

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- 21 (ii) Which of the following clinical signs would most likely be observed if this nerve was chronically compressed at the elbow?
- A. Weakness in forearm pronation
 - B. Loss of thumb opposition
 - C. Wrist drop
 - D. Clawing of the 4th and 5th digits
- 22 A 45-year-old man presents with sudden onset of violent cough and breathlessness after accidentally inhaling a peanut. Foreign body was suspected to be lodged at the carina
- 22 (i) The Carina is an important landmark in which of the following procedure
- A. Barium meal
 - B. Barium enema
 - C. Fundoscopy
 - D. Bronchoscopy
- 22 (ii) The trachea bifurcates at the following vertebral level
- A. Lower border of T3
 - B. Lower border of T4
 - C. Upper border of T3
 - D. Upper border of T4
- 23 A 40-year-old man underwent nasoendoscopic examination. On observation, the soft palate failed to completely close against the posterior pharyngeal wall during swallowing
- 23 (i) Which of the following muscles form the Passavant's ridge helping in closure of posterior pharyngeal wall?
- A. Palatopharyngeus muscle
 - B. Palatoglossus muscle
 - C. Musculus uvulae
 - D. Levator veli palatini
- 23 (ii) Which of the following muscles of soft palate is supplied by mandibular nerve
- A. Levator veli palatini
 - B. Tensor veli palatini
 - C. Stylopharyngeus
 - D. Salpingopharyngeus
- 24 An abscess was surgically removed from middle of posterior triangle of neck on left side, following which patient developed shoulder drooping, difficulty to raise his left hand above his head
- 24 (i) Name the nerve injured
- A. Facial
 - B. Spinal accessory
 - C. Hypo glossal
 - D. Ansa cervicalis
- 24 (ii) Which of the following muscles is supplied by the above nerve
- A. Sterno-cleido mastoid
 - B. Levator scapulae
 - C. Scalenus posterior
 - D. Semi-spinalis capitis
- 25 A 40-year-old male was brought to emergency OPD with complaints of slurred speech, food accumulating in the mouth and difficulty in swallowing. The patient complained of loss of

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taste sensation

25 (i) Which of the following nerves carries taste sensation from anterior 2/3rds of the tongue?

- A. Lingual nerve
- B. Glossopharyngeal nerve
- C. Chorda tympani nerve
- D. Hypoglossal nerve

25 (ii) The above nerve is related to which of the following structures of the middle ear?

- A. Promontory
- B. Tympanic membrane
- C. Fenestra cochlea
- D. Fenestra vestibuli

26 In a patient undergoing routine investigations, the CT showed enlargement of central canal of the spinal cord. The consultant asked the intern about the various lesions affecting the spinal cord and clinical features associated

26 (i) Enlarged central canal of spinal cord is a feature of

- A. Brown Sequard syndrome
- B. Tabes dorsalis
- C. Subacute combined degeneration
- D. Syringomyelia

26 (ii) This condition is associated with loss of following sensation

- A. Touch
- B. Pain & temperature
- C. Position and vibration
- D. Two-point discrimination

27 A 76-year-old male had severe headache and diagnosed with increased intracranial pressure. He had difficulty in lateral gaze

27 (i) Which cranial nerve is most likely affected in this condition

- A. 2nd
- B. 3rd
- C. 4th
- D. 6th

27 (ii) The nerve involved in this condition traverses along which wall of cavernous sinus

- A. Medial wall
- B. Lateral wall
- C. Superior wall
- D. Inferior wall

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MBBS Phase – I (CBME) Degree Examination - 27-Aug-2026

Time: Three Hours

Max. Marks: 100

ANATOMY – PAPER – II (RS-7)

Q.P. CODE: 5502

(QP Contains Four Pages)

Your answers should be specific to the questions asked

Draw neat, labeled diagrams wherever necessary

LONG ESSAY

1 x 10 = 10 Marks

1. Explain the Knee joint under following headings
 - a) Type
 - b) Articular surfaces
 - c) Ligaments
 - d) Movements and muscles producing it

REASONING QUESTIONS (Short Answer)

5 x 3 = 15 Marks

- 2.1. Why umbilicus is called as water shed line. Give the anatomical basis of it.
3. During the surgery of inguinal hernia, the surgeon observed the hernial sac medial to the inferior epigastric artery.
 - a) Name the type of hernia in this case.
 - b) Mention the boundaries of the involved area, where the hernia occurred.
4. A newborn fetus was born with exposed bladder
 - a) Name this clinical condition.
 - b) Explain the embryological basis for this condition.
5. Why is cornea transparent? Explain its microscopic structure with neat labelled diagram
6. A couple had their first child diagnosed with sickle cell anemia (autosomal recessive Inheritance). Explain the chances of having a normal child using a pedigree chart.

