**(3 HOURS)** **[ Total Marks: 80]**

N.B.: 1) **All** questions are compulsory

2) **Figures** to the **right** indicate **full** marks

3) Draw neat, labelled diagrams wherever necessary.

**Q 1 a) Answer the following** **16**

**i) Define negative feedback mechanism of homeostasis**

Negative feedback mechanisms – the net effect of the response to the stimulus is the shut off of the original stimulus or to reduce its intensity These mechanisms cause the variable to change in a direction opposite to that of the initial change, returning it to its "ideal" value; thus the name "negative" feedback mechanisms.

E.g. – body temp, blood chemical levels

**ii) What is pinocytosis**

A form of endocytosis in which tiny droplets of extracellular fluid are taken up (**Bulk-phase endocytosis) is** called as **pinocytosis**. It occurs especially in absorptive cells in the intestines and kidneys.

**iii) Give location and function of Hyaline cartilage**

Location: Most abundant cartilage in body; at ends of long bones, anterior ends of ribs, nose, parts of larynx, trachea, bronchi, bronchial tubes, embryonic and fetal skeleton

Function: Provides smooth surfaces for movement at joints, flexibility, and support; weakest type of cartilage.

**iv) Enlist components of lymphatic system**

1. Lymph
2. Lymphatic vessels that transport the lymph,
3. Primary Lymphatic organs: Thymus and Red bone marrow
4. Secondary Lymphatic Organs: Encapsulated diffuse lymphoid tissue includes the spleen and lymph nodes. Unencapsulated diffuse lymphoid tissue includes gut-associated lymphoid tissues and the tonsils.

**v) Name the antigen and antibody present in following blood group: a) A (b) O**

| Blood Group | Antigen | Antibody |
|---|---|---|
| A | A | B |
| O | Nil | A, B |

**vi) Enlist cardinal signs of Inflammation**

Redness, Heat/ Warm, Swelling, Pain, Loss of Function

**vii) Explain how Graves' disease leads to hyperthyroidism**

Grave's disease is an autoimmune disorder in which Thyroid-stimulating

immunoglobulins (TSIs) are synthesized by patient's body. TSIs bind to and activate thyrotropin receptors, causing the thyroid gland to grow and the thyroid follicles to increase synthesis of thyroid hormone. This overstimulation of thyroid gland is not monitored by negative feedback mechanism and leads to increased level of thyroxine in blood.

**viii) Write classification of muscles:**

*Any classification from following schemes can be written:*

A. General Classification:
   a. Skeletal- striated
   b. Voluntary Cardiac- striated
   c. Involuntary Visceral- smooth Involuntary

B. Based on presence of Striations:
   a. Striated muscle: Skeletal Muscle and Cardiac Muscle
   b. Non- striated: Smooth Muscle

C. Based on Location:
   a. Skeletal
   b. Cardiac
   c. Visceral

D. Based on control:
   a. Voluntary: Skeletal
   b. Involuntary: Smooth and Cardiac

**b) Answer the following** **04**

**i) Give example of basic life processes**

- Metabolism
- Responsiveness
- Movement
- Growth
- Differentiation

**ii) Deficiency of which nutrients cause megaloblastic anemia.**

Vit B12 or folic acid deficiency

**iii) Name the factor involved in the pathogenesis of erythroblastosis fetalis?**

Rh Factor

**iv) What is isotonic contraction?**

The Contraction in which the tension/ tone (force of contraction) developed in the muscle remains almost constant while the muscle changes its length.

**Q.2. a) Answer Any TWO of the following** **08**

**i) Define Hemostasis. Explain the process of Platelet Plug Formation.**

Definition: Hemostasis is a sequence of responses that stops bleeding.
Consists of vascular spasm, Platelet Plug Formation and Blood

coagulation……1M

Platelet plug formation with all three steps ……...3M

**ii) Classify White Blood Cells (WBCs). Name the respective conditions in which Neutrophil and Eosinophill count increases**

WBC Classification (1M), conditions in which Neutrophil count increases (1.5M), conditions in which Eosinophill count increases (1.5M)

**iii) Describe the process of hemoglobin synthesis**

Stepwise synthesis of Hemoglobin starting from condensation of glycine and succinyl coenzyme A under the action of a rate limiting enzyme δ-aminolaevulinic acid synthase.

