



**SPORT AND EXERCISE SCIENCE**

**EXAMINATION NUMBER**

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Time: 3 hours

300 marks

**PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY**

1. This question paper consists of 31 pages. Please check that your question paper is complete.
2. This question paper has a Section A and a Section B. 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.

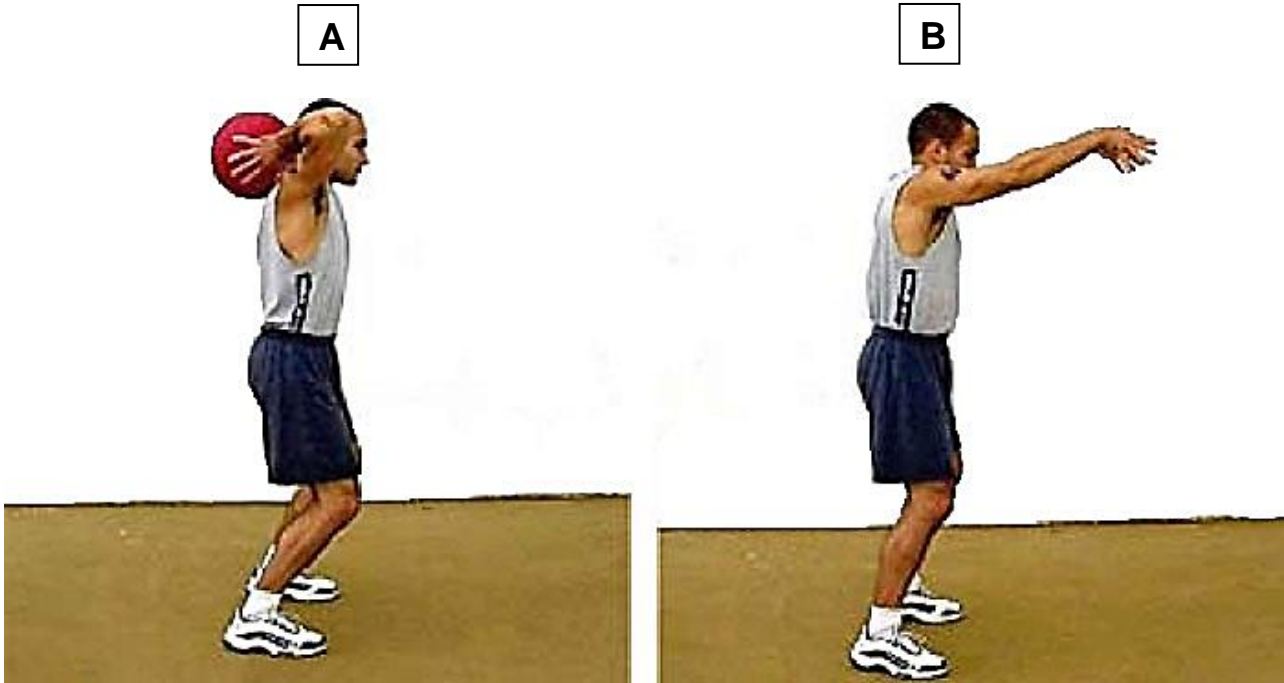
**FOR MARKER'S USE ONLY**

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
Marks	23	12	18	14	6	6	6	37	20	45	9	8	47	29	20	300
Obtained																

**SECTION A**

**QUESTION 1**

The picture below shows the movements involved as a player throws the ball using an overhead pass.