SHORT NOTES

4 x 5 = 20 Marks

7. Explain the preferred artery in the anterior aspect of thigh for cannulation and injecting dye in procedures like angiogram in ischaemic heart disease, explain this artery under the headings of Origin, course, relations and branches.
8. A 60-year old male diagnosed with tuberculosis of kidney. Explain the anterior and posterior relations of kidney with its blood supply
- 9.2. An elderly female was diagnosed with type II diabetes mellitus. Describe the parts and relations of the affected organ. Explain the anatomical basis for developing this condition.
10. Explain the derivatives of paramesonephric duct in females. Add a note on its congenital anomalies

SHORT NOTES

7 x 5 = 35 Marks

11. Describe the origin, course, relations, and branches of abdominal aorta.
12. Compare and contrast the histological features of duodenum and jejunum with neat labelled diagrams
13. Describe the structures traversing the posterior wall of prostatic urethra.
14. Describe the boundaries and recesses of lesser sac of peritoneum
15. Explain the structural abnormalities of chromosomes with examples
16. Compare and contrast superficial perineal pouch in male and female with a neat labelled diagram
17. Why is active listening considered a foundational skill in patient doctor communication and mention other qualities of doctor which helps in good communication with patient

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MULTIPLE CHOICE QUESTIONS (All scenario based)**20 x 1 = 20 Marks**

- 18 In the histology practicals, a first year medical student was observing the slide of the lung.
- 18 (i) Which of the following clue enabled the student to identify the bronchus in the given slide
- A. Smooth muscles around tubular structure
 - B. Thin walled structure lined by simple squamous epithelium
 - C. Bits of cartilages in the wall of a tubular structure
 - D. Thin walled structure lined by simple cuboidal epithelium
- 18 (ii) Which of the following cells secretes surfactants?
- A. Clara cells and type 2 pneumocytes
 - B. Clara cells and type 1 pneumocytes
 - C. Goblet cell and type 2 pneumocytes
 - D. Goblet cell and type 1 pneumocytes
- 19 A child was diagnosed with tetralogy of fallot
- 19 (i) The following are the components of tetralogy of Fallot **Except**
- A. Overriding of aorta
 - B. Pulmonary stenosis
 - C. Atrial septal defect
 - D. Ventricular septal defect
- 19 (ii) Aorta and Pulmonary trunk are developed from
- A. Sinus venosus
 - B. Primitive atrium
 - C. Primitive ventricle
 - D. Truncus arteriosus
- 20 The mesentery is a fold of peritoneum which suspends the small intestine. Its upper end is at duodenojejunal flexure
- 20 (i) The duodenojejunal flexure corresponds to which of the following vertebra**
- A. L1**
 - B. L2**
 - C. L3**
 - D. L4**
- 20 (ii) The mesentery crosses all the structures **EXCEPT**
- A. 2nd part of duodenum
 - B. Abdominal aorta
 - C. Inferior vena cava
 - D. Right ureter
- 21 During a subtotal gastrectomy, the surgeon aims to ligate an artery along the lesser curvature
- 21 (i) Which artery is most likely being ligated
- A. Left gastric artery
 - B. Left gastroepiploic artery
 - C. Pancreaticoduodenal artery
 - D. Right gastroepiploic artery

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- 21 (ii) The ligated artery is a branch of
- Common hepatic artery
 - Splenic artery
 - Celiac trunk
 - Superior mesenteric artery
- 22 Upon stroking of skin of the upper medial aspect of thigh, there is reflex contraction of cremaster muscle leading to elevation of testis.
- 22 (i) The afferent limb for the cremasteric reflex is
- Femoral branch of genitofemoral nerve
 - Genital branch of genitofemoral nerve
 - Pudendal nerve
 - Iliohypogastric nerve
- 22 (ii) Cremasteric reflex centre is at which spinal segment
- L4 & L5
 - L3 & L4
 - L2 & L3
 - L1 & L2
- 23 A middle aged male is operated for appendicitis. The surgeon noted the appendix in the most dangerous position
- 23 (i) The following is the most dangerous position of appendix
- Preileal position
 - Postileal position
 - Promonteric position
 - Retrocolic position
- 23 (ii) During surgery, the surgeon identifies the base of appendix by looking into the
- Appendicular artery
 - Convergence of taenia coli
 - Mesoappendix
 - Position of appendix.
- 24 A 30-year old patient had fracture of lower end of left fibula and had extensor compartment syndrome of left leg.
- 24 (i) All of the following structures passes beneath the extensor retinaculum of leg **EXCEPT**
- Peroneus tertius
 - Peroneus brevis
 - Extensor digitorum longus
 - Extensor hallucis longus
- 24 (ii) The following nerve supplies all the muscles of extensor compartment.
- Deep peroneal nerve
 - Superficial peroneal nerve
 - Tibial nerve
 - Saphenous nerve
- 25 A 45-year old patient presented with varicose ulcer due to incompetence of valves of veins of

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lower limb.

- 25 (i) Which veins acts as "high pressure leaks" in varicose veins due to incompetent valves
- A. Deep veins
 - B. Superficial veins
 - C. Perforator veins
 - D. None of the above
- 25 (ii) Adductor vein perforators connects
- A. Great saphenous vein with femoral vein
 - B. Great saphenous vein with Posterior tibial vein
 - C. Short saphenous vein with Peroneal vein
 - D. Short saphenous vein with popliteal vein
- 26 A 36 years male had painless rectal bleeding and diagnosed as internal hemorrhoids above the pectinate line.
- 26 (i) The veins from this region drains into
- A. Superior rectal vein
 - B. Middle rectal vein
 - C. Inferior rectal vein
 - D. Internal pudendal vein
- 26 (ii) The structure present below pectinate line is
- A. Anal columns
 - B. Anal sinuses
 - C. Anal glands opening
 - D. Anal white line of Hilton
- 27 A 54-year old male patient was brought to emergency department after a road traffic accident. The patient was diagnosed with rupture of urethra.
- 27 (i) If the urethra ruptures above the urogenital diaphragm urine escapes around
- A. Scrotum
 - B. Prostrate
 - C. Penis
 - D. Anterior abdominal wall
- 27 (ii) Crescent shaped male urethra in cross section is seen in
- A. Prostatic urethra
 - B. Membranous part
 - C. Spongy part
 - D. At external urethral orifice

