NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2014

SPORT AND EXERCISE SCIENCE: PAPER II

EXAMINATION NUMBER

Time: 2 hours 150 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of 15 pages. Please check that your question paper is complete.
2. All the questions must be answered on the question paper.
3. Read the questions carefully.
4. Use the total marks awarded for each question as an indication of the detail required.
5. It is in your own interest to write legibly and to present your work neatly.

Question	1	2	3	4	5	6	7	**Total**
Marks								

QUESTION 1

Tampering caught on camera

SA cricketer, Faf du Plessis was caught ball-tampering during the 2nd Test Match against Pakistan, in 2013.

Close-ups of slow-motion replays revealed du Plessis rubbing the ball against the zip of his trouser pocket apparently to alter the condition of the ball.

The umpires deemed du Plessis's action to be in contravention of Law 42, sub-section 3. According to the Law: Actions, such as rubbing the ball on the ground, picking at any of the seams and using implements to damage its surface, which is likely to alter the condition of the ball, are all banned.

At the end of the over, (delivered by Faf du Plessis), Pakistan were awarded 5 penalty runs by the umpires and a new ball was selected before play could continue.

[Adapted from *The Witness*, 26 October 2013]

1.1 Would Faf du Plessis be considered a cheat after this incident? Motivate your response.

_____

_____

_____ (2)

1.2 Describe what effect the rubbing of the ball on a zip could have on the flight of the ball.

_____

_____

_____

_____

_____

_____ (4)

1.3 After this incident, Faf du Plessis' morals and ethics were questioned. His personal performance, standing among team members and pressure from the media required special care. What advice could his coach and sports psychologist provide which would re-establish his morale?

(10)
[16]

QUESTION 2

Apply the Yerkes-Dodson inverted U theory and discuss the factors that a coach should consider when preparing the following athletes for competition:

2.1 A young tennis player competing in his/her first singles tournament.

(4)

2.2 An elite extrovert and confident high jumper competing in the finals of the Athletic World Championships.

(4)

2.3 A dart thrower competing in a televised tournament.

(4)
[12]

QUESTION 3

Usain Bolt is regarded as the best ever human sprinter. Instead of shaving off the occasional hundredth of a second from the World Record, he reduced Asafa Powell's time of 9,74s to 9,72s; then again to 9,69s at the Beijing Olympics later that year. He dramatically reduced it again to 9,58s at the Berlin World Championships. These improvements are so significant that one wonders what Bolt's maximum possible speed might be.

[Adapted from *Mathletics*, John D Barrow. Vintage Books, 2013]

3.1 Explain the factors that could contribute to Usain Bolt's faster times without the unlawful advantage of performance enhancing drugs.

(3)

3.2 Is it possible for Usain Bolt to consistently perform at very high levels, and have a low state of physical and mental well-being? Substantiate your answer.

(4)

3.3 Elite athletes, such as Usain Bolt, apply the **SMARTER** Principle to guide their performance trajectories via goal-setting. Discuss.

(14)

3.4 Motor Acquisition Theory states that there is a difference between the concepts:

- **Knowledge of Results** and
- **Feedback**

3.4.1 Explain the differences between **Knowledge of Results** and **Feedback**.

_____

_____

_____

_____

_____ (4)

3.4.2 When to provide **Feedback** and how much **Feedback** to provide is an important decision for a coach. The nature of the activity and the expertise of the athlete will influence this decision.

Assume that you are the coach of a novice high jumper. What kinds of **Feedback** would you provide which will assist your athlete?

_____

_____

_____

_____

_____

_____

_____ (6)

3.5 Discuss how a rugby, hockey or netball coach could prevent the **Ringlemann Effect** which may induce **Social Loafing** in the team.

_____

_____

_____

_____

_____

_____

_____

_____ (6)

[37]

QUESTION 4

Biomechanics is the study of how the body moves from a mechanical perspective. To demonstrate your knowledge, complete the following tables.

Table 1

NEWTON'S LAWS	
Define Newton's 1st Law	(2)
How is Newton's 1st Law applied in physical activity?	(2)
Define Newton's 2nd Law	(2)
How is Newton's 2nd Law applied in physical activity?	(2)
Define Newton's 3rd Law	(2)
How is Newton's 3rd Law applied in physical activity?	(2)

Table 2

STABILITY	
Define 'Static Balance'	(2)
How is the Principle of Balance applied in physical activity?	(2)

Table 3

FORCE SUMMATION	
Define 'Range of Motion'	(2)
How is Range of Motion applied in physical activity?	(2)
Explain the 'Co-ordination Continuum Principle'	(2)
How is the Co-ordination Continuum Principle applied in physical activity?	(2)

Table 4

PROJECTILE MOTION	
Explain the 'Optimal Projection Principle'	(3)
Provide examples of how the Principle of Optimal Projection is applied in physical activity	(2)
Illustrate the Physics of 'ball spin' when a force is applied by a tennis racquet to a tennis ball	(4)
Is the ball spin outcome you have illustrated above side spin, top spin or back spin?	(1)

