001/22

The West Bengal University of Health Sciences
MBBS 1st Professional Examination (New Regulation), February - March 2022

Subject: Anatomy **Full Marks : 100**
Paper : I **Time : 3 hours**

*Attempt **all** questions. The figures in the margin indicate full marks.*

1. a) Following volleyball practice a player developed dislocation of right shoulder joint.
   a) Which nerve may be commonly injured in this case and why?
   b) Enumerate the ligaments of the joint.
   c) What are the factors which maintain the stability of the joint?
   d) Describe the abduction movement of the joint.
   e) What is scapulo-humeral rhythm?
   f) Justify the statement - the shoulder joint has gained mobility at the cost of stability. 2+3+2+4+2+2

   b) Describe the typical intercostals space. Enumerate the contents. Mention the chief muscles of inspiration and expiration. 3+8+2+2

2. a) Describe the visceral relations of the spleen and give a brief account of splenic circulation. 4+6
   b) Describe the formation of the brachial plexus and name its branches. 4+6
   c) Briefly discuss the Axillary lymph nodes and its clinical significance. 7+3

3. Write a short notes on the following: 2x5
   a) Roles of a doctor in the society.
   b) Epiphysis.

4. Explain the following statements: 5x4
   a) Cancer of the head of the pancreas may give rise to obstructive jaundice.
   b) Coronary disease in old age is less fatal than in young age.
   c) Osteomyelitis is common at the metaphysis of a long bone.
   d) The pain of acute cholecystitis may be referred to the right shoulder.
   e) Long thoracic nerve injury presents with winging of scapula.

5. Choose the correct option for each of the following: 10x1
   i) Haversian system is seen in
   a) Cortical bone.
   b) Cancellous bone.
   c) Teeth.
   d) Nails.
   ii) Sensory innervation of the dorsum of hand is provided by
   a) Radial & ulnar nerves.
   b) Radial & median nerves.
   c) Ulnar & median nerves.
   d) Radial, Ulnar & median nerves.

iii) Ligamentum flavum consists of -
a) Type I collagen.
b) Type II collagen.
c) Reticulin.
d) Elastin.

iv) In pseudo pancreatic cyst the collection is in the
a) Greater sac.
b) Lesser sac.
c) Main pancreatic duct.
d) Duct of santorini.

v) Which of the following is a branch of the external iliac artery?
a) Superficial circumflex iliac artery.
b) Superior epigastric artery.
c) Inferior gluteal artery.
d) Inferior epigastric artery.

vi) The membranous part of the interventricular septum lies between
a) RA & LV.
b) LA & RV.
c) RA & RV.
d) LA & LV.

vii) Cardiac muscle can be identified by the presence of
a) Intercalated disc.
b) Flat peripheral nuclei.
c) Dark and light band.
d) Sacromere.

viii) Hilton's line is represented by -
a) Lower end of anal valves.
b) Lower end of anal columns.
c) Lower end of internal anal sphincter.
d) Lower end of external anal sphincter.

ix) Newborn baby presents with discharge of faecal matter from the umbilicus. The probable diagnosis would be -
a) Meckel's diverticulum.
b) Umbilical urinary fistula.
c) Umbilical faecal fistula.
d) Enterocyst.

x) All of the following are true regarding pudendal nerve except -
a) Sensory & motor.
b) Root value S2,S3,S4.
c) Leaves pelvis through lesser sciatic foramen.
d) Main nerve supply to perineum.

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Subject: Anatomy **Full Marks : 100**
Paper : II **Time : 3 hours**

*Attempt **all** questions. The figures in the margin indicate full marks.*

1. a) A patient after cerebrovascular accident shows hemiplegia. On examination it is found that he has some vascular injury in internal capsule. Describe the internal capsule under the following headings -- position, parts, fibres passing through different parts and effect of injury. Describe the blood supply to internal capsule through circle of willis with a proper diagram. (2+2+3+3)+5

   b) A child came to the OPD with a complaint of injury to the external ear. On examination, a perforation was found in the tympanic membrane. Discuss the development, gross anatomy, arterial and nerve supply of tympanic membrane. Also discuss about the branches of the intrapertrous part of facial nerve. What is Ramsay – Hunt syndrome? 3+3+2+2+3+2

2. a) Enumerate the structures forming the tonsillar bed. Enumerate the arteries supplying the palatine tonsil and origin of the arteries. Describe the histological picture of tonsil with suitable diagram. 3+4+3

   b) Draw a labeled diagram of the transverse section of midbrain at the level of superior colliculus. Mention the functional importance of substantia nigra. Explain weber's syndrome? 4+3+3

   c) Enumerate the arches of foot. Describe the factors maintaining the medial longitudinal arch. Explain pes cavus. 2+6+2

3. Write a short notes on the following: 2x5
   a) Layers of retina with diagram.
   b) Sensory and motor speech areas of the brain.