**b) Write a short note on Any ONE of the following** **04**

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

**i) Define Anemia and discuss different types of anemia**

Definition (1M), Min. three types with cause and description of each (1M for each type)

ii) **Thrombocytopenia and leucopenia***.

**Q.3. a) Answer Any TWO of the following** **08**

**i) Explain various sources of energy for muscle metabolism.**

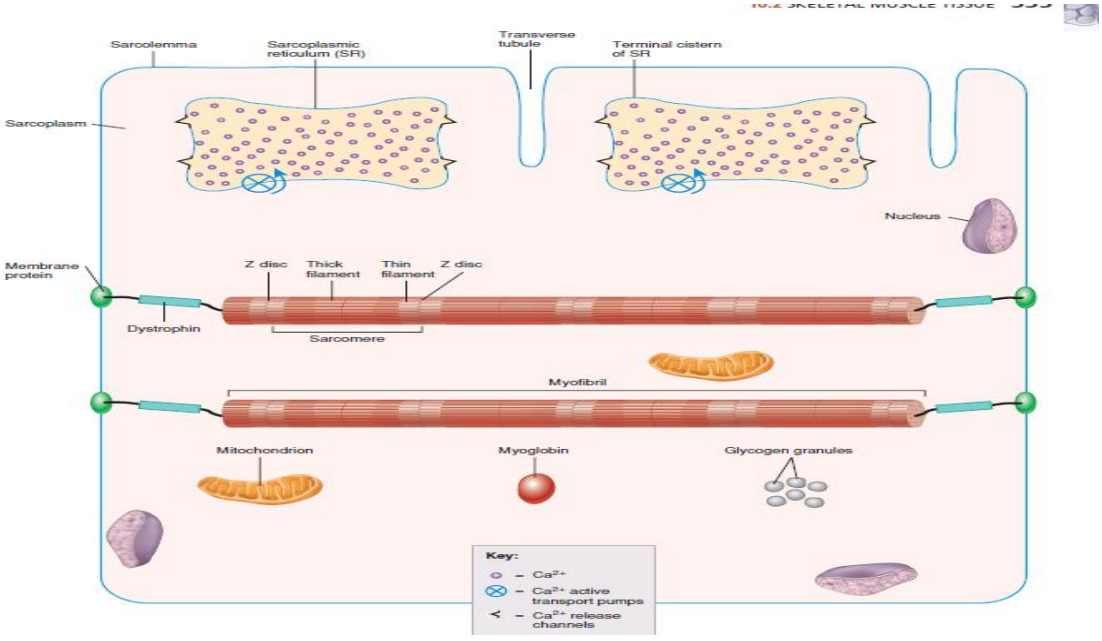
All three sources of energy with reactions involved

