

- Mid-Term Assignment
- Course Title: Biomechanics And Ergonomics I
- DPT 2nd semester section B
- Instructor: Dr. M .Shahzeb khan (PT)
- Marks: 30
- Note:
  - Attempt all questions, all questions carry equal marks.
  - Answer Briefly and to the point, avoid un-necessary details

• **Name: Muhammad Zavvyar Khan**

• **Id: 16121**

- **Q1: (A) What is biomechanics and ergonomics?**
- **Ans: Biomechanics:** The study of forces acting on and generated within a body and the effects of these forces on the tissues, fluid or materials used for the diagnosis or research purposes. It is a vast field that combines physics, calculus, anatomy, and physiology for the study of human movement.
- **Ergonomics:** The study of work and the relationship of work to physical and cognitive capabilities of people. Ergonomics principles derived from many areas, including:
  - Biomechanics
  - Physiology
  - Anthropometry
  - Industrial Engineering
  - Safety
- **(B) why we study biomechanics and ergonomics in physical therapy?**
- **Ans: Use of biomechanics in physical therapy:**
  - Biomechanics is the study of body movements and the forces acting upon the musculoskeletal system. Physical Therapists have extensive education and experience evaluating the mechanical forces at work in the human body.
  - **Use of ergonomics in physical therapy:** Injuries typically occur when biomechanical forces exceed the biomechanical limitations of soft tissue or bone. When combined with biomechanical forces, environmental and ergonomic factors have a cumulative effect on physical health with the help of physical therapy.
- **Q2: (A) What is the shoulder complex? Elaborate it**
- **Shoulder Complex:** The shoulder complex, composed of the clavicle, scapula, and humerus, is an intricately designed combination of three joints that links the upper

extremity to the thorax. ... The glenohumeral (GH) joint, which links the humerus and scapula, has greater mobility than any other joint in the body.

- **(B) What makes shoulder joint most mobile?**
- **Factors which make Shoulder Joint most mobile:** It involves articulation between the glenoid cavity of the scapula (shoulder blade) and the head of the humerus (upper arm bone). Due to the very loose joint capsule that gives a limited interface of the humerus and scapula, it is the most mobile joint of the human body
- **(C) How normal position of scapula and Humerus aid in stability of shoulder joint?**
- **Ans:**The shoulder joint (glenohumeral joint) is a ball and socket joint between the It is one of the most mobile joints in the human body, at the cost of joint stability. The head of the humerus is much larger than the glenoid fossa, giving the joint a Subscapular – located between the subscapularis tendon and the scapula.
- **(D) What is osteo and Arthrokinematics? Explain it with example**
- **OSTEOKINEMATICS:** Osteokinematics typically consist of flexion/extension, abduction/adduction, and internal rotation/external rotation.
- **EXAMPLES:** when you raise your arm up, as if to ask a question, your humerus is moving upwards.
- **ARTHOKINEMATICS:** Arthrokinematics is the small movements happening at the joint surface. Arthrokinematic movements typically consist of rolls, glides/slides, and spins.
- **EXAMPLES:** At the tibiofemoral joint, the tibia is a concave surface and the femur is a convex surface. During a long arc quad, the tibia moves on a stable femur.
- **Q3: (A) How supraspinatus muscle different from other SITS muscle in GH stabilization?**
- **ANS:** Supraspinatus. Teres Minor. Helpful mnemonic to remember these muscles/tendons is "SITS". These muscles arise from ... Along with the other rotator cuff muscles provides dynamic stabilization of the shoulder. No difference in outcome has been reported for surgery over physical therapy in several trials. The rotator cuff tendons, particularly the supraspinatus tendon, are uniquely susceptible to ... the rotator cuff is a group of muscles and their tendons that act to stabilize the shoulder and allow for its extensive range of motion. Of the seven scapulohumeral muscles, four make up the rotator cuff. The four muscles are the supraspinatus muscle, the infraspinatus muscle, ... In other words, without the rotator cuff, the humeral head would ride up .
- **(B) Explain how scapula movement is necessary for normal range of motion of shoulder Joint?**
- **Ans:**The scapulothoracic articulation is one of the least congruent joints in the body. ... glenohumeral joint highly dependent on its for stability and normal motion. The serratus anterior is an important scapular stabilizing muscle. . be defined as backward rotation of the scapula toward the vertebral column. To increase your shoulder range of motion, move your body parts as far the joints comfortably allow. For example, when throwing a punch, keep your elbows tucked close to your body. This will help you use the rotation and weight of your body to power your punch, rather than putting the pressure on your shoulder joint
- ---This is medial rotation and also referred to as internal rotation. And the normal range of motion for a healthy shoulder is 70 to 90 degrees.