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MBBS Phase – I (CBME) Degree Examination - 29-Aug-2026

Time: Three Hours

Max. Marks: 100

PHYSIOLOGY – PAPER – I (RS-7)

Q.P. CODE: 5503

(QP Contains Four Pages)

Your answers should be specific to the questions asked

Draw neat, labelled diagrams wherever necessary

LONG ESSAY

1 x 10 = 10 Marks

1. Describe the mechanics of respiration. Define lung compliance. Mention conditions which can alter lung compliance

Reasoning questions (Short Answer)

5 x 3 = 15 Marks

2. How do gap junctions contribute to coordinated physiological functions in cardiac and smooth muscles?
3. Why do patients with liver disease often present with prolonged bleeding time and easy bruising?
4. How does Starling's law explain fluid exchange at the capillary level, and what changes in pressure can lead to edema?
5. Explain why there is apnea during second stage of deglutition?
6. Explain how kidneys are involved in vitamin D metabolism.

SHORT NOTES

4 x 5 = 20 Marks

7. Define anemia. Classify anemias. Mention the causation, morphological features of red cells of Sickle-cell anemia.
8. Describe the sinoaortic reflex and its importance.
9. Why is the lung apex more commonly involved in tuberculosis? Explain with reference to ventilation-perfusion physiology.
10. Explain the principle of artificial kidney.

SHORT NOTES

7 x 5 = 35 Marks

11. Describe the functions of platelets.
12. Explain the role of lymphocytes in immunity.
13. With the help of a neat, labeled diagram, describe the changes in left ventricular pressure during cardiac cycle.
14. Define cardiac output. Mention factors affecting it. Describe any one method of its measurement.
15. Describe oxygen dissociation curve with a neat, labeled diagram and factors affecting it. Give the significance of its shape. what is P50?
16. Describe the composition, function, hormonal regulation of secretion of pancreatic juice.
17. How can understanding the concept of 'patient-centred care' improve the doctor-patient relationship and clinical outcomes?

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Multiple Choice Questions (All scenario based)

20 x 1 = 20 Marks

- 18 A researcher uses ouabain to inhibit Na^+/K^+ ATPase pump in cultured cells.
- 18 (i) What is the immediate ionic consequence of Na^+/K^+ ATPase inhibition?
- A. Increased intracellular K^+
 - B. Increased intracellular Na^+
 - C. Decreased intracellular Na^+
 - D. Increased extracellular K^+
- 18 (ii) Secondary active transport of which of the following will be most affected?
- A. Oxygen
 - B. Glucose
 - C. Steroid hormones
 - D. Urea
- 19 A patient with a bacterial throat infection has elevated WBC counts and fever.
- 19 (i) Which type of WBC is primarily responsible for the initial immune defense in such infections?
- A. Basophils
 - B. Eosinophils
 - C. Neutrophils
 - D. Lymphocytes
- 19 (ii) Which process allows above blood cells to move through blood vessel walls to the infected tissue?
- A. Chemotaxis
 - B. Endocytosis
 - C. Diapedesis
 - D. Phagocytosis
- 20 A young male athlete has a resting cardiac output of 5.5 L/min and a heart rate of 55 bpm.
- 20 (i) What is his approximate stroke volume?
- A. 70 mL
 - B. 80 mL
 - C. 90 mL
 - D. 100 mL
- 20 (ii) Which factor increases cardiac output during exercise?
- A. Decreased venous return
 - B. Parasympathetic stimulation
 - C. Increased heart rate
 - D. Decreased preload
- 21 A researcher studies the effect of arteriole radius on blood flow using a vascular model
- 21 (i) According to Poiseuille's law, resistance is inversely proportional to which factor?
- A. Viscosity
 - B. Vessel length
 - C. Radius to the fourth power
 - D. Pressure difference
- 21 (ii) The researcher also calculates Reynolds number during different flow conditions. An increase in which of the following factors would most likely lead to **turbulent blood flow**?

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- A. Blood viscosity
- B. Vessel radius
- C. Hematocrit
- D. Vascular resistance

22 A newborn fails to close the ductus arteriosus post-birth, leading to abnormal circulation

22 (i) What is the function of ductus arteriosus in fetal life?

- A. Connects umbilical artery to aorta
- B. Shunts blood from pulmonary artery to aorta
- C. Connects left and right atria
- D. Connects liver to inferior vena cava

22 (ii) Which substance promotes closure of ductus arteriosus after birth?

- A. Prostaglandins
- B. Bradykinin
- C. Norepinephrine
- D. Nitric oxide

23 A 50-year-old man with COPD retains CO₂ chronically

23 (i) What is the primary form in which CO₂ is transported in blood?

- A. Dissolved CO₂
- B. Carbaminohemoglobin
- C. Bicarbonate
- D. Carbon monoxide

23 (ii) Which enzyme facilitates this CO₂ conversion in RBCs?

- A. Carbonic anhydrase
- B. Peptidase
- C. ATPase
- D. Aldolase

24 A 50-year-old man presents with epigastric pain. Endoscopy reveals gastric ulcers. He is found to have decreased mucosal protection and high gastric acid levels.

24 (i) Which hormone is primarily responsible for stimulating gastric acid secretion?

- A. Secretin
- B. Gastrin
- C. Cholecystokinin
- D. Somatostatin

24 (ii) Which cell type secretes hydrochloric acid in the stomach?