**ii) Describe in detail the mechanism of skeletal muscle contraction.**

Explanation with role of each component involved with detailed diagram

Diagram is compulsory

**iii) Describe microscopic anatomy of skeletal muscle.**



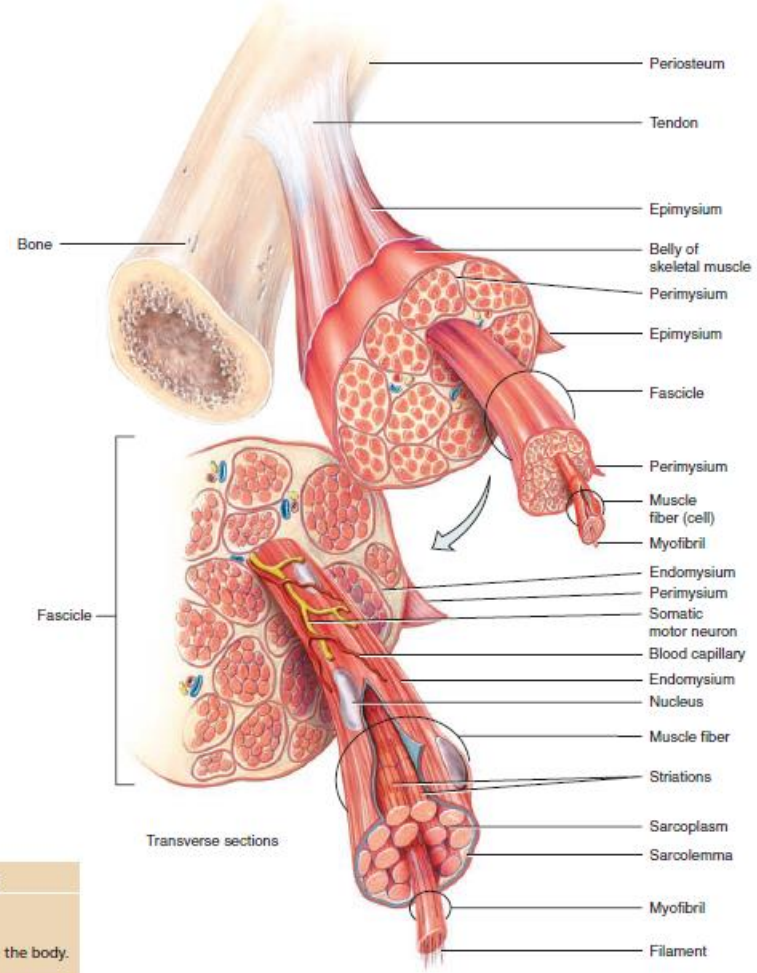
**b) Answer Any ONE of the following** **04**

**i) Explain Excitation - contraction coupling in skeletal muscle.**

Description on following points is expected:

1. Reason for opening of calcium release channels of sarcoplasmic reticulum
2. Increase in Calcium Ion concentration in sarcoplasm
3. Binding of Calcium with Troponin and its consequences → contraction

**ii) Draw a neat, labelled diagram showing organization of skeletal muscle**

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within the body.
s).

Components of a skeletal muscle

**Q 4. a) Answer any ONE of the following** **04**

**i) Draw a neat labelled diagram of lymph node. Discuss functions of lymphatic system**

Diagram of Lymph Node (2.5M); Functions of lymphatic System (1.5M)

**ii) Discuss anatomy and functions of spleen**

Anatomy with Diagram (2.5M); Functions of Spleen (1.5M)

**b) Write a note on (any ONE)** **04**

i) Myasthenia Gravis*

ii) Rheumatic fever*

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

**i) Classify connective tissue and give example and location of each type**

All classes of connective tissue with example and location

**ii) Write a short note on Stratified Epithelium.**

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

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

**i) Compare and contrast between the active and passive transport processes.**

Include Definition, Types, energy requirement and Examples of substances transported via each mechanism

**ii) Explain the mechanism of pinocytosis in detail.**

Explanation of mechanism (3M) Example of substances transported via pinocytosis (1M)

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

**i) Draw a neat labelled diagram of the cardiac muscles. Give role of intercalated discs.**

Diagram (3M), role of intercalated discs (1M)

**ii) Explain the structure and function of neuromuscular junction.**

Neat labelled Diagram with explanation (3 M), function (1M)

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

**i) Give significance of inflammation. Explain the role of histamine and Prostaglandins in inflammation.**

Significance of inflammation (2M). Role of histamine (1M) and Prostaglandins in inflammation (1M).

**ii) Discuss the process of chemotaxis**

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

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

**i) Describe the process of erythropoiesis.**

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

**ii) Write a note on autoimmunity.**

Definition (1M), Description of Autoimmune disorders with Examples of (3M)

**iii) Write a note on hypersensitivity reactions.**

All four types with antibodies involved in each type, mechanism of each type (1M for each type)

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

**i) Compare and contrast between Acute and Chronic inflammation**

Include Definition, outcomes, features of each type

**ii) Discuss various vascular changes during inflammation.**

Description of following points:

The vascular reactions of acute inflammation consist of:

– changes in the flow of blood and

– Change in the permeability of vessels.

• Begin early after injury and consist of the following:

– Vasodilation

– Increased permeability of the microvasculature

– Recruitment of Leukocytes to Sites of Infection and Injury

– Leukocyte Migration through Endothelium

– Recognition of Microbes and Dead Tissues