

BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF SCIENCE AND ENGINEERING

DEPARTMENT: SPORTS SCIENCE

NOV 2023

BACHELOR OF SCIENCE HONOURS DEGREE IN SPORTS SCIENCE AND MANAGEMENT

SSM 217 BIOMECHANICS

DURATION: 3 HOURS

TOTAL MARKS: 100

INSTRUCTIONS TO CANDIDATES

Answer **two** questions from Section and **two** questions from Section B.

SECTION A

1a. Outline the historical development of biomechanics (10 marks)

1b) Explain the application of biomechanics in:

- i) Rehabilitation (3 marks)
- ii) Sports performance (4 marks)
- iii) Ergonomics (3 marks)

2. Explain the meaning of the following kinetic concepts using examples from sports:

- i) Inertia (3 marks)
- ii) mass (2 marks)
- iv) balance (2marks)
- v) Force (3 marks)
- vi) Weight (2 Marks)
- vii) Pressure (2 marks)
- viii) Impulse (2 Marks)
- ix) Torque (2 Marks)
- x) Centre of gravity (2 marks)

3a) Explain the contribution of each of the following factors to air resistance or drag using examples from sports.

- i) Velocity (2 marks)
- ii) Mass (2 marks)
- iii) Front cross-sectional area (2 marks)
- iv) Streamlining or body shape (2 marks)

v) Surface type (2 marks)

3b) The distance covered by a projectile is influenced by the angle of release, velocity of release, height of release and aerodynamic factors. Describe how each of these factors affects the projectile distance.

(10 marks)

SECTION B

1. Explain the effects of each of the following on the performance of the sportsperson:

- i) Shaving their body and using smooth swimming gear by a swimmer. (5 marks)
- ii) Cycling with the upper body vertical. (5 marks)
- iii) Allowing young tennis players to play tennis with adult-sized rackets on an adult-sized court (5 marks)
- iv) Shooting without focussing on a specific target in basketball (5 marks)
- v) Releasing a basketball without a spin (5 marks)
- vi) Playing soccer with a deflated ball (5 marks)

2. Explain the biomechanical concepts behind the following scenarios:

- i) People who carry loaded satchels on one side develop postural deviations (5 marks)
- ii) Heading a fully inflated soccer ball using the centre of the head causes more pain than using the forehead (5 marks)
- iii) Delving into practice or a match without prior warm-up most likely causes injuries (5 marks)
- iv) Practising sports techniques using the right hand or right leg results in an unbalanced player (5 marks)
- v) Playing a sport without using the proper tackies is a recipe for injury. (5 marks)

3. (a) Coaching points are instructions given to players so that they execute a given skill correctly. List the coaching points for any two of the following:

- i. The jump shot in basketball (3 marks)
- ii. The sprint start (3 marks)
- iii. The long jump (3 marks)
- iv. The high jump (3 marks)

(b) Explain how each coaching point helps towards better execution of the skill. (18 marks)

END OF PAPER