- A. Chief cells
- B. G cells
- C. Parietal cells
- D. D cells

25 A 35-year-old woman presents with fat intolerance and steatorrhea. Ultrasound shows gallstones blocking the common bile duct.

25 (i) Which component of bile is essential for fat emulsification and absorption?

- A. Bilirubin

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- B. Bile salts
- C. Cholesterol
- D. Phospholipids

25 (ii) Which part of the intestine is primarily responsible for reabsorption of bile salts?

- A. Duodenum
- B. Jejunum
- C. Ileum
- D. Colon

26 A woman with parathyroid adenoma presents with hypercalcemia and hypophosphatemia

26 (i) What is the effect of PTH on phosphate reabsorption in the kidney?

- A. Increases phosphate reabsorption
- B. Decreases phosphate reabsorption
- C. No effect
- D. Promotes phosphate excretion only in distal tubule

26 (ii) What is PTH's effect on calcium in the distal tubule?

- A. Decreases reabsorption
- B. No effect
- C. Increases calcium reabsorption
- D. Increases calcium secretion

27 A hypertensive patient is prescribed a loop diuretic and experiences increased urine output

27 (i) Which transporter is inhibited by loop diuretics?

- A. $\text{Na}^+/\text{K}^+/\text{2Cl}^-$ cotransporter
- B. Na^+/Cl^- symporter
- C. H^+/K^+ ATPase
- D. ENaC

27 (ii) Where in the nephron do loop diuretics primarily act?

- A. Proximal tubule
- B. Distal tubule
- C. Collecting duct
- D. Thick ascending limb of Henle

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MBBS Phase – I (CBME) Degree Examination - 31-Aug-2026

Time: Three Hours

Max. Marks: 100

PHYSIOLOGY – PAPER – II (RS-7)

Q.P. CODE: 5504

(QP Contains Four Pages)

Your answers should be specific to the questions asked

Draw neat, labelled diagrams wherever necessary

LONG ESSAY

1 x 10 = 10 Marks

1. Describe the regulation of calcium homeostasis in the human body. Add a note on osteoporosis.

Reasoning questions (Short Answer)

5 x 3 = 15 Marks

2. Why does a sprinter experience muscle cramps and pain after a 100 m dash?
3. Explain the basis for aldosterone escape phenomenon
4. A woman with suspected early pregnancy has a positive urine pregnancy test. What is the physiological basis of this test?
5. How does damage to the basal ganglia result in both hyperkinetic and hypokinetic movement disorders?
6. A boy is unable to differentiate red and green colours during school screening. Why are males more commonly affected by red-green colour blindness?

SHORT NOTES

4 x 5 = 20 Marks

7. List the classical clinical features of diabetes mellitus. How do insulin deficiency and hyperglycemia contribute to these features?
8. Explain visual pathway and its lesions
9. Describe the hormonal regulation of menstrual cycle, explain the role of estrogen in preventing Ischemic heart disease
10. Explain the different types of Aphasia

SHORT NOTES

7 x 5 = 35 Marks

- 11.1. Describe the molecular basis of skeletal muscle contraction. Explain the role of calcium and ATP in the contraction-relaxation cycle.
- 2.
12. Explain how a sedentary lifestyle affects normal physiology. Discuss its role in causing metabolic and endocrine changes in obesity.
13. Describe the functions of the thalamus. Add a note on the clinical features of thalamic lesions.
- 3.
14. Discuss the connections and functions of the cerebellum in coordination.
15. List the functions of the hypothalamus. Add a note on its role in temperature regulation.
16. Describe the pain pathway.

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17. A medical student observes her mentor patiently listening to every patient despite a long OPD queue. Enumerate the professional qualities of a physician and explain their role in building a good doctor-patient relationship.

Multiple Choice Questions (All scenario based)

20 x 1 = 20 Marks

- 18 A neurologist uses a strength-duration test to assess a patient's nerve excitability.
- 18 (i) Chronaxie is defined as
- A. Minimum stimulus to cause a response
 - B. Duration of stimulus at twice the rheobase
 - C. Strength needed at infinite duration
 - D. Latent period
- 18 (ii) Fastest conducting fibers are
- A. Type C
 - B. Type B
 - C. A-alpha
 - D. A-delta
- 19 A patient has impaired muscle contraction due to a synaptic defect at the neuromuscular junction.
- 19 (i) Neurotransmitter at NMJ
- A. Dopamine
 - B. GABA
 - C. Acetylcholine
 - D. Glutamate
- 19 (ii) End plate potential is due to
- A. Opening of voltage-gated Ca^{2+} channels
 - B. Closure of K^{+} channels
 - C. Ligand-gated Na^{+} channels activation
 - D. Cl^{-} channel activation
- 20 A patient on chronic glucocorticoid therapy develops adrenal suppression after abrupt cessation.
- 20 (i) Glucocorticoids act via which receptor?
- A. Cell-membrane receptor
 - B. Cytosolic/nuclear receptor
 - C. Tyrosine kinase receptor
 - D. G-protein-coupled receptor
- 20 (ii) The connection between hypothalamus and anterior pituitary is
- A. Neural axons
 - B. Portal blood vessels
 - C. Capillary networks in the median eminence
 - D. Lymphatic vessels
- 21 A 16-year-old girl presents with primary amenorrhea, short stature, and webbed neck. On examination, she has poorly developed secondary sexual characteristics. Karyotype shows 45, XO.
- 21 (i) The most likely diagnosis is
- A. Turner syndrome
 - B. Klinefelter syndrome
 - C. Androgen insensitivity syndrome
 - D. Müllerian agenesis