4. Explain the following statements: 5x4
   a) Infections of the upper lip may spread to the cavernous sinus.
   b) Anteroinferior part of the nasal septum is a common site of epistaxis.
   c) Supranuclear facial nerve injury spares the muscles of the forehead.
   d) Incompetence of the ankle perforators may give rise to varicose veins in the leg.
   e) Anatomical basis of hydrocehalus.

5. Choose the correct option for each of the following: 10x1
   i) All the following are supplied by recurrent laryngeal nerve except:
   a) Cricothyroid
   b) Posterior cricoarytenoid
   c) Lateral cricoarytenoid
   d) Transverse arytenoid

ii) Which of the following attains adult size before birth?
a) Ear ossicles
b) Maxilla.
c) Mastoid.
d) Parietal bone.

iii) What might you expect to see if the obturator nerve is damaged?
a) Waddling gait
b) Lateral swinging of the leg when walking
c) Foot drop
d) High stepping gait

iv) Dorsal part of second aortic arch gives rise to
a) Maxillary artery
b) Common carotid artery
c) Stapedial artery
d) Subclavian artery

v) All structures pass through the petro-tympanic fissure of temporal bone **except**
a) Tympanic branch of glossopharyngeal nerve
b) Chorda tympani nerve
c) Anterior ligament of malleus
d) Anterior tympanic branch of maxillary artery.

vi) Aqueous humor is formed by
a) Iris
b) Sclera
c) Cornea
d) Ciliary body

vii) All of the following cells of cerebellum are inhibitory in nature except
a) Granule cell
b) Golgi cell
c) Purkinje cell
d) Stellate cell

viii) All muscles are supplied by femoral nerve except
a) Iliacus
b) Psoas major
c) Pectineus
d) Sartorius

ix) Housemaid's knee is an inflammation of
a) Infrapatellar bursa
b) Semimembranosus bursa
c) Prepatellar bursa
d) Suprapatellar bursa

x) The only cranial nerve which emerges from the dorsal side of the brain stem -
a) Oculomotor Nerve
b) Trigeminal Nerve
c) Facial Nerve
d) Trochlear Nerve

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Subject: Biochemistry **Full Marks : 100**
Paper : II **Time : 3 hours**

*Attempt **all** questions. The figures in the margin indicate full marks.*

1. a) A 46 year old male patient was admitted to the hospital with symptoms of diphtheria, a condition caused by corynebacterium diphtheria. The diphtheria toxin inhibits translation in mammalian systems.
   i) Describe the process of translation in eukaryotes with flow diagram.
   ii) Name three inhibitors of protein synthesis and mention their mechanism of action.
   iii) Enumerate post-translational modifications. 6+3+6
   b) List the name of four hormones that act through G-protein coupled receptor complex. Describe the process of signal transduction by any one of those hormones. Briefly state the role of Calcium in signal transduction. 2+8+5

2. a) Name two vitamins which have role as antioxidants. Briefly describe the sources, their mode of action as antioxidants and deficiency manifestations. 2+1+5+2
   b) Name the four different types of hypersensitivity. Give one example of each type of hypersensitivity. Describe the mechanism of types I hypersensitivity. 2+2+6
   c) Diagrammatically discuss the absorption transport and storage of Iron. Enlist the iron containing proteins, justify the role of cytochrome in electron transport chain. 6+4

3. Write short notes on the following: 2x5
   a) Southern blotting technique.
   b) Protein energy malnutrition.

4. Explain the following statements: 5x4
   a) Vitamin B12 should be given along with folic acid to treat folic acid deficient anemia.
   b) Cancer may be caused by excessive activity of protein tyrosine kinase activity.
   c) Glutathione is an important mediator for detoxification of toxic materials in humans.
   d) Wilson's disease is a disorder of copper metabolism.
   e) Yeast artificial chromosome can act as a high capacity vector in DNA cloning.

