

Shahabuddin Medical College
Department of Anatomy
Superior Extremity Card Final Examination

Time: 1h.20m
 Total Marks: 40

SM- 22 (Session 2024-2025)
 Date: 29.10.2025

Written & MCQ+SBA: 40+10= 50 marks. 1.30 hrs.

Instructions:

- Questions number 1, 2 & 3 are mandatory.
- Answer any FOUR from questions number 4 to 8.
- Illustrate your answers with a diagram as far as practicable.

01.	Describe the Lymphatic Drainage of the Upper Limb (use diagram). Define fertilization. Describe the process or phases or events of fertilization (use diagram). Mention its results. OR How elbow joint formed? Name the muscles with their origin, insertion, nerve supply, and action involved in different movements of the elbow joint in a tabulated form. Define and classify joints with examples.	4+6=10 1.5+4.5+4=10
02.	A 54-year-old executive officer was feeling severe pain in his right shoulder after falling down from the stairs. On examination the doctors observed that the he was sitting on the stool with right arm by the side of his body and he was supporting his right elbow with his left hand. The inspection of right shoulder revealed loss of its normal rounded contour and loss of skin sensations in the lower half of the deltoid region. He was diagnosed as a case of dislocation of right shoulder. a. Why shoulder joint is commonly dislocated? b. What is the most common type of shoulder dislocation? c. What is the cause of loss of normal rounded contour of the shoulder? d. What is the cause for loss of skin sensation in the lower half of the deltoid region?	1+1+1+2=5
03.	A. Draw & label the anastomosis around the elbow joint B. Draw & label the superficial and deep palmar arch.	2.5+2.5=5
04.	Describe the lymphatic drainage of the mammary gland (use diagram). Classify bones morphologically with example.	3.5+1.5=5
05.	Define implantation. Describe the process of implantation (use diagram). Mention the root value and clinical importance of the radial nerve & ulnar nerve.	3+2=5
06.	Mention the boundaries & contents of the cubital fossa (use diagram). Differentiate between the three cartilages macroscopically (any 3) and microscopically (any 3).	2+3=5
07.	Define dermatome. Draw & label the dermatome of the upper limb. what do you mean by Erb's pulsy?	3.5+1.5=5
08.	Write briefly on I. Anatomical snuff box- definition, formation & functions (use diagram). ii. Retinaculum (flexor & extensor)- definition, formation & functions (use diagram).	2+3=5

Department of Anatomy
Shahabuddin Medical College
Thorax Card Final Examination

Time: 1h.20m

Total Marks: 40 (Pass marks: 24)

SM- 21 (Session 2023-2024)

Date: 26.09. 2024

Written & MCQ: 40+10= 50 marks. 1.30 hrs.

Instructions:

- Questions number 1 & 2 are mandatory.
- Answer any five from questions number 3 to 8.
- Illustrate your answers with a diagram as far as practicable.

01.	Describe the artery supply of the heart (<u>origin, course, branches, and termination</u>) using <u>diagram</u> . What do you mean by <u>Anterior, Posterior, Lateral, Sagittal section & Coronal section</u> ? OR Give the origine, nerve supply, functions & the major opening with the vertebral level of the diaphragm & gives their contents. What do you mean by Superior, Inferior, Medial, Horizontal/Transverse section & Oblique section?	7.5+2.5=10 7.5+2.5=10
02.	A 30-year-old female visited the hospital and complained that she had been feeling severe pain on the right side of her chest for the past two weeks and had little difficulty in breathing. She also said that pain often radiated to the anterior abdominal wall. On auscultation, the doctor noticed the absence of breath sounds over the inferior lobe of her right lung. The X-ray chest PA view revealed blunting of the right costodiaphragmatic angle and line of fluid level. She was diagnosed as a case of pleural effusion. Questions- 1. What is pleural effusion? 2. Enumerate the recesses of the pleura. 3. What is the anatomical basis of radiation of pain to the anterior abdominal wall? 4. Mention the causes of pleural effusion and the site where pleural fluid collects first.	1+1+1+2=5
03.	Define bronchopulmonary segment. Mention the characteristic features & clinical importance of the bronchopulmonary segment. What is respiratory distress syndrome (RDS)?	1.5+2-1.5=5
04.	Draw & label the <u>venous drainage of the posterior thoracic wall</u> . Explain why the manubrium sternum is clinically important.	3+2=5
05.	Define & classify mediastinum. Mention the boundaries & contents of the middle mediastinum (use diagram).	2+3=5
06.	Write briefly on- I. Parietal pleura (layers, parts & nerve supply) II. Pericardium (layers, nerve supply & importance)	2.5+2.5=5
07.	Define bone & give its morphological classification with an example. Differentiate the three types of cartilage at least any five in a tabulated form.	2.5+2.5=5
08.	What is intercostal space & typical intercostal space? State the steps of dissection of a typical intercostal space.	2.5+2.5=5

Shahabuddin Medical College

Department of Anatomy

Superior Extremity Card Final Examination

Time: 1h.20m

SM- 21 (Session 2023-2024)

Total Marks: 40

Date: 27.11.2024

Written & MCQ: 40+10= 50 marks. 1.30 hrs.

