University of Fort Hare
Together in Excellence

HUS 217

Sport Physiology and exercise science principles

DEGREE EXAMINATIONS

June 2023

TIME: 3 HRS

SUBJECT: HUMAN MOVEMENT SCIENCE

MARKS: 100

PAPER: Sport Physiology and exercise science principles

INTERNAL EXAMINERS

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INSTRUCTIONS: Answer All Questions

Question 1 **[50]**

1.1. Describe 4 general principles of training by making use of **SPORT EXAMPLES**. (4x2=8)

1.2. You are responsible for designing a resistance training program that will focus on improving the muscle endurance of the UFH Varsity Cup Rugby team. Before compiling such a training program certain aspects need to be considered, please answer the following questions relating to designing this resistance training program:

1.2.1.1. Describe briefly two assessments that you may use to assess the muscle endurance of these rugby players (2 x 4 = 8) AND explain why these assessments should be done (2). (10)

1.2.1.2. There are several steps to take when designing a muscle endurance resistance training program. Below is a table indicating the steps that should be taken, with practical examples of each step. Please select any TWO correct examples under each step that would apply to designing a muscle endurance resistance training program. (Please redraw the table in your answering book with two correct selections under each heading).

(5x2=10)

Step 2 Exercise selection	**Step 3 Training frequency**	**Step 5 Training Load**	**Step 6 Volume**	**Step 7 Rest periods**
Snatch	8 per week	80% of 1RM; 12 repetitions	2 sets	3 min
Bench press	2 per week	65% 1RM; 6 repetitions	1 set	5 min
Squat	3 per week	60% 1 RM; 20 repetitions	6 sets	< 30 sec
Power clean	4 per week	85% 1RM; 3 repetitions	3 sets	10-20 sec
Pull-ups	1 per week	65% 1RM 12 repetitions	8 sets	>30 sec

1.3. Lwazi's 1RM bench press was 40kg. After 3 weeks of training, his 1RM bench is now 55kg but there is no visible muscle hypertrophy. Please explain in detail what physiological reasons can explain this strength gain. (4)

1.4. By making use of **SPORTS EXAMPLES** please name and describe the three main energy systems.

3x2=6

1.5. Describe three types of aerobic/anaerobic training methods. (3x2=6)

1.6. Interval training can be manipulated in many ways to facilitate specific training adaptations. Please indicate how you would change the 3 examples of exercises below by manipulating the training variables. Indicate firstly, what manipulation you are using to change the variables **AND** give the "new" exercise which includes the manipulated training variable. **PLEASE NOTE that you may not use the same manipulation of variables more than once.** (3x2=6)

1.6.1.50m sprint @ 80% of maximum heart rate, repeat 8 times with 2 minutes rest between each session.

1.6.2.1km run @70% of maximum heart rate, repeat 5 times, with 3 minutes rest.

1.6.3.20m sprints @100% maximum heart rate, repeat 10 times with 6 minutes rest.

Question 2 **[50]**

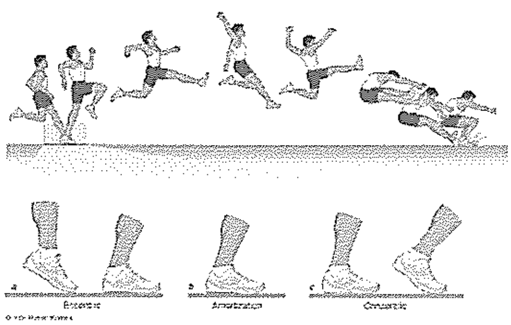
2.1 When one explains the physiology of plyometric exercise, it is important to understand the "stretch-shortening cycle," which combines mechanical and neurophysiological mechanisms and is the basis of plyometric exercise. Figure 16.3 below shows the "Long Jump" and "stretch-shortening cycle," which might be a cause for concern in terms of safety, if not executed properly. **Outline the Safety Considerations when executing this movement, under the following Pretraining Evaluation of the Athlete headings:**

2.1.1.**Technique (3)**

2.1.2.**Strength (4)**

2.1.3.**Speed (3)**

2.1.4.**Balance (5)** **(15)**



2.2 It has been scientifically established that proper Warm-Up regimen is important before one engages in structured physical activities or exercises. **Describe fully the**

2.2.1 **Components of Warm-Up** (5); **and**

2.2.2 **Benefits of Warming-Up before engaging in exercises** (7). (12)

2.3 Movement techniques involve task-specific application of forces that are manifested in terms of acceleration, time or rate of application, and velocity. Towards proper understanding of the key scientific facts when studying sport physiology and exercise science, terminology is key. **Define the following terms:**

2.3.1 **Force**

2.3.2 **Speed**

2.3.3 **Agility**

2.3.4 **Speed-Endurance** (1x4=4)

2.4 The goal of sprinting is to achieve high stride frequency and optimal stride length, with explosive horizontal push-off and minimal vertical impulse. However, due to several common sprinting mistakes, sprinters often fail to achieve these variables and thus fail to win sprint races. **Outline at least three Start and Acceleration common sprinting mistakes and their causes and corrections.** (3x3=9)

2.5 The Strength and Conditioning Professionals should understand that movement techniques involve task-specific application of forces that are manifested in terms of acceleration, time and velocity. The target activity's movement mechanics have important implications in training and should be addressed in the task analysis, if athletes are to skillfully apply force, and therefore, execute movement techniques properly. **Describe the training practical implications of these movement mechanics, with specific reference to the "Functional Versus Simple Movements."** (6)

2.6 The processes of designing and implementing of speed and agility training programs to maximize athletic performance are key. Program design involves multiple levels of planning: microcycles, mesocycles, and macro-cycles. Briefly outline the components of the long – term planning level. (4)

END OF QUESTION PAPER