5. Choose the correct option for each of the following: 10x1

i) Tumour marker for ovarian cancer
   a) β hcG
   b) AFP
   c) Ca-125
   d) CEA.

ii) What is full name of cDNA ?
   a) Cloned DNA
   b) Complementary DNA
   c) Catalytic DNA
   d) Cleaved DNA.

iii) Which of the following belongs to a trace element in humans:
a) Calcium
b) Sodium
c) Potassium.
d) Copper.

iv) The specialized structures located at the ends of the eukaryotic chromosomes are called
a) Terminators
b) Telomeres
c) Terminal sequence
d) Stop signal.

v) Which of the following is a tumour suppressor protein :
a) p53.
b) pRb.
c) Myc.
d) Both a and b.

vi) Cytochrome P450 helps in xenobiotic reactions by which of the following mechanisms:
a) Functioning as a dioxygenase
b) Functioning as a mono-dioxygenase
c) Using NADH as a cofactor
d) Using calcium ion as a second messenger

vii) Which of the following hormones use protein tyrosine kinase as second messenger ?
a) Insulin and growth hormone
b) TSH and growth hormone
c) Insulin and TSH
d) TSH and Catecholamines

viii) Which of the following techniques is used to identify a particular segment of DNA from an agarose gel electrophoresis?
a) Western blot
b) Southern blot
c) Northern blot
d) Polymerase chain reaction

ix) Kwashiorkor is characterized by all of the following except
a) Protein deficiency
b) Marked anorexia
c) Hypoglycemia
d) Fatty liver

x) Vitamin k administration is routinely advised in premature babies. Which of the following reasons explains this most appropriately?
a) Vitamin K helps to initiate respiration more smoothly in premature babies
b) Vitamin K helps to prevent haemorrhage in premature infants
c) Vitamin K helps to promote skeletal muscle activity in premature infants
d) Vitamin K helps to prevent acid base disorder in premature infants.

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Subject: Biochemistry **Full Marks : 100**
Paper : I **Time : 3 hours**

*Attempt **all** questions. The figures in the margin indicate full marks.*

1. a) A 5 year old child came to pediatric OPD with complaints of swelling around the eyes and both legs and generalized body swelling for last 2 weeks. The mother complained that there was diminished urine output along with passage of frothy urine for same duration. On examination: pedal edema+++ Laboratory examination showed: Serum albumin 2.9 g/dl and total cholesterol 348 mg/dl and total urinary protein 2.8g/day.
(urinary protein dipstix=+++)
What is your provisional diagnosis?
Enumerate five plasma proteins and write down their major functions.
What are the acute phase proteins ? 5+5+5
b) Define Lipids. Classify them with examples. Describe the structure and function of Lipoproteins. Explain the VLDL metabolism in our body. Add a note on dyslipidemia. 1+4+4+4+2

2. a) Explain why people suffer from fasting hypoglycaemia in Von Gierke's disease. Describe how glycogen metabolism differs in skeletal muscles and liver. 4+6
b) Write down the steps of heme synthesis. Add a note on various porphyrias. 4+6
c) What are ketone bodies? How are they formed in the body? Describe the role of ketone bodies in starvation and in severe uncontrolled Diabetes Mellitus. 2+4+4

3. Write short notes on the following: 2x5
a) Discuss briefly the professional qualities a doctor should possess.
b) Oxygen dissociation curve.

4. Explain the following statements: 5x4
a) Serum creatinine is more specific than plasma urea for assessing kidney function.
b) Brown adipose tissue promotes thermogenesis.
c) 2,4 dinitrophenol functions as an uncoupler of the respiratory chain.
d) Sudden infant death syndrome is seen in defects of beta oxidation.
e) The mode of action of metalloenzymes and metal activated enzymes are different.

5. Choose the correct option for each of the following: 10x1
i) Cell communicate with each other through all of the following except:
a) Desmosomes
b) Gap junctions
c) Ion channels
d) Tight junctions.

ii) The two nitrogen atoms in urea arise from:
a) Ammonia and glutamine.
b) Glutamine and aspartic acid.
c) Glutamine and glutamic acid.
d) Ammonia and aspartic acid.

iii) Glycocalyx present in the:
a) Nucleus.
b) Cell surface.
c) Ribosomes.
d) Golgi complex.

iv) The following phospholipid is involved in blood clotting:
a) Lecithin.
b) Cardiolipin.
c) Plasmalogen.
d) Cephalin.

v) Identify the co-enzyme required by ALA synthase in biosynthesis of porphyrins:
a) FAD
b) NAD.
c) FMN.
d) Vitamin B6.

vi) Which enzyme does NOT have copper as coenzyme ?
a) Cytochrome oxidase.
b) Xanthine oxidase.
c) Superoxide dismutase.
d) Tyrosinase.