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- 21 (ii) Which of the following hormonal findings is expected in this patient?
- A. Low FSH and high estrogen
 - B. High FSH and low estrogen
 - C. Normal FSH and high progesterone
 - D. Low LH and high androgen levels
- 22 A 27-year-old man presents with infertility. Semen analysis shows oligospermia. His serum testosterone is normal, but FSH is elevated. Testicular biopsy reveals disorganized seminiferous tubules with impaired sperm maturation.
- 22 (i) Which of the following cells form the blood-testis barrier and support developing germ cells?
- A. Leydig cells
 - B. Spermatocytes
 - C. Sertoli cells
 - D. Myoid cells
- 22 (ii) Which hormone is responsible for stimulating testosterone production required for spermatogenesis?
- A. FSH
 - B. LH
 - C. Inhibin
 - D. Estrogen
- 23 A 25-year-old woman has regular 28-day menstrual cycles. Hormonal analysis shows an LH surge on day 14, followed by a rise in progesterone.
- 23 (i) Which hormone is primarily responsible for secretory changes in the endometrium after ovulation?
- A. FSH
 - B. LH
 - C. Progesterone
 - D. Estrogen
- 23 (ii) Ovulation in a 28-day cycle typically occurs on which day?
- A. Day 7
 - B. Day 10
 - C. Day 14
 - D. Day 21
- 24 A first-year MBBS student is revising synaptic physiology and is curious why nerve signals do not travel in reverse across a synapse.
- 24 (i) What is the reason for one-way conduction at chemical synapses?
- A. Axon hillock prevents reverse conduction
 - B. Synaptic cleft allows only forward impulse
 - C. Receptors are present only on the postsynaptic membrane
 - D. Action potentials are generated only in the presynaptic neuron
- 24 (ii) What is the usual time delay in synaptic transmission known as?
- A. Latent period
 - B. Synaptic fatigue
 - C. Synaptic delay
 - D. Action potential refractory time
- 25 A 45-year-old man is brought to the emergency department after a knife injury to the left side of his thoracic spinal cord. Examination reveals:
Loss of motor function and proprioception on the left side below the lesion & Loss of pain and temperature sensation on the right side & Increased tone and exaggerated reflexes in the left lower limb & Positive Babinski sign on the left.

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- 25 (i) The patient most likely has which condition?
- A. Anterior cord syndrome
 - B. Central cord syndrome
 - C. Brown-Séquard syndrome
 - D. Posterior cord syndrome
- 25 (ii) Which descending tract is primarily responsible for the ipsilateral motor weakness and UMN signs observed in this patient?
- A. Corticospinal tract
 - B. Spinothalamic tract
 - C. Dorsal column pathway
 - D. Vestibulospinal tract
- 26 A 52-year-old male visits the clinic with complaints of reduced hearing in the left ear. On examination:
Rinne's test: Bone conduction > Air conduction on the left
Weber's test: Sound lateralizes to the left
No signs of neurological deficit
- 26 (i) What is the most likely type of hearing loss?
- A. Sensorineural hearing loss in the left ear
 - B. Conductive hearing loss in the left ear
 - C. Central auditory pathway lesion
 - D. Bilateral sensorineural deafness
- 26 (ii) Which part of the auditory pathway helps in reflex responses to loud sounds (e.g., turning the head)?
- A. Inferior colliculus
 - B. Cochlear nucleus
 - C. Lateral lemniscus
 - D. Medial geniculate body
- 27 A 20-year-old male athlete performs daily isometric strength training (like planks and wall-sits) and occasionally runs in hot and humid conditions. During one session, he experiences elevated heart rate and feels dizzy. His BP is found to be 160/100 mmHg during the workout, which normalizes post-exercise.
- 27 (i) What is the most likely physiological reason for the elevated BP during isometric exercise?
- A. Increased vagal tone
 - B. Sudden fall in peripheral resistance
 - C. Sympathetic stimulation leading to increased total peripheral resistance
 - D. Decreased stroke volume due to reduced preload
- 27 (ii) Which of the following is an appropriate physiological adaptation to chronic aerobic training in a hot environment?
- A. Decreased sweating threshold
 - B. Decreased plasma volume
 - C. Decreased skin blood flow
 - D. Increased core temperature set point

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MBBS Phase – I (CBME) Degree Examination - 02-Sep-2026

Time: Three Hours

Max. Marks: 100

BIOCHEMISTRY – PAPER – I (RS-7)

Q.P. CODE: 5505

(QP Contains Four Pages)

Your answers should be specific to the questions asked

Draw neat, labelled diagrams wherever necessary

LONG ESSAY

1 x 10 = 10 Marks

1. Describe the Sources, Normal Reference range, Biochemical functions and deficiency manifestations of Calcium. Add a note on its Regulation

Reasoning questions (Short Answer)

5 x 3 = 15 Marks

2. Brown adipose tissue is involved in thermogenesis. Justify
3. Give a reason
 - a) Lipid profile is estimated in the fasting state
 - b) PUFA are antiatherogenic
4. Hypovolemia and hypotension activate Renin Angiotensin aldosterone system
5.
 - a) Cori's cycle does not contribute to maintaining blood glucose. Substantiate
 - b) Glutathione helps to maintain RBC membrane integrity. Substantiate
6.
 - a) Acidosis is associated with hypercalcemia. Justify
 - b) Alkalosis is associated with hypokalemia. Justify

