BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF SCIENCE AND ENGINEERING

DEPARTMENT: SPORTS SCIENCE

MASTER OF SCIENCE DEGREE IN SPORTS SCIENCE

SS509 LABORATORY TECHNIQUES IN EXERCISE SCIENCES

DURATION: 3 HOURS TOTAL MARKS: 100

(Plus 15 Minutes for Practical Preparation/Case Reading)

INSTRUCTIONS TO CANDIDATES

Section A is **compulsory.**

Answer **three** questions from Section B.

Section A

1. Lance Armstrong, a former professional cyclist, leveraged advancements in exercise science to enhance his performance. His success was attributed to rigorous physiological assessments and strategic use of biochemical analyses.

a. How did Lance Armstrong utilize physiological measurements, specifically VO2 max testing, to optimize his cycling performance? **[10 marks]**

b. Discuss the significance of blood lactate measurements in Lance Armstrong's training regimen and race strategy. Provide an example of how lactate threshold data influenced his approach to competitive cycling. **[15 marks]**

c. Evaluate the role of hormonal assays in understanding the physiological adaptations of Lance Armstrong's body to intensive training. How did this knowledge contribute to his success in competitive cycling? **[15 marks]**

Section B.

2. Evaluate the physiological parameters measured during a VO2 max test and assess their significance in designing individualized exercise programs. **[20 marks]**

3. Analyse the applications of electromyography (EMG) in designing rehabilitation protocols. Evaluate how EMG data can inform specific exercise prescriptions. **[20 marks]**

4. Apply the considerations for selecting body composition assessment methods in the context of designing a wellness program for a diverse population. **[20 marks]**

5. Evaluate the role of wearable technology in monitoring physical activity and propose strategies to enhance its impact on personalized exercise prescription. **[20 marks]**

6. Analyse the impact of emerging technologies, such as CRISPR gene editing, on the future of talent identification in sports. Discuss the ethical implications and propose strategies for responsible implementation. **[20 marks]**

END OF PAPER