

**2025**

**KINESIOLOGY AND BIOMECHANICS**

**Course : CC-402**

**Full Marks : 70**

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words  
as far as practicable.*

*Answer the following questions.*

1. Define Biomechanics and Sports Biomechanics. Write down the importance of Sports Biomechanics in Physical Education. Explain different planes and axes with examples of human movements. 4+5+6

**Or**

Briefly explain the following :

5×3

- (a) Role of Centre of Gravity in Sport
- (b) Fundamental Movement Terminologies
- (c) Principles of Stability.

2. Explain the core concept of kinesiology. What are the types of muscles? Make a list of six different upper body muscles with their functions. 3+3+9

**Or**

Briefly explain the following :

5×3

- (a) Muscle Contractions
- (b) Postural Deformities of the Spine
- (c) Reciprocal Innervations.

3. What is body lever? Explain different types of levers with mechanical and human example. Write down the principle of leverage. 2+9+4

**Or**

Briefly explain the following :

5×3

- (a) Newton's 1st and 2nd Laws of Motion
- (b) Principles of Projectile Motion
- (c) Force and its application in Sport.

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4. Write notes on (*any two*) :

- (a) Kinematics and Kinetics
- (b) Angular Momentum and Couple
- (c) Friction and its role in sport performance
- (d) Inertia and Mass.

5. Answer the following MCQs by choosing the correct option from the given alternatives for each question and write it on your answer script (*any ten*) : 1×10

- (a) The primary focus of Sport Biomechanics is
- (i) Nutritional impact on performance
  - (ii) Movement analysis and efficiency
  - (iii) Mental health of athletes
  - (iv) All of these.

- (b) Inertia and torque are
- (i) Scalar quantities
  - (ii) Vector Quantities
  - (iii) Scalar and vector quantity respectively
  - (iv) None of these.

- (c) Newton's 2nd Law of Motion states (Symbols have usual meanings) :

- (i)  $F = ma$
- (ii)  $F = mv$
- (iii)  $F = m/g$
- (iv)  $F = v/t$ .

- (d) An example of uni-axial joint is

- (i) Shoulder
- (ii) Elbow
- (iii) Hip
- (iv) Wrist.

- (e) The sutures is

- (i) Synovial joint
- (ii) Hinge joint
- (iii) Cartilaginous joint
- (iv) Fibrous joint.

- (f) Coronal plane lies on

- (i) Sagittal axis
- (ii) Vertical axis
- (iii) Frontal axis
- (iv) None of these.

- (g) A lever usually has mechanical advantage less than 1 is

- (i) Class-1 lever
- (ii) Class-2 lever
- (iii) Class-3 lever
- (iv) None of these.

- (h) At the peak point of trajectory, the vertical component of velocity of a projectile is

- (i) Zero
- (ii) Same as initial velocity
- (iii) Maximum
- (iv) Unpredictable.

- (i) If the velocity of an object is doubled then kinetic energy of that object will be
- (i) half
  - (ii) double
  - (iii) three times
  - (iv) four times.
- (j) If a car takes 10 minutes to cover a distance of 5 km, then what is the speed of that car?
- (i) 8.33 m/s
  - (ii) 83.3 m/s
  - (iii) 833.3 m/s
  - (iv) None of these.
- (k) Angle of pull refers to the angle between the
- (i) Bone and joint
  - (ii) Ligaments and bone
  - (iii) Muscle fiber and tendon
  - (iv) Line of pull of a muscle and the bone it moves.
- (l) Area under a velocity time graph indicates
- (i) Speed
  - (ii) Displacement
  - (iii) Acceleration
  - (iv) Distance.
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