Date: **10/10/2023**   Max. Time: **60 minutes**
                                                        Max Marks: **30**


Write in brief and to-the-point only

Q 1) Describe the mechanical / physics principles applied in walking and running, essentially differentiating between the two. How does a normal bicycle rider cover the same distance with lesser effort and without getting tired or cover the distance faster?   What mechanical principles can be applied to re-design a bicycle to reduce human effort further.   [6]

Q 2) What are the elements that contribute stability and motion in a synovial joint? What is closed and open loop kinematics in human motion analysis. For elbow joint, the normal and functional ROM are defined as 80° & 50° respectively for Pronation and 85° and 50° for Supination - explain the meaning of the same. Explain with a rough sketch Normal cubitus valgus and varus variation in human arm.

[3x4=12]

Q 3) State any three limitations of traditional performance analysis methods. List any four types of analysis used in today's sports field. What is gait analysis, how can this help in performance analysis

[3x3=9]

Q 4) Holding a ruler at the pivot point, P, swing it round so that it strikes the two balls at the same time.
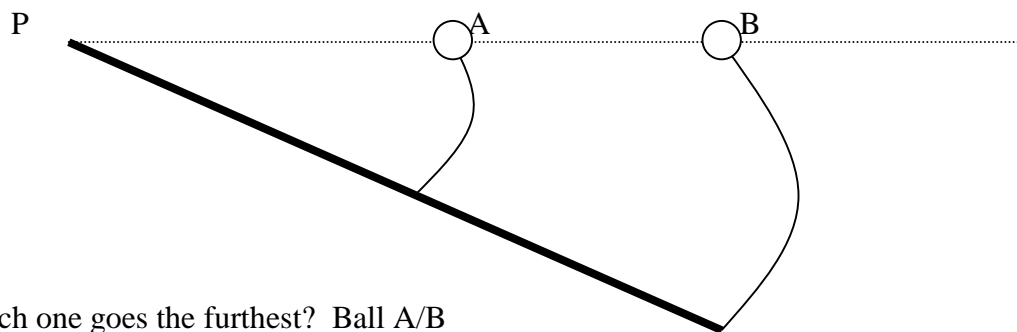
a) Which one goes the furthest? Ball A/B
b) Which is fastest- / has the greatest velocity]? Ball A/B
c) Where in sport/exercise can you apply this principle?   [3]