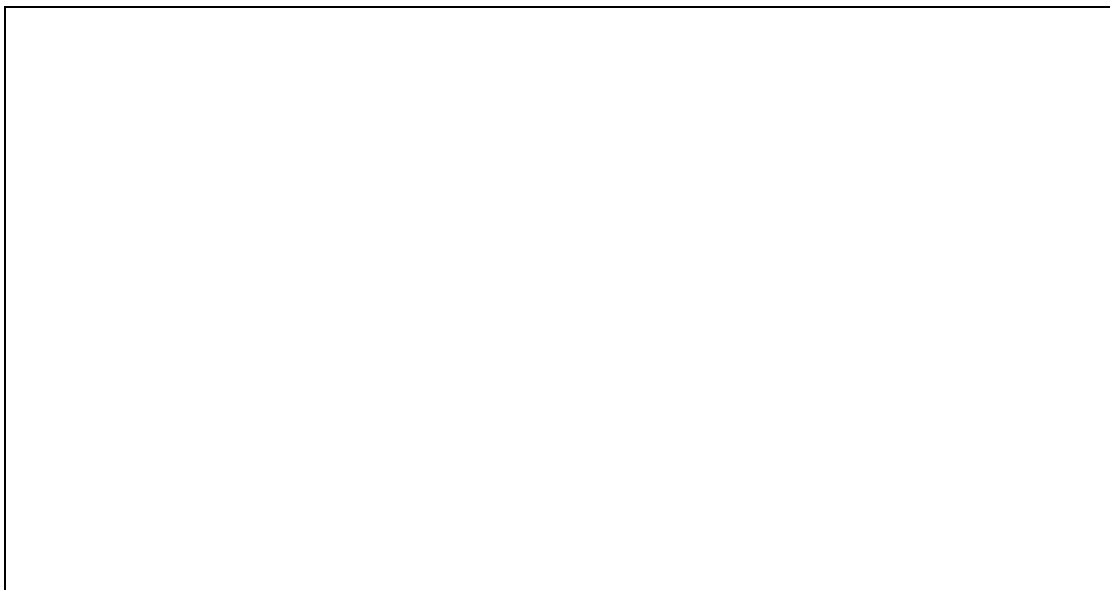
[Source: <<https://www.google.overhead+pass&biw>>, Accessed on 27 January 2016]

1.1 Name the lever system in action at the elbow joint of this player as the ball is thrown overhead.

\_\_\_\_\_

(1)

1.2 Draw and label the lever system in action at the elbow joint as the ball is thrown overhead.



(6)

1.3 Put the following letters **A** to **H** in order from most important to least important to demonstrate the correct order needed when throwing a ball.

- A Throwing arm extends behind the body
- B Upper body turns in the direction of the throw
- C Run up
- D Arm propels the ball with a whip-like action
- E Fall forward after the ball leaves the hand
- F Front foot planted on the ground and feet placed side on
- G Body leans forward
- H Arm follows through towards the target

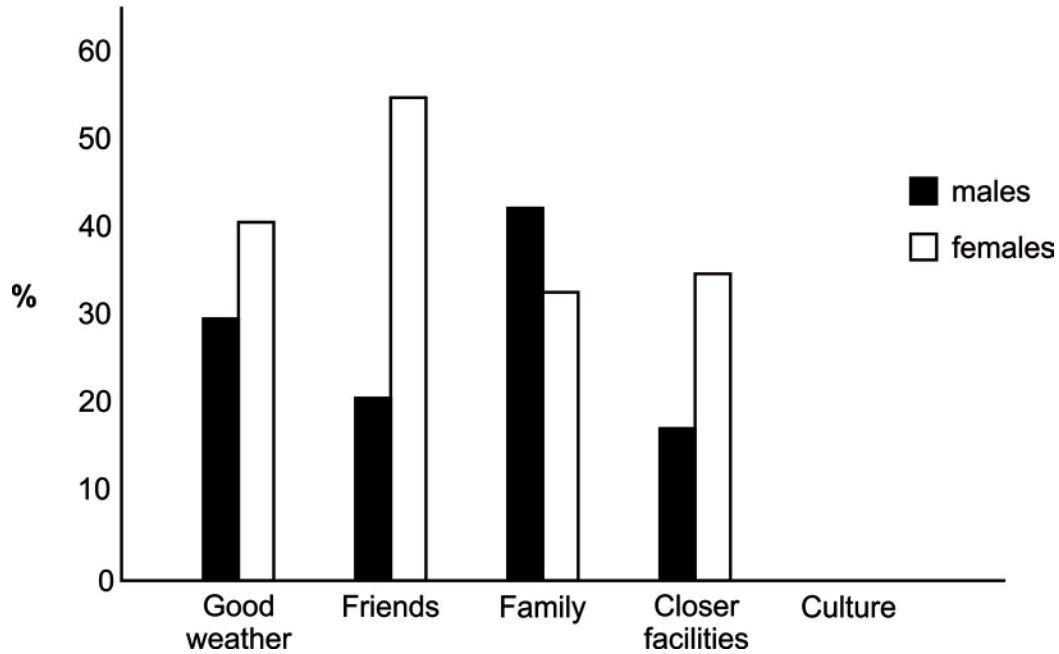
Action	Correct letter
1st movement	
2nd movement	
3rd movement	
4th movement	
5th movement	
6th movement	
7th movement	
Last movement	