Instructions:

- Questions number 1 & 2 are mandatory.
- Answer any five from questions number 3 to 8.
- Illustrate your answers with a diagram as far as practicable.

01.	Describe the steps of dissection of the axilla pointing out its skin incision, boundaries, and contents (use diagram). Write briefly on the axillary group of lymph nodes and their area of drainage (use diagram).	6+4=10
	OR	
	Describe the lymphatic drainage of the upper limb (use diagram). Differentiate between the paired terms "Erb's palsy" and "Wrist drop" (any two).	6+4=10
02.	A 35-year-old mother was crossing the road along with her 3-year-old son. After seeing a speeding car rushing towards them she suddenly pulled her son away by holding his left hand to avoid danger of being crushed by the car. The child cried out and later refused to use his left upper limb. The mother took the child to the doctor. On examination the doctor noticed that the child held his left forearm in a position with elbow semiflexed and forearm pronated. A diagnosis of 'pulled elbow' was made. Questions- 1. What is a pulled elbow? 2. Why is pulled elbow common in preschool (1-3-year-old) children? 3. How can a pulled elbow be reduced /treated?	1.5+1.5+2=05
03.	Define dermatome. Draw and label the dermatome of the upper limb	1+4=05
04.	Describe the lymphatic drainage of the mammary gland (use diagram).	05
05.	Explain from your knowledge of anatomy why/ how: I. Ulnar nerve palsy leads to ulnar claw hand. II. Median cubital vein is clinically important	2.5+2.5=05
06.	Write down the origin, insertion, nerve supply & action of the triceps muscle, biceps brachii muscle, and serratus anterior muscle in a tabulated form.	05
07.	Write briefly on: a) Anatomical snuff box- boundaries and importance b) Flexor retinaculum of the hand- formation, relation, and importance	2.5+2.5=05
08.	Draw and label the brachial plexus of the nerve.	05

Shahabuddin Medical College
Department of Anatomy
Abdomen Card Final (supplementary)

Time: 1hr.20 m
 Total Marks: 40

SM- 21(Session 2023-2024)
 Date: 19.04.2025

Instructions.

- Question number 1, 2, 3 are mandatory.
- Answer any four from question number 4 to 8.
- Illustrate your answers with a diagram as far as practicable.

01.	Define gametogenesis. what do you mean by capacitation and acrosomal reaction? Draw and label a blastocyst.	2+2+3+3=10
	OR	
02.	Describe the formation and contents of the rectus sheath (use diagram). What is the linea alba and give its clinical importance.	7+3=10
02.	A 65-year-old male patient was admitted in the hospital with the following complaints: progressive jaundice, pale greasy stools, itching of skin, loss of appetite and weight, and back pain. On examination the doctors found palpable gallbladder and ascites. After thorough investigations he was diagnosed as a case of "carcinoma of the head of pancreas". 1. What is Courvoisier's law? 2. What are the important posterior relations of the head of pancreas? 3. Give the source of development of common bile duct and main pancreatic duct	1.5+1.5+2= 5
03.	Draw and label the histological/ light microscopic structure of the (ANY TWO) a) Kidney b) Liver c) Appendix	2.5+2.5 = 5
04.	Describe the lymphatic drainage of the stomach (use diagram).	05
05.	Describe the trigone of the urinary bladder (use diagram). Mention the effects of sympathetic (two) and parasympathetic (two) innervation on the urinary bladder.	3+2 = 5
06.	Explain anatomically/ developmentally why/how: a. Inguinal hernia is common in males. b. Portal obstruction may cause hemorrhage per anus.	2.5+2.5 = 5
07.	Mention the supports of the uterus. What is ante flexion and ante version of the uterus (use diagram)?	3+2=5
08.	Define spermatogenesis. Draw and label the histological structure of the testis.	2+3=5

Shahabuddin Medical College

Department of Anatomy

2nd Term final examination

Time: 3hr

Total Marks:100 (Pass marks:60)

SM- 21 (Session 2023-2024)

Date: 04.05.2025

Written & MCQ +SBA: 80+10+10 =100 marks 3.00 hours

Instructions.