vii) Methotrexate a widely used anticancer drug acts by inhibiting
a) Xanthine oxidase.
b) Thymidylate synthase.
c) Dihydrofolate reductase.
d) Phosphoribosyl pyrophosphate synthatase.

viii) Maple syrup urine disease may be caused by deficiency of :
a) Branched chain α-keto acid dehydrogranase.
b) Pyruvate dehydrogenase complex.
c) Tyrosinase.
d) Aldolase.

ix) Uncontrolled cell growth may be a sequel to :
a) Decreased telomerase activity.
b) Increased telomerase activity.
c) Decreased topoisomerase activity.
d) Increased topoisomerase activity.

x) Prostanoids include all except:
a) Prostacyclins.
b) Lipoxins .
c) Thromboxanes.
d) Prostaglandin G_2

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Subject: Physiology **Full Marks: 100**
Paper: I **Time: 3 hours**

*Attempt **all** questions. The figures in the margin indicate full marks.*

1. a) A 66 year old male sought medical care at the hospital due to severe chest pain lasting for 24 hours. The patient was aware of being hypertensive and was a smoker. The ECG disclosed extensive ongoing anterior acute myocardial infarction, an inactive area in the inferior wall; the presence of ST-elevation at V1 to V5 and ST depression in leads I, II, and aVF; ST elevation in aVR.
   i) What is myocardial infarction?
   ii) Write in brief about PR interval and the different changes that occur in different types of heart block in correlation to ECG. Add a note on sinus arrhythmia
   iii) Describe in brief the long-term mechanisms involved in the regulation of blood pressure.
   iv) Enumerate the changes in ECG with changes in ionic composition of blood. 2+(4+2)+5+2

   b) Draw a schematic diagram of erythrocyte membrane and label the different components of it. How the shape of this corpuscle is maintained? Define and explain the osmotic fragility. What is hereditary spherocytosis? 5+4+4+2

2. a) Differentiate between innate and acquired immunity. Write an account on B and T lymphocytes. Discuss how B lymphocytes are playing important role in the regulation of humoral immunity. 3+3+4
   b) Draw and describe the oxygen-haemoglobin dissociation curve. List the factors that shift the curve, and comment on the physiological significance. 5+5
   c) Enumerate various functions of liver. Give an account of bile salts and explain their role in digestion of fat. 5+5

3. Write a short note on the following: 2x5
   a) What is meant by a " DOCTOR".
   b) Megaloblastic anaemia.

4. Explain the following statements: 5x4
   a) Pancreas is not digested by powerful protein splitting enzymes secreted from it.
   b) Normal cell volume and pressure depends on Na+K+ATPase.
   c) Coronary perfusion decreases with increasing heart rate.
   d) Muscle is a machine for converting chemical into mechanical energy.
   e) Hematocrit of the venous blood is more than that of arterial blood.

5. Choose the correct option in each of the following: 10x1
   i) Diastolic blood pressure depends on :
      a) Venous compliance.
      b) Velocity of blood flow.
      c) Peripheral resistance.
      d) Cardiac contractility.

ii) All are coagulation factors except:
   a) Calcium ion.
   b) Calmodulin.
   c) Prothrombin.
   d) Kininogen.

iii) The main determinant of coronary blood flow is-
   a) Hypoxia.
   b) Potassium ion.
   c) Bicarbonate ion.
   d) Adenosine.

iv) If transport of ca^{++} into the sarcoplasmic reticulum is inhibited, the resulting continuous contraction is called:
   a) Summation of contraction.
   b) Complete tetanus.
   c) Incomplete tetanus.
   d) Contracture.

v) Parasympathetic stimulation to the gut leads to all except:
   a) Increased glandular secretion.
   b) Sphincteric constriction.
   c) Increased motility.
   d) Proper digestion.

vi) Which type of hypoxia does not stimulate peripheral chemo receptors?
   a) Hypoxic hypoxia.
   b) Anaemic hypoxia.
   c) Histotoxic hypoxia.
   d) Stagnant hypoxia.

vii) Acetylcholine acts in the neuromuscular junction of skeletal muscle on :
   a) Alpha receptor.
   b) M1 muscarinic receptor.
   c) Nn nicotinic receptor.
   d) Nm nicotinic receptor.

viii) Exocytosis, is best described by the following example of:
   a) Phagocytosis.
   b) Pinocytosis.
   c) Receptor-mediated invagination.
   d) Secretory vesicle fusion and content release.

ix) Following are the constituents of Plasma Protein except:
   a) Coagulation factor proteins.
   b) Ankyrin.
   c) Fibrinolytic system.
   d) Ceruloplasmin.

x) The law governing the pulmonary gas exchange, includes all of the following factors except :
   a) Haemoglobin concentration of the pulmonary blood.
   b) Solubility of the gas.
   c) Available surface area of the blood-gas-barrier.
   d) Thickness of the blood-gas-barrier.