SHORT NOTES

4 x 5 = 20 Marks

7. A 58-year-old male was rushed to the emergency room with complaints of severe chest pain and shortness of breath. ECG showed ST-segment elevation, and cardiac enzyme levels were ordered. Troponin T was also positive.
 - a) What is the probable diagnosis based on the clinical and biochemical findings?
 - b) Define isoenzyme
 - c) Name the isoenzymes of creatine kinase and state their tissue specificity
 - d) Explain the diagnostic relevance of CK in this case
8. A 9-year-old boy known case of type 1 Diabetes mellitus was brought to the emergency department in a disoriented state. On examination patient had Kussmaul's breathing. ABG analysis is as follows: pH 7.2, pCO₂ 40 mmHg, HCO₃⁻ 18mEq/litre and anion gap 22 millimoles/litre. RBS 500 mg/dl, urine Rothera's test positive.
 - a) What is the probable diagnosis?
 - b) What is the significance of increased RBS and Rothera's test?
 - c) What is the significance of an altered anion gap?
 - d) Describe the compensatory mechanisms
9. Mention the reference range of fasting, post-prandial Blood Glucose levels in healthy individuals. Describe the regulation of blood glucose
10. A 65-year-old chronic smoker and alcoholic suffered from non-specific symptoms like painful swallowing, dementia, and recurrent diarrhea. On examination patient was disoriented and had exfoliative dermatitis
 - a) What is the probable diagnosis?
 - b) Name the biomolecule that is deficient in this case
 - c) Describe the functions of this biomolecule?

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SHORT NOTES

7 x 5 = 35 Marks

11. What is the glycemic index? Give examples. Write its clinical significance
12. Name the bile salts. List primary and secondary bile acids. Describe the formation of bile acids
13. What are glycosaminoglycans? Enumerate their composition and functions.
14. Describe the formation of collagen. How is collagen degraded in our body? List disorders associated with collagen
15. Describe the Sources, Biochemical Functions, and deficiency manifestations of Ascorbic acid.
16. Describe the Diagnostic and Therapeutic utility of enzymes.
17. Discuss the roles of a Physician in a health care system

Multiple Choice Questions (All scenario based)

20 x 1 = 20 Marks

- 18 Defective reabsorption of phosphate in the renal tubule is suspected in a 12-year-old boy
 - 18 (i) Identify the appropriate inborn error of metabolism
 - A. Renal rickets
 - B. Vitamin D-resistant rickets
 - C. Classical rickets
 - D. Hypophosphatemic rickets
 - 18 (ii) Lab parameters that are altered in Rickets include all of the following EXCEPT
 - A. Decreased calcium
 - B. Decreased phosphorus
 - C. Increased ALP
 - D. Decreased ALP
- 19 A child presents to the Pediatrician with severe growth retardation and neurological problems, and Zellweger's syndrome is suspected.
 - 19 (i) Which of the following organelles is involved?
 - A. Mitochondria
 - B. Nucleus
 - C. Lysosomes
 - D. Peroxisomes
 - 19 (ii) Which of the following is the marker enzyme for the affected organelle?
 - A. Catalase
 - B. Nucleotidase
 - C. Lactate dehydrogenase
 - D. Galactosyl Transferase
- 20 A 56-year-old man with an elevated lipid profile is prescribed statins.
 - 20 (i) Choose the enzyme inhibited by Statins
 - A. HMG CoA reductase
 - B. HMGCoA dehydrogenase
 - C. HMGCoA lyase
 - D. HMGCoA ligase
 - 20 (ii) Choose the appropriate mechanism by which statins inhibit this enzyme
 - A. Competitive inhibition
 - B. Uncompetitive inhibition
 - C. Non-competitive inhibition
 - D. Suicide inhibition

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- 21 A 32-year-old obese female consults a Physician with complaints of uncontrolled eating. Physician suspects a mutation in adipose cytokine.
- 21 (i) Identify the adipocytokine
- A. Leptin
 - B. Resistin
 - C. Adiponectin
 - D. Neuropeptide Y
- 21 (ii) The Physician confirms that the lady is obese by calculating BMI, which was found to be
- A. $< 18.5 \text{ kg/m}^2$
 - B. $18.5\text{-}23 \text{ kg/m}^2$
 - C. $24\text{-}29 \text{ kg/m}^2$
 - D. $>30 \text{ kg/m}^2$
- 22 Biochemists are interested in studying the effects of ATP depletion on cellular processes.
- 22 (i) Identify the compound that inhibits the ATP synthase complex of ETC
- A. Carboxin
 - B. Mitomycin
 - C. Actinomycin
 - D. Oligomycin
- 22 (ii) ATP generated inside the mitochondria is transported to the cytoplasm by the following shuttle mechanism
- A. Malate shuttle
 - B. Carnitine shuttle
 - C. Creatine phosphate shuttle
 - D. Glycerol phosphate shuttle
- 23 An anaemic patient on oral iron supplementation complains of severe gastritis.
- 23 (i) What could be the most effective method of drug delivery that can be used to overcome gastritis
- A. Using phospholipids
 - B. Using glycolipids
 - C. Using plasmalogens
 - D. Using liposomes
- 23 (ii) All of the following factors decrease the absorption of iron **EXCEPT**
- A. Vitamin C
 - B. Phytates
 - C. Oxalates
 - D. Calcium
- 24 A pediatrician notices stunted growth in a 5-year-old child fed with only cereals in the form of rice without pulses.
- 24 (i) Choose the appropriate amino acid that is deficient in pulses
- A. Methionine
 - B. Lysine
 - C. Threonine
 - D. Glycine

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24 (ii) Pediatrician plans for mutual supplementation of cereals with pulses to enhance the child's growth. What is the optimal ratio of pulses to cereals?