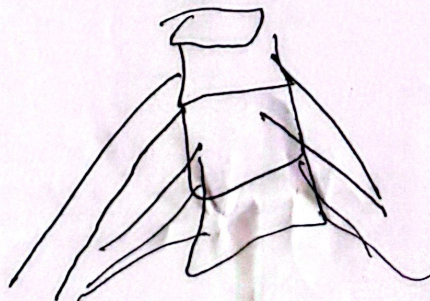
- Question number 1,2,3 (group A) & 9,10,11 (group B) are mandatory.
- Answer any four from question number 4 to 8(group A) & 12 to 16(group B).
- Illustrate your answers with a diagram as far as practicable and use separate scripts.

GROUP-A

01	Describe the processes of fertilization (use diagram). Mention its results. Draw and label the mature graafian follicle.	5+2+3=10
	OR	
02	Describe the venous drainage of the lower limb (use diagram). Name the factors responsible for venous return of the lower limb. What do you mean varicose vein?	6+2+2=10
02	A 55-year-old woman complained that for the past 1 year she had frequently passed blood-stained stools and recently she noticed that one rounded mass protrudes out from her anus during straining at stool. After defecation, she is able to push it back inside the anus. The proctoscopic examination revealed three pink coloured swellings located at 3, 7, and 11 o'clock positions with the patient in lithotomy position. The swellings bulged downward when the patient was asked to strain. A diagnosis of internal hemorrhoids was made. 3, 7, and 11 o'clock positions. Questions 1. What are the internal and external hemorrhoids? 2. What is the site of occurrence of internal piles? 3. Why the internal hemorrhoids painless and the external hemorrhoids are painful?	2+1+2=5
03	Draw and label the histological structure/ light microscopical structure of- A) The Testis B) The Appendix	2.5+2.5=5
04	Describe why the kidneys ascend during development. Draw and label the anterior relations of both kidneys.	2.5+2.5=5
05	Explain anatomically/ developmentally why/how: a. 2 nd week of development is called the week of twos. b. mucous membrane of GIT provides extensive surface area for absorption.	2.5+2.5 = 5
06	Mention the origin, insertion, nerve supply and action of the following muscles in a tabulated form- I. Gluteus maximus II. Psoas major	2.5+2.5 = 5
07	Write down the formative elements and factors maintaining the stability of the hip joint. Explain why the medial meniscus is damaged much more frequently than the lateral.	3.5+1.5=5
08	Describe the interior of the anal canal. Mention the histological structure of the large gut.	3+2=5

GROUP-B

9.	Describe the histological structure of the liver. Mention 3 (three) differences between the hepatic lobule & portal lobule of the liver. What do you mean by the space of the Mall in liver? OR Write down the lymphatic drainage of the stomach (use diagram). Give its clinical importance. Why does ulceration of the stomach usually occur along the lesser curvature of the stomach?	5+3+2=10 5+2+3=10
10.	A final year medical student, while playing football received a blow on the lateral side of his right knee and fell on the ground. He felt sharp pain on the medial aspect of the right knee and was not able to extend the leg on the same side. He was taken to the hospital where the examining doctor found that his right knee was swollen especially above the patella. Drawer's sign was negative. The radiograph of the knee did not reveal any fracture. He was diagnosed as a case of torn medial meniscus of the knee joint. Question- 1. Enumerate the main intracapsular structures of the knee joint? 2. Why is the injury of medial meniscus more common than that of a lateral meniscus? 3. What is the cause of swelling of the knee especially above the patella in this case?	1.5+1.5+2= 5
11.	Draw and label the A) Dermatome of the lower limb ✓ B) Blastocyst ✓	2.5+2.5=5
12.	Mention the supports of the uterus. Name the parts of the uterine tube and give the histological structure of the uterine tube (use diagram).	2+1+2 = 5
13.	Explain from your knowledge of anatomy why/ how: a. fracture of the neck of the fibula causes foot drop. b. physiological hernia occurs in intrauterine life.	2.5+2.5 = 5
14.	Mention the formation and maintenance of the medial longitudinal arch of the foot. Give the derivatives of the neural crest cells.	3.5+1.5=5
15.	Mention the steps of dissection, boundaries, and contents of the popliteal fossa (use diagram).	2+3=5
16.	Describe the interior of the urinary bladder (use diagram). Give the nerve supply of the urinary bladder and mention the effects of the nerve supply over the urinary bladder.	3+2=5



Card Final Written Examination: Biophysics & Biomolecules (SM – 22)

Marks : 35

Time : 1hr 20 min

Answer any 4 from question no. 1 – 5. Question no. 6 & 7 are mandatory to answer.

