***Muhammad Arif khan***

***ID No. 15798***

***DPT 2nd Sec - B***

**Q 1(A) What is biomechanics and ergonomics?**

***Biomechanics;***

Biomechanics is the branch of bio-physics. It deals with the study of human motion and action of force. Biomechanics is the combination of two prefix “ bio “ and “mechanics” which mean “life” and “related to force”.

***Ergonomics;***

Ergonomics is derived from two word “ergo and nomio” which means “work and natural laws” . Ergonomics is related to work performance.

**B) Why we study biomechanics and ergonomics in physical therapy?**

Biomechanics and ergonomics play important role in physical therapy. Biomechanics is the study of body movement specially force on muscles internally or externally. Due to biomechanics the PT able to know which muscles is involve in movement. Ergonomic is the study of work performance. Ergonomics help in physical therapy that how to fit the work performance.

**Q 2 (A) What is shoulder complex? Elaborate it.**

The shoulder complex composed of the clavicle, sternum, scapula and humerus bone. It is a complex designed combination of five joints, The Glenohumeral joint, The Acromioclavicular joint, The Sternoclavicular joint, The scapulothoracic joint and Subacromial. The GH, AC and SC joints link the upper extremity to the axial skeleton at the thorax. All the Five joints work collectively together to achieve normal shoulder girdle movements.

**B) What makes shoulder joint most mobile?**

***Factors that contribute to mobility***:

Joint capsule makes shoulder joint most mobile. The shoulder joint is one of the most mobile joint in the human body. Shoulder joint is a ball and socket joint. The Joint capsule is lax, permitting greater mobility .The synovial membrane lines the inner surface of the joint capsule and produces synovial fluid to reduces friction between the articular surfaces.

**C) How normal position of scapula and humerus aid in stability of shoulder joint?**

When scapula moves there is also movement occur in humerus due to these movement the stability of shoulder joint occur by muscle attached with scapula and humerus i.e. upper trapezius, lower trapezius and seratus muscles. Joint capsule and glenoid labrum also contributes to the stability of shoulder joint.

**D) What is Osteo and Arthokinematics? Explain it with example.**

***Osteokinematics;***

The branch of biomechanics concerned with bone movement. Osteokinematics is derived from two words “ osteo and kinematics” which means “Bone and movement”. **For Example**; When a bone moves through a range of motion around the axis in a join such as flexion, extention, abduction, adduction or rotation.

***Arthrokinematics;***

It refers to the movement of joint surfaces. Arthrokinematics is a combination of two words which means “ joint and movement”. **For Example;** The angular movement of bones in the human body occurs as a result of a combination of rolls, spins, and slides.

**Q 3 (A) How supraspinatus muscle different from other SITS muscle in GH stabilization?**

The Supraspinatus is the principal supporting and kinetic muscle of the shoulder. The primary function of SITS muscle is to stabilize the GH joint Supraspinatus muscle plays different role in GH stabilization because it inserts to a Greater Trubulcle of humerus and cover humeral head that is why the supraspinatus muscle is different from other SITs muscle.

**B) Explain how scapula movement is necessary for normal range of motion of joint?**

The Scapula is an important bone in the function of the shoulder joint. It engages in 6 type of motion, which allow for full functional upper extremity movement including protraction, retraction, elevation, depression, upward rotation and down rotation.