

GUIDANCE ANSWER KEY: Anatomy, physiology and Pathophysiology I - CBCS

References:

1. For Anatomy and Physiology: Latest edition of Tortora
2. For Pathophysiology: a) Robbins b) Harsh Mohan

Q 1 a) Answer the following

16

i) Define homeostatis and state components of feedbacksystem

Homeostasis is the condition of equilibrium (balance) in the body's internal environment due to the constant interaction of the body's many regulatory processes.

Components of feedback system: Receptor • Control center • Effector

ii) What is facilitated diffusion

Solutes that are too polar or highly charged to move through the lipid bilayer by diffusion can cross the plasma membrane by a passive process called **facilitated diffusion**. In this process, an integral membrane protein assists a specific substance across the membrane. The integral membrane protein can be either a membrane channel or a carrier.

iii) Give location and function of Adiposetissue

- beneath the skin, between muscles, around the kidneys and heart, behind the eyeballs, and abdominal membranes

Functions: Adipose tissue acts as an insulating layer, helping to reduce heat loss through the skin. • It also has a protective function, providing mechanical protection ("padding") • and support around some of the major organs, e.g. kidneys. Adipose tissue is also a means of energy storage. • Food that is excess to requirements is converted into fat and stored within adipose tissue in the body.

iv) Enlist the functions of lymphaticsystem

1. Drains excess interstitial fluid. Lymphatic vessels drain excess interstitial fluid from tissue spaces and return it to the blood.
2. Transports dietary lipids. Lymphatic vessels transport lipids and lipid-soluble vitamins (A, D, E, and K) absorbed by the gastrointestinal tract.
3. Carries out immune responses. Lymphatic tissue initiates highly specific responses directed against particular microbes or abnormal cells.

v) Explain how RBCs are specialized carrier for Hemoglobin

Elaborate on following points:

1. Biconcave shape with relative higher surface area
2. Hemoglobin
3. No aerobic respiration

vi) Define the process of angiogenesis.

- Angiogenesis is the growth of blood vessels from the existing vasculature.
- It is a part of healing process
- vascular endothelial growth factor type A (also called VEGF, vascular permeability factor) is a key proangiogenic growth factor.

vii) Define autoimmune disorders.

In an autoimmune disease or autoimmunity, the immune system fails to display self-tolerance and attacks the person's own tissues. Any examples can be given such as Grave's Disease

viii) Enlist the connective tissue coverings of skeletal muscle.

- Perimysium
- Epimysium
- Endomysium

b) Answer the following

04

i) Define hemostasis

Hemostasis is a sequence of responses that stops bleeding. Consists of Vascular spasm, Platelet Plug Formation and Blood coagulation.

ii) What is polycythemia vera.

Polycythemia vera is a condition characterized by an increased number of red blood cells in the blood (erythrocytosis). Other formed elements can also be elevated.

iii) Enlist various mediators of inflammation.

Histamine, Serotonin, Lysosomal Enzymes, Prostaglandins, Cytokines, Leucotrienes, Platelet activating factor, Nitric oxide

iv) Name the neurotransmitter involved in muscle contraction

Acetylcholine

Q.2. a) Answer Any TWO of the following

08

i) Describe the process of Blood Coagulation.

Definition and process including all the clotting factors

ii) Write a note on composition of blood and its functions.

General functions (1.5 Mark) and Composition with percentage / normal range of each component (2.5 M)

iii) Describe the process of erythropoiesis.

Definition and Growth factor (1 M), Process from stem cells to RBC formation stepwise (3M)

b) Write a short note on Any ONE of the following

04

In case of all pathophysiology or disease related questions the answer should cover Definition, Etiology, Symptoms and types if any

i) Leukopenia and Leukocytosis:

ii) Leukemia

Q.3. a) Answer Any TWO of the following

08

i) Describe neuromuscular junction with the help of a neat, labeled diagram.

Neat labelled Diagram with explanation (3 M), Removal of neurotransmitter (1M)

ii) Write a note on energy metabolism in skeletal muscle.

All three sources of energy with reactions involved

iii) Distinguish between skeletal muscle and smooth muscle.

Eight good points are expected (Location, Function, Types, anatomy, voluntary/involuntary, Physiology, Diagrams)

b) Answer Any ONE of the following

04

i) Draw a neat labelled diagram of sarcomere and enlist various types of proteins involved in skeletal muscle.

Diagram of Sarcomere (3M), Enlist types of protein (1M)

ii) Give examples of two structural, two regulatory proteins in skeletal muscle. Distinguish between Isotonic and Isometric type of muscle contraction.

examples of two structural, two regulatory proteins – (2M), Four distinguishing points including definition and example of each type of contraction (2M)

Q 4. a) Answer any ONE of the following

04

i) Discuss process of lymph formation and write a note on composition of lymph.

lymph formation – 2M, composition of lymph – 2M

ii) With the help of a neat labelled diagram, explain anatomy of lymph node.

neat labelled diagram- 2.5 M, Explanation - 1.5 M

b) Write a note on ANY ONE of the following **04**
In case of all pathophysiology or disease related questions the answer should cover Definition, Etiology, Symptoms and types if any

- i) Grave's disease
- ii) Hypersensitivity reactions

c) Answer any ONE of the following **04**

- i) Draw a neat labelled diagram of pseudostratified columnar epithelium, discuss its location and functions

Definition, diagram, Location and Function (1M each)

- ii) Write a short note on Extracellular Matrix of Connective tissue.
Role of Extracellular Matrix of Connective tissue (1 M), classify components (0.5 M), Give examples of with location. (2.5 M)

Q 5 a) Answer any ONE of the following **04**

- i) Draw a neat labelled diagram of plasma membrane and state its functions.

Diagram – 2.5 M and Functions – 1.5

- ii) Discuss with suitable example the process of active transport.

Definition (1M), Example (1M), Explanation (2M)

b) Answer any ONE of the following **04**

- i) Explain sliding filament theory of muscle contraction in detail.

Explanation with role of each component involved with detailed diagram

Diagram is compulsory

c) Answer any ONE of the following **04**

- i) Write a short note on healing and repair process

Explain the processes with mediators/ cells/ components involved

- ii) Compare and contrast between transudate and exudates. Give role of mast cells in inflammation.

Compare and contrast between transudate and exudates including definition, composition, role (3M) and role of mast cells (1M)

Q 6 a) Answer any TWO of the following **08**

- i) Explain the Life Cycle of RBC in detail.

Lifespan and site of formation (0.5 M), Life cycle in detail, (3.5 M)

- ii) Enlist various types of immune reactions giving suitable examples of each type.

2 M for each type and examples

- iii) Write a note on humoral immunity.

Definition (1M), Components and Mechanism (3M)

b) Answer any ONE of the following **04**

- i) Enlist the cardinal signs of Inflammation. Explain the role of histamine and Prostaglandins in inflammation.

cardinal signs of Inflammation (1M), role of histamine and Prostaglandins in inflammation (1.5 M each)

ii) Discuss the process of chemotaxis

Definition (1M), Diagrammatic representation and explanation including components involved (3M)