1. a) Define buffer. Name the buffer system of our body with their composition. (2)
b) Bicarbonate buffer system is the most important buffer system- explain. (3)
2. a) Define and classify monosaccharides with examples. (2½)
b) Name the GAGs. Write their importance. (2)
3. a) Define tonicity. Classify solution according to tonicity with examples. (2½)
b) Write the differences between crystalloids and colloids. (2½)
4. a) Define isotope. Write the clinical use of isotopes. (2½)
b) What is the clinical use of Dialysis ? Describe the principle & basic mechanism of dialysis. (2½)
5. a) Define & Classify lipids. (2½)
b) Write the functions of ω -3 & ω -6 fatty acids along with their sources. (2½)
6. A 20 years old student experienced a nasty motorcycle accident. No bones were broken, but that student experienced fever & severe pain in lower limbs.
a) Name the group of chemical substance responsible for pain & fever. (½)
b) Define, give examples & write the functions of that special group of chemical substances. (½+1+1½)
c) What is relationship between Steroids, Sterols & Cholesterols? Show the use of cholesterol in human body. (1½)
7. Proteins are large, complex molecules that play many important roles in the body.
a) Define & Classify proteins according to their function with examples. (3)
b) Briefly discuss different level of structures of protein. (3)
c) What is denaturation of protein ? Give the features of a denatured protein. (2)
d) What is peptide bond ? How a peptide bond is formed. (2)

Or,

Enzymes are biocatalysts, produced by living cell. They increase the velocity of a biochemical reactions.

- a) Describe the IUBMB classification of enzymes with example. (3)
b) What do mean by coenzyme, holoenzyme and apoenzyme. Give examples of cofactors. (3)
c) State the effect of PH and substrate concentration on enzyme activity. (3)
d) What is K_m value ? Give its significance. (1)

Card Final Written Examination: Biophysics & Biomolecules (SM – 21)

Marks : 35

Time : 1hr 20 min

Answer any 4 from question no. 1 – 5. Question no. 6 & 7 are mandatory to answer.

1. a) Define P^H and buffer. Name the buffer system of our body with example. ($\frac{1}{2}+2$)
b) Bicarbonate buffer system is the most important buffer system- explain. ($2\frac{1}{2}$)
2. a) Define and classify monosaccharides with examples. (3)
b) Name the GAGs. Give their importance. (2)
3. a) Define tonicity. Classify solution according to tonicity with examples. ($2\frac{1}{2}$)
b) Write the biomedical importance and hazards of radioactive isotopes. ($2\frac{1}{2}$)
4. a) Define enzyme, coenzyme, holoenzyme and apoenzyme. (2)
b) State the effect of P^H and substrate concentration on enzyme activity. (3)
5. a) Classify lipids. ($2\frac{1}{2}$)
b) Write the functions of phospholipids & Cholesterol in the body. ($2\frac{1}{2}$)
6. A 60 years old patient came to the hospital with end stage renal failure. Blood picture shows: blood urea= 154 mg/dl, S. Creatinine= 9 mg/dl, S. Potassium= 5.4 mmol/L, eGFR= 8ml/min.
a) Name the clinical procedure that can be advised for this patient. Explain why that procedure is needed. (1)
b) Write down the principle of the procedure. ($1\frac{1}{2}$)
c) Explain the basic mechanism how these procedures work. ($2\frac{1}{2}$)
7. Proteins are large, complex molecules that play many important roles in the body.
a) Classify proteins according to their function with examples. (2)
b) Briefly discuss the structures of protein. (4)
c) What is denaturation of protein? Give the features of a denatured protein. (2)
d) What is peptide bond? How a peptide bond is formed. (2)

SHAHABUDDIN MEDICAL COLLEGE

Department of Biochemistry

Card Final Examination : Food, Nutrition & Vitamins (SM-22)

Full marks: 35

Time: 1 hour 20 min

Answer any 4 from question no.1 – 5. Question no. 6 & 7 are mandatory to answer

1.
 - a) Define BMR & Balanced diet. (1)
 - b) How BMR of a person can be calculated. Give normal values of BMR. (1½)
 - c) How will you calculate the TDER of a female medical student? (2½)
2.
 - a) Define Essential Nutrients. Give examples. (1½)
 - b) What is glycemic index? Mention its importance. (1½)
 - c) Write the dietary sources of Iron. What are the factors that affect iron absorption? (2)
3.
 - a) State the active forms of vitamin B₁₂. (1)
 - b) Write the functions of vitamin B₁₂. (1½)
 - c) Describe the deficiency features of vitamin B₁₂. (2½)
4.
 - a) Write the role of vitamin A in vision. (1)
 - b) Write in short about visual cycle. (1½)
 - c) Describe the deficiency features of vitamin A. (2½)
5.
 - a) Show the biosynthesis of vitamin D in a figure. (2)
 - b) Describe the functions of vitamin D. (2)
 - c) State the pathophysiology of vitamin D deficiency in infants. (1)
6. A sea traveler after coming from a 3½ month sea-trip to the arctic, attended a hospital with complaints of gum bleeding, knee swelling and weakness. He was injured during the last month of his journey, the wound is not healing. The patient was on diet mostly of carbohydrate and proteins during his whole trip. Vegetables were totally absent in his diet.
 - a) What can be the possible disease the patient is suffering from? Give reasons behind your guess. Name the sources of the deficient nutrient. (1½)
 - b) Give the functions of the nutrient in the body. (2½)
 - c) Explain why the wound is not healing. (1)
7. PEM is a range of disorders of starvation & malnutrition, that arise from lack of dietary protein & calories:
 - a) Classify PEM according to WHO. (3)
 - b) Give difference between Marasmus & Kwashiorkor. (3)
 - c) Explain why oedema occurs in Kwashiorkor? (2)
 - d) How nutritional status can be assessed? What is BMI. (2)



