IN LUMINE TUO VIDEBIMUS LUMEN

University of Fort Hare
Together in Excellence

HUS-323

DEGREE SUPPLEMENTARY EXAMINATION
JANUARY 2019

TIME: 3 HRS

SUBJECT: HUMAN MOVEMENT SCIENCE

MARKS: 100

PAPER: BIOMECHANICS

INTERNAL EXAMINERS	EXTERNAL EXAMINER
MR. Xoxo; Mr Mandiringana	Prof. Travill

<u>INSTRUCTIONS:</u>
Answer All Questions

Question 1 **[24]**

a. Explain a scalar and a vector quantity by giving relevant examples.(6)

b. A swimmer covers the first 50 m length of a 100 m backstroke race at an average speed of 1.5 m/s and the second length at an average speed of 1.2 m/s. (a) What were the times for the first and second length, respectively? (b) What was the average speed for the whole race? (c) What was the average velocity for the whole race? (9)

c. Explain the three scenarios of the optimum angle of release or takeoff. ($3 \times 3 = 9$)

Question 2 **[31]**

a. A golfer practicing on a range with an elevated tee 4.9 m above the fairway is able to strike a ball so that it leaves the club with a horizontal velocity of 20 m/s. (Assume the acceleration due to gravity is 9.8 $m.s^{-2}$, and the effects of air resistance may be ignored unless otherwise stated). (i). How long after the ball leaves the club will it land on the fairway? (ii). What horizontal distance will the ball travel before striking the fairway? (8)

b. Every planetary body (including Earth) is surrounded by its own gravitational field, which exerts an attractive force on all objects. With this in mind explain acceleration due to gravity in detail. (13)

c. Explain in detail the effect of no-spin, topspin and backspin on the flight path and rebound of a tennis ball. Assume that the velocities of the balls at impact with the court are the same. (10)

Question 3 **[45]**

a. Explain the different types of levers by means of examples. ($3 \times 3 = 9$)

b. Discuss the four variables that can increase or decrease an athlete's stability using sporting examples. ($4 \times 4 = 16$)

c. Explain instances in sport where the Magnus effect is applied and further more explain its effect on a projectile. (12)

d. Explain how surface drag can affect a javelin during flight. (8)

TOTAL 100