- A. 1:3
- B. 5:1
- C. 2:5
- D. 5:2

25 A child is born at the 30th week of gestation. The pediatrician suspects deficient lung surfactant.

25 (i) Choose the appropriate lab test that indicates lung immaturity

- A. Lecithin Sphingomyelin ratio <2
- B. Lecithin Sphingomyelin ratio >2
- C. Lecithin Sphingomyelin ratio <1
- D. Lecithin Sphingomyelin ratio >1

25 (ii) Which of the following is the main component of lung surfactant?

- A. Phosphatidyl choline
- B. Phosphatidyl ethanolamine
- C. Phosphatidyl glycine
- D. Phosphatidyl serine

26 Coronary angiography reveals a 50% block in a 40-year-old businessman who has been a chronic smoker for 20 years.

26 (i) All of the following statements are true regarding smoking **EXCEPT**

- A. Increased lipolysis with increased cholesterol
- B. Increased CRP
- C. Increased oxidation of LDL
- D. Vasodilation

26 (ii) All of the following are modifiable risk factors for atherosclerosis **EXCEPT**

- A. Lipoprotein a
- B. Homocysteine
- C. Stress
- D. Age

27 A 2-year-old child presents to the Pediatrician with liver enlargement. Lab investigations revealed decreased blood sugar, increased uric acid, lactic acid & cholesterol.

27 (i) Identify this inborn error of metabolism

- A. VonGierke's disease
- B. Pompe's disease
- C. Her's disease
- D. McArdle's disease

27 (ii) Choose the enzyme that is deficient in this condition

- A. Branching enzyme
- B. Debranching enzyme
- C. Liver phosphorylase
- D. Glucose 6 phosphatase

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MBBS Phase – I (CBME) Degree Examination - 04-Sep-2026

Time: Three Hours

Max. Marks: 100

BIOCHEMISTRY – PAPER – II (RS-7)

Q.P. CODE: 5506

(QP Contains Four Pages)

Your answers should be specific to the questions asked
Draw neat, labelled diagrams wherever necessary

LONG ESSAY

1 x 10 = 10 Marks

1. Explain the metabolism of Tyrosine in detail. Explain the synthesis of three biologically important substances from Tyrosine.

Reasoning questions (Short Answer)

5 x 3 = 15 Marks

2. Explain why,
 - a) Gout is precipitated after alcohol ingestion.
 - b) Anti-cancer treatment can cause secondary Gout.
3. Explain how,
 - a) Free radicals can cause cancer.
 - b) Antioxidants prevent drug induced haemolysis.
4. Explain why,
 - a) Alpha 1 band is increase during acute infection.
 - b) Alpha 2 band is increased and albumin band is decreased in nephrotic syndrome.
5. Explain how,
 - a) Conjugation is required for detoxification.
 - b) Endoplasmic reticulum of liver is required in detoxification.
6. Explain why,
 - a) Prolonged tourniquet tying during phlebotomy can cause pseudo hyperkalaemia.
 - b) Collection of blood in non-fluoridated vacutainer leads to false low estimation of glucose.

SHORT NOTES

4 x 5 = 20 Marks

7. A 30-year-old woman presented with weight gain, cold intolerance, infertility and menstrual disturbances. Her TSH was very high, whereas T3, T4 and fT4 were low.
 - a) What is the probable diagnosis?
 - b) Explain how to differentiate between primary, secondary, tertiary and subclinical hypothyroidism using Thyroid function tests.
8. List Normal and Abnormal haemoglobin derivatives and their significance.
9. Define porphyria. Enumerate types of porphyria and the respective enzyme defects.
10. A 25-year-old female presented with hyponatremia, hyperkalaemia, low early morning cortisol. Explain how to differentiate types of adrenal hypo function using Adrenal function tests in above condition.

SHORT NOTES

7 x 5 = 35 Marks

11. Explain different levels at which regulation of gene expression occurs in eukaryotes.
12. Name the carbon and nitrogen sources in purine and pyrimidine ring along with its diagram.
13. Define, list and explain the role of different vectors in recombinant DNA technology.
14. List types of DNA repair mechanisms. Explain any two DNA repair mechanisms.
15. Define each structural organisation of proteins with examples. List bonds stabilising each.

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16. Differentiate between active vs passive immunity with suitable example.
17. Describe and discuss the role of a physician in health care system.

Multiple Choice Questions (All scenario based)