Table 5

FORCE	
Define 'Momentum'	(2)
How is the Principle of Momentum applied in physical activity?	(3)

[39]

QUESTION 5

Diagram 1: Downhill skier

[<http://www.google/Fnews.bbcimg>]
(Accessed: 9 April 2014)

Diagram 2: Rugby scrum

[<http://www.google/Fblogs.independent.co.uk>]
(Accessed: 9 April 2014)

Diagram 3: Skeleton racer

[<http://www.google/Fi.telegraph.co.uk>]
(Accessed: 9 April 2014)

5.1 **Dynamic Balance** is the outcome of precise timing, weight transference and force production. Analyse each diagram and then explain the inter-dependent relationship of mechanical factors which enables extreme dynamic balance.

Diagram 1: _____

_____

_____

_____ (3)

Diagram 2: _____

_____

_____

_____ (3)

Diagram 3: _____

_____

_____

_____ (3)

5.2 Explain the difference/s between **internal** and **external** force.

_____

_____

_____ (2)

5.3 Provide an example of:

Internal force _____

_____ (1)

External force _____

_____ (1)

5.4 For each of the following athletic activities explain the action **AND** the reaction forces.

5.4.1 An archer pulling the bow and arrow back and then releasing the arrow.

[<http://www.google/Fresources0.news.com>]
(Accessed: 9April 2014)

Action force: _____

_____

_____

_____ (4)

Reaction force: _____

_____

_____

_____ (4)

5.4.2 A gymnast taking off for a vault.

Action force: _____

_____

_____ (2)

Reaction force: _____

_____

_____ (2)

5.4.3 The tennis court surfaces at Roland Garros, Wimbledon and the US Open provide very different challenges for the competitors. In terms of the **co-efficient of friction**:

(a) How will ball speed be affected?

Clay: _____

_____

Grass: _____

_____

Acrylic/Hard court: _____

_____ (3)

(b) How will the stopping speed of the player be affected?

Clay: _____

_____

Grass: _____

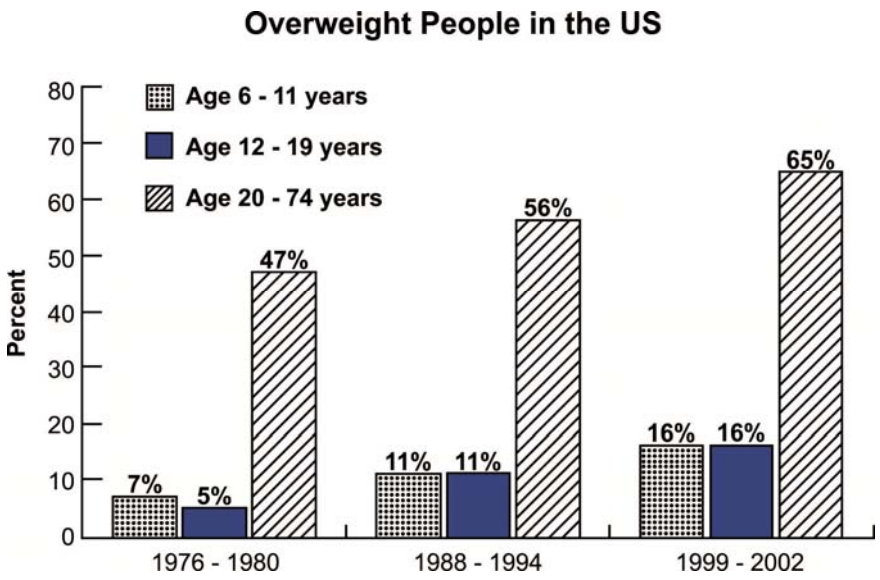
_____

Acrylic/Hard court: _____

_____ (3)

[31]

QUESTION 6



The graph depicts the increase of obesity across a sample of American citizens since 1976.

6.1 Provide **FOUR** reasons why obesity has increased from 1976 onwards.

_____

_____

_____

_____

_____

_____

_____

_____ (4)

6.2 The incidence of diabetes follows this trend. List **THREE** precautions that a diabetic should take with respect to exercise.

_____

_____

_____

_____

_____

_____ (3)
[7]

QUESTION 7

7.1 Two light round balls of equal size are placed against an open door. The first ball (Ball A) is placed 30 cm from the door's hinges. Ball B is placed 60 cm from the door's hinges.

[<http://berniesiegelmd.com>
Accessed: 26 June 2014]

7.1.1 Explain/describe what will happen to both of the balls if the door is slammed shut quickly.

_____

_____ (2)

7.1.2 Why does this occur?

_____

_____ (2)

7.2 Greater force is exerted with a longer lever, however a long lever may not always be an advantage when:

7.2.1 hitting a ball. Explain.

_____

_____ (2)

7.2.2 performing a high kick in karate. Explain.

_____

_____ (2)
[8]

Total: 150 marks