(16)  
[23]

**QUESTION 2**

Study the graph below and answer the questions that follow.

**Factors affecting sporting participation in children 15 years and older**



2.1 What factor has the most influence on female participation in sport?  
 \_\_\_\_\_ (1)

2.2 What factor has the most influence on male participation in sport?  
 \_\_\_\_\_ (1)

2.3 Explain why good weather would have an impact on participation.  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_ (2)

2.4 Why do you think that "closer facilities" encourage more females to participate?  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_ (2)

2.5 On the graph provided, data has been omitted relating to the children's culture.

2.5.1 Predict the impact that a person's culture will have on sporting activity by adding a column for female and male participation onto the existing graph. (2)

2.5.2 Provide reasons for the data that you have provided.

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(4)  
**[12]**

**QUESTION 3**

Match the term in column A to a description in column B. Write only the letter of your chosen description in the table below.

COLUMN A		COLUMN B	
3.1	Linear Motion	A	The blood vessels narrow and this reduces blood flow
3.2	Velocity	B	Movement about an axis of rotation
3.3	Rotational Motion	C	Consists of 1 year block of training
3.4	Momentum	D	Movement along a straight line
3.5	Angular Momentum	E	How fast an object moves and in what direction
3.6	Macro-cycle	F	The amount of matter or substance in a body
3.7	Mass	G	The increase in the internal diameter of blood vessels
3.8	Vasodilation	H	Product of momentum of inertia and rotational velocity
3.9	Vasoconstriction	I	Product of weight/mass and velocity

**ANSWERS:**

3.1	
3.2	
3.3	
3.4	
3.5	
3.6	
3.7	
3.8	
3.9	

**[18]**

**QUESTION 4**

Provide the scientific term for the following definitions or descriptors.

- 4.1 Positive stress is called \_\_\_\_\_ . (2)
  - 4.2 Negative stress is called \_\_\_\_\_ . (2)
  - 4.3 Name the tendon that continuously monitors tendon tension during a contraction or stretch.  
\_\_\_\_\_ (2)
  - 4.4 Which plane divides the body or body part vertically into left and right halves?  
\_\_\_\_\_ (2)
  - 4.5 Which plane divides the body vertically into front and back halves of equal mass?  
\_\_\_\_\_ (2)
  - 4.6 Which plane separates the body into top and bottom halves of equal mass?  
\_\_\_\_\_ (2)
  - 4.7 Name the condition where the body's core temperature drops below that needed for normal metabolism and body functions.  
\_\_\_\_\_ (2)
- [14]**

**QUESTION 5**

The following statements are wrong. Underline the incorrect word(s) and replace with the correct answer.

- 5.1 One PC resynthesises only one ATP in the Lactic Acid system.  
\_\_\_\_\_ (2)
  - 5.2 OBLA stands for "onset of blood lactate addition".  
\_\_\_\_\_ (2)
  - 5.3 The total energy produced via the Aerobic System is 18 ATP.  
\_\_\_\_\_ (2)
- [6]**

**QUESTION 6**

Complete the table below on energy systems.

