NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

SSC1212

FACULTY OF APPLIED SCIENCES

BACHELOR OF SCIENCE HONOURS DEGREE EXAMINATIONS

DEPARTMENT OF SPORTS SCIENCE AND COACHING

THEORY: SSC1212: SPORTS SPECIALITY MODULE (TRACK AND FIELD ATHLETICS – SPRINTS, RELAYS AND HURDLES)

MAY 2006

3 HOURS (100 MARKS)

INSTRUCTIONS

Answer any 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.

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1. a) Discuss the biomechanical requirements and consequences of training for each of the following in the sprint start.
   - (i) Preparation phase (4 marks)
   - (ii) "Set" Position (6 marks)
   - (iii) Starting Drive (10 marks)

   b) Briefly explain the exercises that you would use as a coach to improve the crouch start technique. (5 marks)

2. a) Explain the mechanisms of the sprinting stride under the following phases;
   - (i) Rear swing (2 marks)
   - (ii) Front swing (2 marks)
   - (iii) Front support (2 marks)
   - (iv) Rear support (2 marks)

   b) Identify and give a detailed explanation of eight tests which a coach can give to a sprinter to help him set training goals. (17 marks)

3. a) Discuss Ballreich's (1976) most important research findings on stride length and frequency. (5 marks)

   b) Discuss the principles to be observed in sprint training for the following;

   (i) Acceleration training (5 marks)
   (ii) Sub maximal speed training (5 marks)

   c) Give a detailed account of the exercises that you would use to improve:
   (i) Acceleration (4 marks)
   (ii) Maximum speed (6 marks)

4. a) In what ways do general strength and special strength exercise differ from each other? (5 marks)

b) Identify the exercises that you would recommend to a coach for the development of a sprinter's (i) general strength and (ii) special strength, explaining why each of the exercises in the two groups is important. (20 marks)

5. a) With the aid of a diagram discuss how you would coach an incoming and outgoing runner their responsibilities in the acceleration and takeover zones. (15 marks)

b) Discuss the differences among the legs and the athletes' attributes who should be assigned to them in the 4 x 400 meters relay. (10 marks)

6. Briefly explain the training aspects which a coach needs to observe, to ensure that each of the sprint hurdles biomechanical requirements listed below are met.

BIOMECHANICAL REQUIREMENTS	**TRAINING ASPECTS**
(i) Takeoff in front of the hurdle should not introduce any braking force. Short amortization phase - supporting leg must be planted under the vertical projection of the body's centre of gravity.	(2 marks)
(ii) Distance between takeoff point and hurdle 2.05-2.18 m (110m) and 1.95-2.00m (100m).	(2 marks)
(iii) High starting point for body's centre of gravity at the beginning of the flight phase encourages a flat curve of the path of the body's centre of gravity.	(2 marks)
(iv) Smallest angle in the knee of the lead leg during takeoff 35^0-45^0.	(2 marks)
(v) Highest point of body's centre of gravity 20 – 30cm above the hurdle.	(2 marks)
(vi) Greatest angle in the knee of the swinging leg above the hurdle 170^0-$180^{0.}$	(2 marks)
(vii) Avoid rotation around the long axis of the body.	(2 marks)
(viii) Move trailing leg forwards a) Delayed b) Then quickly	(2 marks)
(ix) Forward rotation of pelvis around its axis facilitates the recovery of the trail leg.	(2 marks)
(x) Reflex landing as a neurophysiological process must be initiated.	(2 marks)
(xi) Distance between hurdles and point of landing 10 metres hurdles - 1.40 - 1.55m 100 metres hurdles – 1.10 – 1.25 m	(2 marks)
(xii) Landing point below the vertical projection of the body's centre of gravity. Short amortization phase in the landing leg.	(3 marks)

END OF EXAMINATION QUESTION PAPER