



**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY
(MMUST)**

**MAIN CAMPUS
UNIVERSITY EXAMINATIONS
2021/2022 ACADEMIC YEAR**

**SECOND YEAR, FIRST TRIMESTER EXAMINATIONS
FOR THE DEGREE
OF**

BACHELOR OF SCIENCE IN PHYSIOTHERAPY

COURSE CODE: BSP 224

COURSE TITLE: BIOMECHANICS I

DATE: FRIDAY 22ND APRIL 2022

TIME: 2:00-5:00 PM

INSTRUCTIONS TO CANDIDATES

Answer all Questions

Sec A: Multiple Choice Questions (MCQ) 20 Marks

Sec B: Short Answer Questions (SAQ) (40 Marks)

Sec C: Long Answer Questions (LAQ) (40 Marks)

TIME: 3 Hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 4 Printed Pages. Please Turn Over.

SECTION A: MULTIPLE CHOICE QUESTIONS 20 MARKS

1. Which force exerts a pull on a body?
 - A. Shear
 - B. b) Compression
 - C. Tension
 - D. All of the above
2. Which force acts parallel to a surface?
 - A. Shear
 - B. Compression
 - C. Tension
 - D. All of the above
3. The flexibility of bone is provided by:
 - A. Water
 - B. Calcium carbonate
 - C. Calcium phosphate
 - D. Collagen
4. Properties of muscle tissue include:
 - A. Extensibility
 - B. Irritability
 - C. The ability to develop tension
 - D. All of the above
5. The greatest source of elasticity in human skeletal muscle tissue is attributed to:
 - A. The parallel elastic component
 - B. The series elastic component
 - C. The continuous elastic component
 - D. The active elastic component
6. When muscle provides a braking mechanism to slow limb movement, the contraction type is:
 - A. Eccentric
 - B. Isotonic
 - C. Anisometric
 - D. Anisotonic
7. The role of an antagonist muscle is to:
 - A. Cause a motion opposite to that of the movement
 - B. Prevent an undesirable motion of the movement
 - C. Produce a movement
 - D. None of the above
8. Elite sprinters are distinguished from their less-skilled counterparts by:
 - A. Higher stride rates
 - B. Longer stride lengths
 - C. Both A and B
 - D. Neither A and B
9. If acceleration is zero, then the body:
 - A. Must be motionless
 - B. Must be moving with a constant speed

- C. Has a constant velocity
 - D. More information is needed to answer this question
10. A skater gliding on ice will continue to move in the same direction and with the same speed (in the absence of the action of additional forces). This exemplifies which of the following laws?
- A. Newton's first law of motion
 - B. Newton's second law of motion
 - C. Newton's third law of motion
 - D. The law of force
11. In the human body, the lever systems formed by muscles pulling on bones are:
- A. First class
 - B. Second class
 - C. Third class
 - D. No one class predominates
12. One of the following movements does not happen in vertical axis, which one?
- a. Internal rotation
 - b. External rotation
 - c. Supination/pronation
 - d. Horizontal adduction/abduction
13. Scapular winging happens along which axis?
- a. Lateral axis
 - b. Vertical axis
 - c. AP axis
 - d. Horizontal axis
14. One of the following is not a type of a joint
- a. Synarthroses
 - b. Amphiarthroses
 - c. Syndesmosis
 - d. Synovial joints
15. Which one of the following statements is true
- a. Open-packed position is more stable
 - b. Close-packed position is less stable
 - c. Open-packed position is less stable compared to closed packed position
 - d. All of the above
16. When a joint is not free to move, the muscle that move it cannot be free to move it.
- a. True
 - b. False
 - c. None of the above
 - d. I don't know
17. Impaired muscle function perpetuate and may cause deterioration in abnormal joint
- a. True
 - b. False
 - c. None of the above
 - d. I don't know

18. When the concave surface is fixed and the convex surface moves on it, the convex surface rolls and glides in

- a. Same direction
- b. Opposite direction
- c. Glides
- d. All of the above

19. Which one of the following is agonist for knee extension

- a. Quadriceps muscles
- b. Hamstring muscles
- c. Triceps muscles
- d. SCM muscle

20. In concentric muscle contraction, the muscle

- a. Lengthens
- b. Shortens
- c. Same length
- d. None of the above

SECTION B: SHORT ANSWER QUESTION

40 MARKS

1. Define the following terms as used in biomechanics

- a. Kinematics
- b. Kinetics
- c. Superincumbent mass
- d. Line of gravity
- e. Segmental mass

(5 Marks)

2. Explain the clinical application of dangers of forward head posture

(5 Marks)

3. Briefly explain five movements exhibited by Closed Kinetic Chain (CKC) pelvic motions in sagittal plane

(5 Marks)

4. List 5 muscles that causes scapula elevation

(5 Marks)

5. Discuss 5 consequences of poor posture?

(5 Marks)

6. Explain the rules of concavity and convexity

(5 Marks)

7. Giving muscle examples explain the linear forced system

(5 Marks)

8. Discuss the first lever system giving examples in the human body system

(5 Marks)

SECTION C: LONG ANSWER QUESTIONS

40 MARKS

1. Discuss the phases of a gait cycle

(20 Marks)

2. Explain the following postural abnormalities and their general effects on an individual

(20 Marks)

- a. Hyperlordosis posture
- b. Flat back posture
- c. Kypholordosis