Card Final Written Exam: Digestion, Absorption, Bioenergetics & Metabolism (SM – 21)

Marks : 35

Time : 1hr 20 min

Answer any 4 from question no. 1 – 5. Question no. 6 & 7 are mandatory to answer.

1.	a) Write the functions of 4 major components of gastric juice. (2½) b) Classify the local hormones of GIT. Write the functions of any two of them. (2½)
2.	a) What is respiratory chain ? Show the arrangements of the components of respiratory chain with sites of ATP formation. (3½) b) What do you mean by high energy phosphate compounds ? Give 3 examples of it. (1½)
3.	a) Define Transamination & Oxidative deamination. Give examples of each. (3) b) Write the sources and fates of Acetyl CoA in the body. (2)
4.	a) Why TCA cycle is called an amphibolic pathway? (3) b) Name the substrates for gluconeogenesis. Give importance of gluconeogenesis. (1½)
5.	a) How long chain fatty acids are transported from cytoplasm to matrix for oxidation? (2) b) How ketone bodies are synthesized in the body? Give their functions. (2+1)

6.	A 50 years old diabetic patient came to hospital for follow-up. His blood glucose level was not controlled properly. His LDL-C level was 250 mg/dl, TG = 358 mg/dl, HDL-C = 23 mg/dl. To prevent cardiac complications of this patient, treatment and advice given accordingly. a) Which cholesterol is cardio-protective & which one is bad for this patient ? (½) b) Explain why some cholesterol is cardio-protective & some cholesterol increases risk of coronary artery disease. (1½+1½) c) Explain the reverse cholesterol transport process. (1½)
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7.	Carbohydrates are metabolized in the body through different routes. Pathways through which it will traverse depends upon necessity of the body at a specific body condition. a) Mention the metabolic pathways or steps which are to be traversed by a molecule of glucose to be completely catabolized to CO₂ & H₂O. Mention the number of ATP yield by the process of glycolysis when it happens in RBC. (4) b) What are the fates of pyruvate produced in glycolysis ? (2) c) What would be the products if the glucose is alternatively catabolized in HMP shunt and what are the utilities of those products ? (4) Or, Digestion of protein releases free Amino Acids. Amino acids are the sources of nitrogen for the body. Nitrogen disposal from the body is also necessary to prevent toxicity. a) Describe how proteins are digested in human body. (3) b) What do you mean by Amino Acid Pool ? (3) c) Show the urea cycle in a diagram. (2½) d) Explain the biochemical basis of developing ammonia intoxication. (1½)
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SHAHABUDDIN MEDICAL COLLEGE

DEPARTMENT OF BIOCHEMISTRY

Card Final (Supplementary) Examination- Digestion, Absorption, Bioenergetics and Metabolism (SM-21)

Full marks: 35

Time: 1 hour 20 min

Answer any 4 from question no. 1-5. 6 & 7 are mandatory to answer

1. a) Name the digestive juices with their pH value. (3)
b) Discuss about carbohydrate digestion and absorption. (2)
2. a) Mention the sites of ATP synthesis and inhibitors of electron transport chain. (2)
b) TCA cycle is called a common metabolic pathway- Explain. (3)
3. a) What are the requirements of urea formation? Show the urea cycle with diagram. (3)
b) Give the sources and fates of ammonia. (2)
4. a) Enumerate the lipoproteins with their site of origin. (2.5)
b) Mention the steps of LDL metabolism. (2.5)
5. a) Name the ketone bodies. How they are synthesized in the body? (2)
b) Why does ketoacidosis occur in uncontrolled Diabetes Mellitus? (3)
6. A 4 years old child was brought to a doctor with the complaints of abdominal pain and cramps, diarrhoea and flatulence which was aggravated after taking milk and milk products.
a) What is the probable diagnosis of this condition? (2)
b) What is the biochemical defect and explain the mechanism of causing diarrhoea in this child. (3)
7. Digestion of lipids in the intestine requires emulsification. After being digested, the end products are absorbed, entered into the circulation and finally metabolized.
a) Name the dietary lipids and their end products of digestion. (2.5)
b) What happens in the process of emulsification and how does it help in lipid digestion? (2.5)
c) How the end products of lipid digestion are absorbed from GIT? (3)
d) Enumerate the lipases present in our body. (2)

