

Pearson BTEC Level 3 Nationals

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Learner Registration Number

Centre Number

Level

3

Sport and Exercise Science

Unit 1: Sport and Exercise Physiology

Diploma/Extended Diploma

Sample Assessment Materials for first teaching September 2016
Time: 1 hour 30 minutes

Total

You do not need any other materials.



marks

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 70.
- The marks for **each** question are shown in grey boxes
– *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.

Paper reference

31813

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

Scarlett often takes part in 'fun runs' of 3 km in her local park, but decides to train for the London Marathon, a distance of just over 42 km (26 miles).

During her first training session Scarlett ran 5 km. She recorded the time it took her to complete each kilometre. Her times are shown in Table 1.

1 km	2 km	3 km	4 km	5 km
7 min	7 min	8 min	10 min	11 min

Table 1

- 1 (a) State **three** causes of fatigue that could account for Scarlett's drop in performance during her 5 km run.

3 marks

1

2

3



Scarlett continues with her training programme by running 5 km each day.

After the first three days of training Scarlett felt weak and her times got even worse.

- (b) Explain **one** nutritional strategy Scarlett could use to improve her running performance.

2 marks

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Scarlett continues with her training programme, running between 5 km and 10 km each day.

After six weeks she has to stop training due to an overuse injury.

(c) Explain **one** reason for Scarlett's overuse injury.

3 marks

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After recovering from injury and revising her training programme, Scarlett continued to train. Her performance improved until she was comfortably running between 50 km and 60 km a week.

As part of Scarlett's preparation she reduced the level of her training two weeks before running the marathon.

- (d) Discuss the impact of Scarlett reducing the level of her training two weeks before running the marathon.

8 marks

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Total for Question 1 = 16 marks



Kevin plays rugby competitively.

As part of his training, Kevin spends 3 hours a week weightlifting in the gym to increase his muscular strength.

- 2 (a) Explain **one** effect on Kevin's blood pressure when his muscles contract isometrically during a strength training session.

3 marks

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- (b) State **two** adaptations to Kevin's endocrine system as a result of his strength training programme.

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Every Tuesday evening Kevin attends rugby club training.

Before taking part in the training session Kevin completes a warm-up.

His warm-up consists of three phases: pulse raisers; static stretching exercises and then rugby specific drills.

- (c) Explain how muscle spindles help prevent muscle injury during the flexibility phase of Kevin's warm-up.

3 marks

Handwriting practice area for question (c) with horizontal dotted lines.

- (d) Describe how Kevin's minute volume (VE) could change between the three phases of his warm-up.

2 marks

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Before the rugby playing season begins, Kevin uses aerobic training to improve his aerobic fitness.

A sample of Kevin's aerobic training programme is shown in **Table 2**.

Kevin's aerobic training causes adaptations to his muscular system.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Rest	Fartlek run (30 min)	Long distance run (75% max HR)	Rest	Interval training (45 min)	Rest	Fartlek run (30 min)

Table 2

(e) Analyse the impact of the adaptations to Kevin's muscular system on energy production and his future rugby performance.

8 marks

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Total for Question 2 = 18 marks



Stuart is 17 and is a triathlete.

Each time Stuart competes in a triathlon he has to:

- swim 750 m
- cycle 20 km and
- run 5 km.

Stuart has completed many triathlons, but only at low altitude. His next race is at high altitude in Switzerland.

When Stuart first arrives at high altitude his body responds by becoming hypoxic.

3 (a) State **three** other initial responses of Stuart's body to being at high altitude.

3 marks

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(b) Explain why Stuart becomes hypoxic in response to being at high altitude.

3 marks

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Stuart's friends told him that he should spend more time training at high altitude before the triathlon competition so his body systems can adapt to the high altitude.

Stuart was concerned that if he did train at high altitude he may suffer from altitude sickness. This would reduce the amount of time he could train.

- (c) Explain **two** ways Stuart could reduce the risk of altitude sickness, yet still allow his body to adapt to high altitude to improve his triathlon performance.

4 marks

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During the triathlon, Stuart will perform in a range of temperatures.

The swimming part of the race is in cold water; when running and cycling the environmental temperatures can be much warmer.

- (d) Assess the role of convection, conduction and evaporation in maintaining Stuart's body temperature during the **swimming** part of the race.

8 marks

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Total for Question 3 = 18 marks



Penny swims for her local swimming club.

Figure 1 shows Penny's heart rate before, during and after a swimming race.

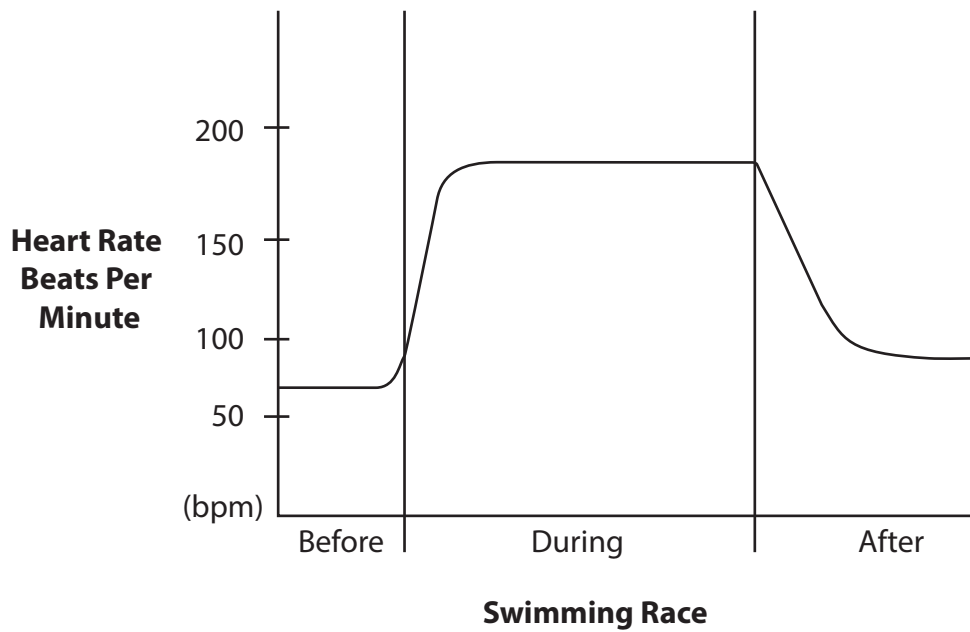


Figure 1

- 4 (a) Using **Figure 1**, explain the changes in Penny's heart rate before, during and after her swimming race.

4 marks

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(b) Explain the role of chemoreceptors in regulating Penny's heart rate.

4 marks

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Blood flow around Penny's body will vary during exercise and rest.

(c) Describe how blood flow is redistributed when Penny starts to swim.

2 marks

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During training, members of Penny's swimming team have their fitness regularly monitored.

This includes measuring their:

- VO_2 max
- anaerobic threshold
- anaerobic power.

All swimmers carry out the same tests regardless of their event. Penny is a **sprint** swimmer.

(d) To what extent would these measurements of body systems be of value to Penny's swimming performance?

8 marks

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Total for Question 4 = 18 marks

END OF EXAM

TOTAL FOR PAPER = 70 MARKS