**Predominant Energy Systems**

<b>Activity</b>	<b>Predominant energy system used</b>	<b>Approximate duration</b>
6.1 Running a marathon		
6.2 A gymnastic vault		
6.3 Swimming a 100 m individual medley		

**[6]**





**SECTION B**

**QUESTION 8**

8.1 A cricket bowler's main objective is to bowl the batsman out. In order to do this, the bowler uses a variety of bowling techniques.

8.1.1 What is the reasoning behind cricket players shining one side of the cricket ball?

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(2)

8.1.2 Describe the impact on the flight path of the ball after one side of the ball has been rubbed.

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(2)

8.1.3 Describe the impact on a batsman when the bowler has rubbed one side of the ball.

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(2)

8.1.4 What is the purpose of a "bouncer"?

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(2)

8.2 International sportsmen need to have exceptional eye-hand co-ordination and visual skills.

8.2.1 Describe **TWO** visual skills needed for a top cricket batsman.

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(4)

8.2.2 Compile, with explanation, **TWO** visual exercises that you would implement for the team if you were the South African basketball coach.

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(6)

8.3 Select any sport, except basketball or cricket, and compile **ONE** visual exercise that you would implement for that sport. Provide reasoning for your choice of exercise,

Sport selected: \_\_\_\_\_

Exercise 1: \_\_\_\_\_

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(2)

Reason for choice of exercise: \_\_\_\_\_

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(2)

8.4 A batsman's arm muscles will contract when hitting the ball. Describe the complex system known as the sliding filament theory.

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(5)

8.5 It is believed that advancements in sport technology have improved the sporting experience for both players and spectators.

Using cricket as an example:

8.5.1 Provide **TWO** examples of how **players** have benefited from improved technology.

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(2)

8.5.2 Provide **TWO** examples of how **spectators** have benefited from improved technology.

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(2)

8.5.3 Provide **ONE** example of how **players** have been disadvantaged from improved technology.

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(2)

8.5.4 Provide **ONE** example of how **spectators** have been disadvantaged from improved technology.

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(2)

8.5.5 To what extent has the use of technology created unfair competition in sport?

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(2)  
**[37]**

**QUESTION 9**

All sporting events need to submit Risk Management profiles to the local municipality before an event is approved.

You are drawing up a risk management profile for a road cycling race happening through a suburb in which you live.

Name **FIVE** potential hazards to the event **AND** provide a solution for each.

Write the suburb and the province you are referring to in this question on the line below:

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Hazard 1:

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(2)

Solution to hazard:

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(2)

Hazard 2:

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(2)

Solution to hazard:

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(2)

Hazard 3:

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(2)

Solution to hazard:

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(2)

Hazard 4:

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(2)

Solution to hazard:

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(2)

Hazard 5:

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(2)

Solution to hazard:

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(2)

**[20]**

**QUESTION 10**

St. Estelle's School for Girls, located in the Drakensberg mountains at an altitude of 3 000 m, is hosting a 3-day hockey tournament for both male and female school 1st hockey teams. This tournament will act as a qualifier for the Youth Olympics.

10.1 List **THREE** factors that could contribute to the hockey player's stress at this tournament.

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(3)

10.2 Provide **FOUR** strategies that a coach will implement in order to prepare the team for a tournament such as this. These strategies could relate to diet, psychology, training and more.

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(8)









**QUESTION 11**

11.1 Describe how a Springbok rugby prop could psych himself up to the optimal level of arousal before a test match.

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(2)

11.2 Describe how an archer could attain their optimal level of arousal before an Olympic final.

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(2)

11.3 Using the "catastrophe theory", describe how over-arousal may affect a player's performance.

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(5)  
[9]



**QUESTION 13**

Track and Field Decathletes aim to peak for the World Championships. Over 2 days they will compete in 10 events, including high jump, long jump, shot putt, 400 m, 1 500 m and 110 m hurdles. These athletes will run the 400 m in approximately 46 seconds. They will throw the shot put approximately 18 metres, using maximal effort lasting 2 seconds. The last event in the decathlon is the 1 500 m – they will run this in approximately 4 minutes 20 seconds.