Department of Biochemistry
Shahabuddin Medical College

Card Final Written : Fundamentals of Molecular Biology & Genetics (SM-20)

Marks : 35

Time : 1hr 20 min

Answer any 4 questions from question no. 1– 5. Question no. 6 & 7 is mandatory to answer

1. a) Describe the structure of a nucleotide. (2)
b) Differentiate between DNA and RNA. (3)
2. a) Define gene, genotype, phenotype and karyotype. (2)
b) Mention the characteristics of the genetic code with explanation. (3)
3. a) Write down the requirements of Translation. (2)
b) Describe the post-translational modifications of protein. (3)
4. a) What is cell cycle? (1)
b) Write down the requirements and steps of replication. (4)
5. a) Define and classify mutation. (2.5)
b) Describe point mutation. (2.5)
6. Diabetes is one of the most common diseases in Bangladesh. Insulin injection is sometimes needed for its treatment.
 - a) Which technology is used to produce insulin commercially? (0.5)
 - b) What are the other uses of that technology? (1.5)
 - c) What is a vector? (1)
 - d) Describe the steps of biological cloning briefly. (2)
7. Genetic information flows from DNA to RNA to protein. Expression of genetic information starts with transcription and ends by forming proteins. Proteins ultimately are responsible for all cellular functions.
 - a) Define transcription. Give its requirements. (2)
 - b) Briefly describe the steps of transcription of the eukaryotic gene. (3)
 - c) Write down the post-transcriptional modification of mRNA. (3)
 - d) Differentiate between replication and transcription. (2)

Department of Biochemistry
Shahabuddin Medical College

Card Final (Supplementary Examination):
Fundamentals of Molecular Biology & Genetics(SM-21)

Marks:35

Time: 1hr 20 min

Answer any 4 questions from question 1-5. Question no. 6 & 7 is mandatory to answer.

- ✓ 1. a) Draw & label Watson & Crick model of DNA. (2)
b) Differentiate between DNA & RNA. (3)
- ✓ 2. a) Define genotype, phenotype & karyotype. (1.5)
b) Describe how DNA is organized in chromosome. (3.5)
- ✓ 3. a) Write down the requirements & steps of replication. (4)
b) What are the differences between replication & transcription? (1)
- ✓ 4. a) Name major types of RNA with their relative proportion & functions of each. (2)
b) Describe the post-transcriptional modification of mRNA. (3)
5. a) Define mutation & write down the causes of mutation. (2)
b) Describe point mutation. (3)
- ✓ 6. Arginine is encoded by six codons which are: CGA, CGG, CGU, CGC, AGA, AGG.
a) This statement is supported by which property of genetic code? (1)
b) Describe the other properties of genetic code with examples. (2)
c) Mention the types of codons. What is initiating codon & termination codon?
(2)
- ✓ 7. A molecular biologist want to produce huge copies of DNA fragments within a short period of time.
a) Which procedure will be applied to do this? (1)
b) Name the requirements of the procedure. (3)
c) Describe the steps of this procedure with figure. (3)
d) Write down the important applications of this procedure. (3)

OR,

Genetic information flows from DNA to RNA to protein. Expression of genetic Information starts with transcription & ends by forming proteins.

- a) Define translation. What are the requirements of translation? (2)
- b) Briefly describe the steps of translation. (4)
- c) Write down the post-translational modification of protein. (3)
- d) What is Restriction Endonuclease? (1)

Department of Biochemistry
Shahabuddin Medical College

Card Final Written : Fundamentals of Molecular Biology & Genetics (SM-21)

Marks : 35

Time : 1hr 20 min

Answer any 4 questions from question no. 1– 5. Question no. 6 & 7 is mandatory to answer

1. a) Describe how nitrogenous bases are catabolized. (1½)
b) Describe how DNA is organized into chromosomes. (3½)
2. a) Define gene, genotype, phenotype and karyotype. (2)
b) Describe characteristics of the genetic code. (3)
3. a) Write in short about cell cycle. (2)
b) Describe the post-transcriptional modifications of mRNA. (3)
4. a) Enumerate different types of RNA with their relative proportion. Write the functions of each type of RNA. (1)
b) Write down the requirements and steps of replication. (4)
5. a) Define mutation & write the causes of mutation. (2½)
b) Describe point mutation. (2½)
6. In a Road Traffic Accident many people have died. Most of them are beyond recognition. Police is trying hard to identify each deceased person.
 - a) Which technology can be used to identify the unrecognizable persons ? (½)
 - b) Describe the steps of that technology in details. (3)
 - c) What are the other use of that technology ? (1)
 - d) What is DNA fingerprinting ? (½)
7. Genetic information flows from DNA to RNA to protein. Expression of genetic information starts with transcription and ends by forming proteins. Proteins ultimately are responsible for all cellular functions.
 - a) Define translation. Give its requirements. (2)
 - b) Briefly describe the steps of translation. (4)
 - c) Write down the post-translational modifications of protein. (3)
 - d) Write in short about codons. (1)

DNA fingerprinting

Answer any 4 questions from question no. 1 – 5 of both A & B groups.
Question no. 6 & 7 of both A & B groups are mandatory to answer.

