

2022

SPORTS BIOMECHANICS AND KINESIOLOGY

Paper : MPCC-202

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.*

1. Define Exercise and Sports biomechanics. Write down the importance of studying Sports Biomechanics in the field of physical education and sports. How will you relate line of gravity and centre of gravity? 4+6+5

*Or,*

Explain the following terms with suitable examples :

(a) Statics and Dynamics

(b) Kinetics and Kinematics

(c) Work and Power. 5+5+5

2. What are agonist and synergist muscles? Name the muscles that are involved in the movements of shoulder joint and mention the origin, insertion and action of any two of those. 4+6+5

*Or,*

What are antagonist and stabilizer muscles? Mention the major muscles and movements of ankle joint. Write the origin, insertion and action of *any two* of the muscles of ankle joint. 4+5+6

3. What is Aerodynamics? Explain the different forces acting on an object in the airborne position. What is Magnus Effect? 2+8+5

*Or,*

What do you mean by Biomechanical analysis? Make a list of scientific equipments used in sports biomechanical research. Biomechanically analyze *any one* fundamental human movement. 3+4+8

4. Write notes on *any two* : 7½×2

(a) Projectile motion and two equations related to it.

(b) "Friction has negative as well as positive impact on sports performance."— Explain.

(c) General motion and basic equations of motion.

(d) Levers and principles of leverage.

Please Turn Over

5. Answer the MCQs from below by choosing the correct option and writing the answer on your script  
(any ten) : 1×10

- (a) Which of the following statements is correct about kinesiology?
- (i) The word kinesiology was first used in the late 19th century and became popular during the 20th century.
  - (ii) The word kinesiology was first used in the late 18<sup>th</sup> century and became popular during the 19th century.
  - (iii) Kinesiology is defined as the study of human anatomy.
  - (iv) None of the above.
- (b) Biomechanics is a branch of :
- (i) Biology
  - (ii) Kinesiology
  - (iii) Physics
  - (iv) Sports science.
- (c) Which of the following is a unit of force?
- (i) Newton
  - (ii) kg/cm
  - (iii) Watt
  - (iv) m/s<sup>2</sup>.
- (d) If angular velocity is initially zero and angular acceleration is constant, then the angular velocity must be :
- (i) Constant
  - (ii) Steadily increasing
  - (iii) First increasing, then decreasing
  - (iv) Equal to zero.
- (e) Which two forces are always opposite in direction?
- (i) Lift and drag
  - (ii) Buoyancy and drag
  - (iii) Buoyancy and weight
  - (iv) Drag and weight.
- (f) Fluid friction is an important factor in :
- (i) Swimming
  - (ii) Boxing
  - (iii) High jump
  - (iv) Weight-lifting.
- (g) A ball, dropped from rest from a height of 45m from ground, falls freely under gravity. How long will it be before the ball hits the ground? ( $g = 10 \text{ ms}^{-2}$ )
- (i) 3.3s
  - (ii) 3.0s
  - (iii) 9.0s
  - (iv) 9.3s

(h) Mathematically, average acceleration is expressed as :

(i)  $a = \frac{V_f - V_i}{\Delta t}$

(ii)  $a = \sqrt{\frac{V_f - V_i}{\Delta t}}$

(iii)  $a = \sqrt{\frac{V_f - V_i}{\Delta t}} \times 100$

(iv)  $a = (V_f - V_i)^2$

(i) The book 'Philosophiæ Naturalis Principia Mathematica' was written by—

(i) Galileo

(ii) Aristotle

(iii) Wilhelm Leibniz

(iv) Isaac Newton.

(j) In mechanics, energy is defined as:

(i) The capacity of doing work (ii) The strength of doing work

(iii) The speed of doing work (iv) both (ii) and (iii).

(k) Planter flexion and dorsiflexion occurs at:

(i) The frontal plane and sagittal axis

(ii) Sagittal plane and transverse axis

(iii) Frontal axis and sagittal plane

(iv) All of the above.

(l) Advantage in the form of speed can be obtained using :

(i) Class-I and Class-II lever

(ii) Class-II and Class-III lever

(iii) Class-III and Class-I lever

(iv) None of the above.