13.1 Provide the dominant energy system used in each event listed below:

13.1.1 Shot put \_\_\_\_\_

13.1.2 1500 m \_\_\_\_\_

13.1.3 400 m \_\_\_\_\_

(6)

13.2 What can a decathlon athlete do to ensure that their glycogen stores are ideal over the two days that they are competing?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(2)

13.3 Using a suitable sporting example, explain what *lactate threshold* is.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(3)

13.4 What impact would the onset of blood lactate have on a decathlete's performance?

\_\_\_\_\_  
\_\_\_\_\_

(1)

13.5 What type of training would an athlete utilise in order to improve their lactate threshold?

\_\_\_\_\_  
\_\_\_\_\_

(2)

13.6 Some decathletes score better at throwing and jumping events, while others are more suited to the longer running events.

Name the predominant muscle fibre type for the athletes performing well in the throwing and jumping events.

\_\_\_\_\_ (2)

13.7 Below are statements relating to the diets of a weightlifter and a decathlete. Select which statements apply to which athlete by ticking the appropriate column.

**Note:** No statements apply to both athletes.

Statement	Weightlifter	Decathlete
13.7.1 Eat lots of protein for muscle growth and repair.		
13.7.2 Eat two hours before training.		
13.7.3 Eat lots of complex carbohydrates for energy.		
13.7.4 Eat low GI foods.		
13.7.5 Drink extra fluid to replace losses.		
13.7.6 Eat in excess to drive muscle growth.		
13.7.7 Eat protein at breakfast, lunch and dinner.		
13.7.8 Eat lean protein.		

(8)

13.8 Provide **TWO** reasons for the differences in the diets of the weightlifter and decathlete.

\_\_\_\_\_  
 \_\_\_\_\_  
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(2)









14.2 In most sports the athlete will use both linear and rotational motion. Explain how this is possible in a sport like swimming.

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(4)

14.3 Explain what effect **momentum** and **time of contact** will have on the force of an object.

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(2)



**QUESTION 15**

Read the following excerpts written by sports scientist Professor Ross Tucker and author Malcolm Gladwell.

**"Spare sporting kids the risk of burnout"**

By Professor Ross Tucker

The Sports Science Institute of South Africa held a successful conference on Youth Sport and Talent Development. Acclaimed scientists and leaders in the field spoke to coaches, administrators and teachers about what they should be doing to give the youth the best possible chances at (a) podiums and medals and (b) a life of enjoyable sports participation.

One of the talks spoke about the need to find a balance between what science says is ideal (delay specialisation and encourage wide sports participation) and what the "market" forces on athletes (to pick early, and train hard in one sport). A coach asked advice on a talented 11-year-old who played good cricket and was a runner. The coach wanted to know how to advise the father who had recognised his son's ability and wanted to give him the best start possible.

The fundamental point is that 11 is too young to commit to a single sport. There are many reasons for this. Studies show an increased risk of injury and burnout with early specialisation. Play and compete early and you're likely to give it up later.

**The 10 000 hour rule**

By Malcolm Gladwell

"Research suggests that ... the thing that distinguishes one performer from another is how hard he or she works. That's it. And what's more, the people at the very top don't work just harder or even harder than everyone else. They work much, *much* harder. The idea that excellence at performing a complex tasks requires a critical minimum level of practice surfaces again and again in studies of expertise. In fact, researchers have settled on what they believe is the magic number for true expertise: ten thousand hours. In study after study, of composers, basketball players, ice skaters, concert pianists, chess players, and what have you, this number comes up again and again. To become a chess grandmaster ... takes about 10 years. And what's ten years? Well, it's roughly how long it takes to put in 10 000 hours of hard practice." So to become a great athlete, it means that the performer must start training as young as possible.

Above are two views on the amount of time that should be spent participating in sport in order to achieve a high level of expertise.

Write an essay in which you convincingly argue whether or not the amount of time spent participating in a sport influences the level of expertise attained.

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