Group A

1. a) Define pH & buffer. Name the body buffer systems with their composition. (1+2)
b) Explain the mechanism of action of buffer system with examples. (2)
2. a) Define and classify polysaccharide with examples. (½+2)
b) Write the biomedical importance of Glucose & Ribose. (2½)
3. a) Give differences between crystalloids & colloids. (2½)
b) Write the clinical importance of dialysis in medical practice. State the principles & basic mechanism of dialysis. (2½)
4. a) Classify enzymes according to IUBMB and give one examples of each. (2½)
b) Explain the effects of substrate concentration and pH on enzyme activities. (1½+1)
5. a) Define & classify lipid. (2½)
b) Write the biomedical importance of eicosanoids. (2½)
6. A patient came to the hospital with diarrhoea. On examination, the patient's pulse was just palpable, BP was low (80/50 mm of Hg), eyes were sunken & tongue was dry.
 - a) Which type of fluid infusion will you suggest for this patient ? (½)
 - b) What will happen if you infuse hypotonic fluid to the patient ? (1)
 - c) Define tonicity. Classify solution according to tonicity with examples. (½+1½)
 - d) State the normal level of Plasma Osmolarity. Explain osmolar gap. (1½)
7. Proteins are the polymers of amino acids. Proteins perform diverse functions in our body.
 - a) Classify protein according to their functions with one example of each. (2½)
 - b) Describe the level of structures of protein. (4)
 - c) Define denaturation of protein. Name 3 common denaturing agents. Enumerate the effects of denaturation. (1½)
 - d) Draw and label a peptide bond. (2)

Group B

1. a) Define food, diet & balanced-diet. (1)
b) Calculate the total calorie value of a food containing 250 gm of carbohydrate, 100 gm of protein & 50 gm of fat. (1)
c) How can you calculate daily calorie requirement of a medical student ? (3) *Both*
2. a) Differentiate between fat-soluble & water-soluble vitamins. (2)
b) Name the hemopoietic vitamins. Describe the functions & deficiency features of any one of them. (3)
3. a) What do you mean by essential nutrients? Give examples. (1)
b) What are the sources of insoluble & soluble dietary fibers? What are the advantages and disadvantages of taking dietary fibers? (1+2½+½)
4. a) Define macro-minerals & microminerals. Give examples. (1½)
b) Write the functions of Iron, Zinc & Iodine in human body. (3½)
5. a) Name the active & endogenous form of vitamin D in human body. (½)
b) Describe the steps of synthesis of vitamin D in human body. (2)
c) Name the deficiency features of vitamin D. Describe the pathophysiology of developing any one of such disorders. (2½)
6. A patient came to hospital with complain of inability to see at night. Local examination revealed a white foamy spot on the conjunctiva.
 - a) Patient is deficient of which nutrient ? Mention their sources. (1)
 - b) What is the role of the deficient nutrient in vision. (2)
 - c) Describe the deficiency features of that nutrient. (2)
7. A child was brought to a hospital with nutritional disorder. The 7 years old child weighs 10 Kg & height is 2 feet 10 inches.
 - a) Define BMI. Calculate the BMI of the child. Give your comment on it. (3)
 - b) Enumerate the anthropometric measurements used for assessment of nutritional status. (2)
 - c) Classify PEM according WHO. (2)
 - d) Give differences between marasmus & kwashiorkor. (2)
 - e) Explain why oedema occurs in this patient. (1)