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Subject: Physiology **Full Marks : 100**
Paper : II **Time : 3 hours**

*Attempt **all** questions. The figures in the margin indicate full marks.*

1. a) A 49 year old woman was brought to the Emergency department 2 hours after the onset of hemiplegia and aphasia during a transatlantic flight. Examination revealed evidence of acute ischemic stroke. Additional diagnostic studies were performed.
   i) Define Aphasia
   ii) Describe briefly the different forms of Aphasia.
   iii) Differentiate between features of Upper and lower motor neuron lesion.
   iv) Describe briefly the different forms of memory and the areas of the brain associated with them.
   v) Add a note on synaptic plasticity. 1+4+3+5+2
   b) With the help of a diagram discuss in brief the juxta-glomerular apparatus. Enumerate the important regulators of rennin secretion. Describe the mechanism of formation of anigiotensin II and its physiological effects. 2+3+3+3+4

2. a) Draw a diagram of visual pathway. Enumerate the effects of lesions at different levels of visual pathway. What are the layers of retina? 4+3+3
   b) Describe the hypothalamic and peripheral control of Growth Hormone secretion. Add a note on Acromegaly and Gigantism. 7+3
   c) Describe the neurochemical mechanisms promoting sleep and arousal. Enumerate the stages of Sleep. Add a note on circadian rhythm. 5+3+2

3. Write short notes on the following: 2x5
   a) Gate control theory of pain.
   b) Physiology of lactation.

4. Explain the following statements: 5x4
   a) Vasa recta is essential for concentration of urine.
   b) Thalamic nuclear activity is the source of EEG waves.
   c) Renal hypotension triggers rennin activity.
   d) Dissociated sensory loss occurs in Syringomyelia.
   e) Smell sensation is lost in COVID.

5. Choose the correct option of each of the following: 10x1
   i) All are true regarding glomerular filtration except,
   a) The rate is 7.5 liter per hour.
   b) The capillary hydrostatic pressure gradually decreases along the glomerular capillary plexus.
   c) The capillary oncotic pressure gradually increases along the glomerular capillary plexus.
   d) The substances having molecular weight 2000 are freely filtered.

ii) Structure of brain involved in emotion:
   a) Neocortex.
   b) Thalamus.
   c) Limbic system.
   d) Basal ganglia.

iii) Ability to appreciate the shape and size of an object placed in the hand is lost in lesion of
   a) Tractus Gracilis.
   b) Tractus Cuneatus.
   c) Spinoreticular Tract.
   d) Anterior spinothalamic tract.

iv) The hormone AVP causes,
   a) Fall in systemic arterial blood pressure.
   b) Decrease water permeability of cortical collecting tubule.
   c) Increase urea permeability in inner medullary collecting duct (IMCD).
   d) Stimulate $Na^{+}Cl^{-}$symport (NCC).

v) Insulin increases the entry of glucose into:
   a) All tissues.
   b) The mucosa of the small intestine.
   c) Most neurons in the cerebral cortex.
   d) Skeletal muscle.

vi) The neurotransmitter at the postganglionic sympathetic neuron is :
   a) Acetylcholine.
   b) Noradrenaline.
   c) Adrenaline.
   d) Dopamine

vii) Secretion of prolactin is affected by:
   a) GnRH analogue.
   b) Dopamine.
   c) Serotonin.
   d) FSH.

viii) The NREM sleep is characterized by all except:
   a) One hour duration.
   b) Sleep spindles are seen in EEG waves.
   c) Profound hypotonia.
   d) It has 4(four) stages.

ix) Bitemporal Hemianopia is due to:
   a) Injury to the temporal lobes bilaterally.
   b) Disruption of the optic nerve fibres arising from the temporal retina.
   c) Damage to the optic chiasma.
   d) Loss of vision in the Midline half aspect.

x) Which set of hormones have nuclear receptor:
   a) Estrogen, thyroxin, glucagon.
   b) Estrogen, TSH, GnRH.
   c) Thyroxin, retinoic acid, LH.
   d) Estrogen, cortisol, testosterone.