

- Attempt all questions, all questions carry equal marks.
- Answer Briefly and to the point, avoid un-necessary details

**Q1:** (A) What is biomechanics and ergonomics?

(B) why we study biomechanics and ergonomics in physical therapy?

**Ans.(A): BIOMECHANICS:.**

“ The study of analyzing the mechanical aspects of human body”

- Bio means “life”
- Mechanics means “study of action of forces”

**DIVISION:**

Biomechanics is further divided into

- Statics
- Dynamics
- Kinematics
- Kinatics.

**ERGONOMICS:.**

“The process of fitting a person and his job into each other”

- Ergonomic plays imp role in physiotherapy.
- It improves the quality work.
- When ergonomic is applied to work many workplace injuries are reduce and performance is improved.

**Ans (b): BIOMECHANICS IN PHYSIOTHERAPY:**

We study biomechanics in physiotherapy because in humans it can help to understand the impairments and disease and to increase the the knowledge and understanding the work of human body and improve athletic performance

**ERGONOMICS IN PHYSIOTHERAPY:.**

Ergonomic plays imp role in physiotherapy .it applies information about human behavior, abilities,and limitations to the design tools for effective human use . We study ergonomic to improve the quality of work.

- Q2:** (A) What is shoulder complex? Elaborate it
- (B) What makes shoulder joint most mobile?
- (C) How normal position of scapula and Humerus aid in stability of shoulder joint?
- (D) What is osteo and Arthrokinematics? Explain it with example

**Ans(a): SHOULDER COMPLEX:**

The shoulder complex is formed by 5 types of functional joints which are

- Glenohumeral joint
- Subacromial joint
- Acromioclavicular joint
- Scapulothoracic joint
- Sternoclavicular joint.

**GLENOHUMERAL JOINT: “**

**“THE joint between the humeral head and glenoid fosa”**

- It is the most mobile joint of the shoulder complex.

**MOVEMENTS:**

- **Following are the** movements
- **Flection** /extension
- Abduction/adduction
- Circumduction etc

**AC JOINT:**

“ The joint between the clavicle and acromion process”

**MOVEMENTS:**

- Internal /external rotation
- Upward/downward
- Anterior/posterior tilting.

**Ans(b): MOBILITY OF SHOULDER JOINT:**

- The shoulder joint is the type of ball and socket joint scapula and humerus .the head of humerus is greater than the glenoid fosa of the scapula which gives the shoulder joint a wide range of movement .
- The loose capsule of glenohumeral joint gives limited interaction between humerus and scapula and it is the most mobile joint of body .

- To avoid dislocation the glenoid labrum deepens the glenoid fossa .

#### **Ans(c):ROLE OF SCAPULA IN STABILITY OF SHOULDER JOINT:**

**In Normal** position the scapula provides a stable base due to which glenohumeral mobility occurs .the scapular muscle position the glenoid so efficient movements occurs .

- When the scapula fails to perform it's stabilization role the shoulder function decrease .

#### **ROLE OF HUMERUS IN STABILITY OF SHOULDER JOINT:**

**The glenoid** labrum deepens the glenoid fossa and humerus for stability . The glenohumeral ligaments i.e superior, middle and inferior are the main source of stability holding it in place.

- The interaction between scapula and humerus is important for the function of shoulder joint.

**SCAPULAR DYS KINESIA:.** The change in Normal position of the is calledd scapular dys kinesia.

- If there occurs the change in Normal position of scapula to humerus then it can cause disfunction .

#### **Ans(d): OSTEOKINEMATICS:**

- Osteo means bone
- " The study of bone movements is called osteokinematics.
- They are the gross movements between the two bones .
- It is the movement which occurs around the joints.
- In osteokinematics the bones surfaces articulates at the joint such as flexion/extension, adduction /abduction.

#### **ARTHOKINEMATICS:**

- Artho means joint .
- Study of the joint movements that occurs at the surfaces of joints.
- Small movements that occurs at joint surfaces.
- Artho movements are rolls, glides, slides, spine.

**EXAMPLE** :During the rise of hand the position of humerus i.e abduction is osteokinematics and the rolling of humeral head into glenoid fossa is called ARTHOKINEMATICS.

**Q3:** (A) How supraspinatus muscle different from other SITS muscle in GH stabilization?

(B) Explain how scapula movement is necessary for normal range of motion of shoulder  
Joint?

Ans(a): **ROTATER CUFF MUSCLES:** There are four rotator cuff muscles

- Supraspinatus
- Infraspinatus
- SSubscapularis
- Teresminor

**SUPRASPINATUS MUSCLE IN GH STABILIZATION:** the SUPRASPINATUS muscle Is different from other rotator cuff muscles in GH stabilization because unlike other RC muscle the supraspinatus has a superior translatory compnents than Inferior that's why it can not ofset the superior translaiof deltoid.

- The supraspinatus has a superiorly directed translatory and rotatory components that is more compressed than other rotator cuff muscles.
- SUPRASPINATUS can independently abduct the HUMERUS.

Ans(b): **SHOULDER JOINT:** "The shoulder joint is formed between the humeral head and glenoid fosa ."

- It is also called Glenohumeral joint .

**IMPORTANCE OF SCAPULA MOVEMENTS IN SHOULDER JOINT:**

In the shoulder complex the scapula forms many joint which help in it's movement . The scapula forms ...:

- AC joint
- ST joint
- GH joint.

The ST joint is important as most of the movements occurs through it and it provides a wide range of motion. The AC and SC joints are generally dependent on the ST joints and produce movement along ST joint. So when the shoulder joint moves the scapula will also move gradually in the direction of movement .

- If any dysfunction occurs in the scapula the shoulder joint will be also unable to produce movement along normal range.

**SCAPULOHUMERAL RHYTHM:** The role of scapula in the normal range movements of shoulder joint can b explain by the scapulohumeral rhythm.

- The scapulohumeral rhythm can be define as : **“THE ratio of Glenohumeral movement to the scapulothoracic movement during arm elevation”**.