Group B

1. a) Name the proximate principles of food. (½)
b) An individual takes 300 gm of carbohydrate, 100 gm of protein & 50 gm of fat daily along with sufficient vitamins and minerals. Calculate the amount of calorie intake of that person. (1½)
c) How can we calculate daily calorie requirement of a rickshaw puller? (3)
2. a) Name the active forms of energy releasing vitamins. Why they are so named? (1+½)
b) Describe briefly the deficiency features of vitamin B₁, B₂ & B₃. (2+1+1)
3. a) What do you mean by essential nutrients? Give examples. (1)
b) What are the sources of insoluble & soluble dietary fibers? What are the advantages and disadvantages of taking dietary fibers? (1+2½+½)
4. a) Define trace elements & give examples. (1)
b) Write the functions of Iron, Zinc & Iodine in human body. (3)
c) What is BMI? Give its clinical importance. (1)
5. a) Name the endogenously synthesized vitamins with their site of synthesis. (1)
b) Name the active form of vitamin K. Explain their functions in the body. (½+2)
c) Who are at greater risk of developing vitamin K deficiency & how can it be prevented? (1½)
6. A 1½ year old child was suffering from fever and cough. Suddenly the child develops swelling of the leg & abdomen. The parents says that they used to give the child only khichuri. They thought the child won't be able to digest protein, so they avoided.
 - a) What is your possible diagnosis ? Explain. (½)
 - b) Enumerate the WHO classification of PEM. (1)
 - c) Give differences between marasmus & kwashiorkor. (2½)
 - d) Explain why oedema occurs in this patient. (1)
7. A patient's Hemoglobin concentration was 9.5 gm/dl & PBF shows large oval shaped RBC with hyper-segmented neutrophils. Megaloblastic anemia was the diagnosis.
 - a) What are the causes of Megaloblastic anemia? (½)
 - b) Briefly describe the functions of the vitamins responsible for such anemia. (2½+3)
 - c) Explain why megaloblastic anemia occurs in deficiency of these vitamins. (2½)
 - d) Enumerate other deficiency features of those vitamins. (1½)

Or,

In National Immunization Day, every child under 5 years of age is given vitamin A capsule. It is an inexpensive, quick, and effective way to reduce child morbidity and mortality in the long term.

- a) Name the active forms of vitamin A. Write their sources. (½+1)
- b) Explain their role on vision & epithelial tissues. (3½+1½)
- c) What happens if vitamin A fails to play their role on vision & epithelial tissues? (2½+1)

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Department of Biochemistry
Shahabuddin Medical College
3rd Term Written Examination : SM – 21

Marks : 70

Time : 2hr 30 min

Answer any 4 question from question no. 1 – 5. Question no. 6 & 7 are mandatory to answer.

Group A

1. a) Write down the chemistry of nucleosides & nucleotides with two examples of each. (2)
b) Write the functions of nucleotides. (3)
2. a) What is central dogma ? Mention the enzymes & proteins required for replication with their functions. (3)
b) Write the differences between replication & transcription. (2)
3. a) Describe the steps of translation. (4)
b) Define phenotype, genotype & karyotype. (1)
4. a) Define and classify mutation. Write the causes of mutation. (3)
b) What effects may occur following point mutation. (2)
5. a) What is genetic code? Write the properties of genetic code. (3)
b) Define and classify codon. Name the initiation codon & stop codons. (2)
6. A persons was suffering from liver cancer. Part of the liver of that patient has to be removed. By the end of the month, liver of that person almost attains its normal size by regenerating liver tissues.
 - a) Which property of liver cell allow it to regenerate ? ($\frac{1}{2}$)
 - b) Discuss the cell cycle. ($2\frac{1}{2}$)
 - c) What are the fates of G_0 phase of cell cycle ? (1)
 - d) What are the checkpoints of a cell cycle ? (1)
7. A molecular biologist wants to produce huge copies of DNA fragments within a short period of time.
 - a) Name the procedure applied for such. Write the requirements of that procedure. (2)
 - b) Describe the steps of that procedure. (3)
 - c) Write the applications of that procedure. (3)
 - d) Define vector, give examples. Explain the properties of a vector. (2)

Answer any 4 question from question no. 1 – 5. Question no. 6 & 7 are mandatory to answer.

Group B

1. a) Name the substances completely reabsorbed from renal tubules. (1)
b) Describe how acidification of urine occurs. (4)
2. a) Define diuresis. Differentiate between water and osmotic diuresis. (3)
b) Define Plasma Clearance. How plasma clearance can be calculated? write the importance of plasma clearance. (2)
3. a) Name the routinely measured serum electrolytes with their reference value. (2)
b) What do mean by K^+ flux ? write the causes & consequences of hypokalemia. (3)
4. a) What do you mean by Acid-Base parameters ? (1½)
b) Describe the primary defect, causes & compensation of respiratory alkalosis. (3½)
5. a) State the distribution of calcium in plasma. (1½)
b) Describe how Ca^{2+} homeostasis in the body is maintained. (3½)
6. A 70-year-old man brought to hospital with complaints of severe watery diarrhea. The patient is feeling fatigue, headache, drowsiness & confusion.
 - a) What kind of volume disorder the patient is suffering from ? What should be the treatment plan (1½)
 - b) Explain the nature of electrolyte imbalance occurring in this patient ? (1½)
 - c) What type of acid base imbalance is possible in this patient ? Explain the anion gap status of this patient. (2)
7. Water and its dissolved constituents are known as body fluid, which are required for maintaining internal environment of the body.
 - a) What are the factors that affects total body water ? (1)
 - b) Show the distribution of body fluid in a 60 kg adult female. (3)
 - c) How body fluid volume is regulated ? (3)
 - d) What is water turnover rate ? Explain its importance. (3)