

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

SSC2104

FACULTY OF APPLIED SCIENCES

BACHELOR OF SCIENCE HONOURS DEGREE SUPPLEMENTARY EXAMINATIONS

DEPARTMENT OF SPORTS SCIENCE AND COACHING

THEORY: SSC2104: BIOMECHANICS

OCTOBER 2009

3 HOURS (100 MARKS)

INSTRUCTIONS

Answer **four** questions only. Each question carries 25 marks. Where a question contains subdivisions, the mark value for each subdivision is given in brackets. Illustrate your answer where appropriate with large, clearly labeled diagrams.

1. a) If the horizontal acceleration is $-0,5\text{m/s}^2$ and the vertical acceleration is $-7,683\text{m/s}^2$ what is the resultant acceleration? (5 marks)
- b) A softball is thrown with a velocity of $22,5\text{m/s}$ at an angle of 56° from a height of $1,7\text{m}$. Calculate:-
 - i) Vertical and horizontal components. (4 marks)
 - ii) Time to peak trajectory. (4 marks)
 - iii) The height of the trajectory peak from point of release. (4 marks)
 - iv) Total height of parabola. (4 marks)
 - v) The time from apex to ground. (4 marks)
2. Outline the factors that influence the projectiles. (25 marks)
3. a) Give examples of sports activities that illustrate each of the following motion:-
 - i) Translational motion. (5 marks)
 - ii) Curvilinear. (5 marks)
 - iii) Angular motion. (5 marks)
 - iv) General motion. (5 marks)
- b) A cyclist completes 2.1 cycle revolutions in 1second what is the angular velocity? (5 marks)
4. Outline the characteristics of a Force. (25 marks)

5. a) An individual has a mass of 72kg. What is their body weight? (5 marks)
- b) What are the coefficient of friction if the friction forces are:-
i) 80,9 N
ii) 25,7 N
iii) 100 N and the normal force is 110 N. (20 marks)
6. Outline the angular analog to Newton's Laws of motion. (25 marks)

END OF EXAMINATION