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# Sport and Exercise Science

## Unit 1: Sport and Exercise Physiology

Monday 5 June 2017 – Morning <b>Time: 1 hour 30 minutes</b>	Paper Reference <b>31813H</b>
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<b>You do not need any other materials.</b>	Total Marks
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### Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and learner registration number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*

### Information

- The total mark for this paper is 80.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

### Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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**Answer ALL questions. Write your answers in the spaces provided.**

Bonnie starts exercising to improve her health.

Bonnie attends a body pump class to tone and strengthen her muscles.

Body pump is a 60-minute exercise class. In body pump people lift weights in time to music.

Over the next two days Bonnie's muscles ache and are very painful.

**1** (a) Explain why Bonnie's muscles ache in the days after the body pump class. (3)

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(b) Explain **two** ways body pump classes could improve the strength of Bonnie's skeletal system. (4)

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During the body pump session Bonnie varies the weight that she lifts.

- (c) Explain **one** way the nervous system makes it possible for Bonnie to vary the weight she can lift.

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The intensity of the body pump session is varied by the speed of the music and the amount of weight lifted.

Different music tracks are used to speed up or slow down the workout.

Bonnie's oxygen requirement changes as workout intensity varies.

(d) Analyse how Bonnie's chemoreceptors and baroreceptors maintain appropriate blood oxygen levels during the body pump session.

(10)

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**(Total for Question 1 = 20 marks)**



To raise money for charity Jenna ran in the London Marathon dressed as a polar bear.

**Figure 1** shows Jenna and other fun runners during the London Marathon.



**Figure 1**

To perform well in the marathon Jenna's body maintained an appropriate body temperature through thermoregulation.

2 (a) State the meaning of the term thermoregulation.

(1)

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(b) Give **two** responses of the body to excessive heat during exercise.

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(c) Explain **one** reason why it will be harder for Jenna to maintain an appropriate body temperature compared to the other fun runners in **Figure 1**.

(3)

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(d) Describe how the cardiovascular system helps the fun runners in **Figure 1** to maintain an appropriate body temperature.

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Runners complete months of aerobic training before they run in the London Marathon. This aerobic training includes running long distances on a regular basis.

- (e) Assess the impact of regular aerobic training on the muscular and respiratory systems to improve the runners' marathon performance.

(10)

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**(Total for Question 2 = 20 marks)**



Enzo has developed an addiction to exercise.

He attends at least three fitness sessions a day.

A fitness instructor has advised him that he may be overtraining.

3 (a) State **three** physiological effects of overtraining.

(3)

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(b) Explain **two** reasons why overtraining will result in a drop in Enzo's fitness.

(4)

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During Enzo's fitness sessions he experiences muscle fatigue due to lactate accumulation.

(c) Explain how lactate accumulation causes muscle fatigue.

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A fitness instructor produces an aerobic fitness training programme to improve Enzo's cardiovascular fitness without causing overtraining.

(d) Analyse how adaptations to Enzo's cardiovascular system will improve his cardiovascular fitness.

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**(Total for Question 3 = 20 marks)**



Kai plays basketball. When he plays basketball his body systems respond to the increase in physical activity.

4 (a) State **two** responses of the skeletal system during a game of basketball. (2)

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A basketball match lasts for 40 minutes. The match is fast paced, with a lot of quick runs from one end of the court to the other.

Kai uses all three energy systems during a basketball match to provide the energy he needs.

(b) (i) Explain how the ATP-PC energy system is used during a basketball match. (3)

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(b) (ii) Explain how the lactate energy system is used during a basketball match. (3)

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Kai's basketball match is split into four periods.

There is a two-minute break between each period.

(c) Explain how the ATP-PC system recovers between periods.

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Figure 2 shows Kai jumping to score a basket.



Figure 2

(d) Assess the importance of the different muscle fibre types in a game of basketball. (10)

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**(Total for Question 4 = 20 marks)**

**TOTAL FOR PAPER = 80 MARKS**





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