20 x 1 = 20 Marks

- 18 A 58-year-old man presents with severe throbbing and excruciating pain in his great toe, similar episodes after consuming meat and alcohol. Laboratory tests reveal high levels of uric acid and normal orotic acid in his blood.
 - 18 (i) Which enzyme, when inhibited, might prevent the recurrence of these symptoms?
 - A. Xanthine Oxidase
 - B. Adenosine Deaminase
 - C. UMP Synthase
 - D. Ornithine Transcarbamylase
 - 18 (ii) Which of the following enzyme defect can cause high orotic acid?
 - A. Xanthine Oxidase
 - B. Adenosine Deaminase
 - C. PRPP synthetase
 - D. Ornithine Transcarbamylase
- 19 Case. A patient with chronic alcoholic liver disease had bilateral pitting pedal oedema. Serum albumin: 2.1 g/dL, Total protein: 5.5 g/dL, Urine protein: negative, Liver enzymes: elevated, Creatinine: 1 mg/dL.
 - 19 (i) What is the most likely cause of the patient's oedema?
 - A. Increased capillary hydrostatic pressure.
 - B. Decreased plasma oncotic pressure.
 - C. Sodium retention due to renal failure.
 - D. Obstruction of lymphatic drainage
 - 19 (ii) Which of the following functions of albumin is also compromised in this patient?
 - A. Immunoglobulin production
 - B. Blood clotting
 - C. Transport of bilirubin and drugs
 - D. Complement activation
- 20 Case. A patient had paracetamol (acetaminophen) over dosage. Liver function tests reveal elevated Bilirubin, AST and ALT
 - 20 (i) Which of the following pathways is primarily responsible for the hepatotoxicity seen in paracetamol overdose?
 - A. Sulfation of the drug in phase II reaction.
 - B. Cytochrome P450-mediated oxidation producing NAPQI.
 - C. Glucuronidation followed by renal excretion.
 - D. Acetylation by liver N-acetyltransferase
 - 20 (ii) What is the best antidote to administer in this condition, and what is its mechanism of action?
 - A. Activated charcoal – inhibits absorption
 - B. N-acetylcysteine – replenishes glutathione stores
 - C. Vitamin K – corrects coagulopathy
 - D. Methionine – methyl donor for detoxification
- 21 A 3-day-old newborn had lethargy, vomiting, seizures with high blood ammonia, high glutamine, low citrulline and no acidosis. A diagnosis of a urea cycle disorder is considered.
 - 21 (i) Which of the following enzymes is most likely deficient in this patient?
 - A. Carbamoyl phosphate synthetase I (CPS-I).

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- B. Ornithine aminotransferase.
- C. Arginase.
- D. Phenylalanine hydroxylase.

21 (ii) What is the primary purpose of the urea cycle in amino acid metabolism?

- A. To produce glucose from amino acids.
- B. To synthesize non-essential amino acids
- C. To remove excess nitrogen from the body
- D. To generate NADH for energy production

22 A 52-year-old man presents with sudden-onset pain, redness, and swelling of the right big toe. Joint aspiration showed monosodium urate crystals. Serum uric acid was 10 mg/dl.

22 (i) Which of the following metabolic pathways is primarily responsible for the accumulation of uric acid in this condition?

- A. Pyrimidine degradation
- B. Purine degradation
- C. Urea cycle
- D. Beta-oxidation of fatty acids

22 (ii) Which of the following drugs is used in gout treatment by inhibiting xanthine oxidase?

- A. Methotrexate
- B. Azathioprine
- C. Allopurinol
- D. Probenecid

23 A 42-year-old woman presents with fatigue, weight gain, cold intolerance, and dry skin. She has bradycardia and periorbital puffiness. Laboratory tests show: TSH: elevated, T₄ (thyroxine): low, T₃: low.

23 (i) What is the most likely diagnosis?

- A. Hyperthyroidism
- B. Euthyroid sick syndrome
- C. Primary hypothyroidism
- D. Secondary hypothyroidism

23 (ii) Which of the following metabolic abnormalities is commonly associated with hypothyroidism?

- A. Hyperglycemia
- B. Hypercalcemia
- C. Hypercholesterolemia
- D. Metabolic alkalosis

24 A 28-year-old man presented with recurrent oral candidiasis, chronic diarrhea and weight loss. ELISA test is positive for HIV antibodies.

24 (i) Which of the following enzymes is essential for the integration of HIV's viral genome into host DNA?

- A. Reverse transcriptase
- B. RNA polymerase
- C. Integrase
- D. Protease

24 (ii) The progressive decline of which immune cell type leads to AIDS-related immunodeficiency?

- A. CD8+ T cells
- B. B cells
- C. CD4+ T cells
- D. Natural killer (NK) cells

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- 25 A 3-month-old child presented with developmental delay, orange sand like crystals in diaper, constantly chewing on his lips and fingers. He also has hyperuricemia.
- 25 (i) What is the probable disorder he is suffering from?
- A. SCID [Subacute combined immune deficiency]
 - B. Lesch Nyhan syndrome
 - C. Orotic aciduria
 - D. Gouty arthritis
- 25 (ii) Which enzyme defect is responsible for this disorder?
- A. Adenosine de aminase
 - B. OMP decarboxylase
 - C. UMP synthase
 - D. HGPRTase
- 26 A 50-year-old man Colonoscopy reveals a mass in the sigmoid colon. Biopsy confirms adenocarcinoma. Genetic analysis shows loss of function in the APC gene, followed by p53.
- 26 (i) The APC gene mentioned in this case functions as which of the following?
- A. Proto-oncogene
 - B. Oncogene
 - C. Tumor suppressor gene
 - D. DNA repair gene
- 26 (ii) What role does the p53 gene mutation play in tumor progression?
- A. Enhances DNA repair mechanisms
 - B. Inhibits cell cycle arrest and apoptosis
 - C. Converts proto-oncogenes into oncogenes
 - D. Promotes angiogenesis directly
- 27 MBBS students were administered Hepatitis B vaccine prophylactically
- 27 (i) Which of the following technique is used to prepare Hepatitis B vaccine?
- A. Submarine gel electrophoresis
 - B. Southern blotting
 - C. Recombinant DNA technology
 - D. Microarray method
- 27 (ii) The transfer of 6-10 kbp long foreign DNA uses which of the following vectors
- A. Artificial yeast chromosome
 - B. Bacteriophage
 - C. Plasmids
 - D. Cosmids
