OCR
Oxford Cambridge and RSA

SAMPLE ASSESSMENT MATERIAL

Level 3 Cambridge Technical in Sport and Physical Activity

05826/ 05827/ 05828/ 05829

Unit 1: Body systems and the effects of physical activity

Date – Morning/Afternoon

Time Allowed: 1 hour 30 minutes

You must have:
- None

You may use:
- A calculator

Do not use:
- None

* 800000001 *

First Name		Last Name	
Centre Number		Candidate Number	
Date of Birth			

INSTRUCTIONS
- Use black ink.
- Complete the boxes above with your name, centre number and candidate number.
- Answer **all** the questions.
- Write your answer to each question in the space provided.
- Do **not** write in the bar codes.

INFORMATION
- The total mark for this paper is **70**.
- The marks for each question are shown in brackets **[ ]**.
- This document consists of **16** pages.

Answer **all** the questions.

Section A

1 What type of bone is the femur?

Put a tick (✓) in the box next to the correct answer.

- ☐ Long bone
- ☐ Short bone
- ☐ Flat bone
- ☐ Irregular bone

[1]

2 Which one of the following bones forms part of the axial skeleton?

Put a tick (✓) in the box next to the correct answer.

- ☐ Scapula
- ☐ Humerus
- ☐ Sternum
- ☐ Patella

[1]

3 Which one of the events listed below would benefit from a high percentage of fast glycolytic fibres?

Put a tick (✓) in the box next to the correct answer.

- ☐ Marathon
- ☐ Shot put
- ☐ 800 m race
- ☐ 400 m hurdles race

[1]

4 Below are listed four components of blood. Which component fights infections?

Put a tick (✓) in the box next to the correct answer.

- ☐ Red blood cells
- ☐ White blood cells
- ☐ Platelets
- ☐ Plasma

[1]

5 Which component of blood helps in the clotting process?

..... **[1]**

6 Which one of the following is a short-term effect of exercise on the muscular system?

Put a tick (✓) in the box next to the correct answer.

- ☐ Increase in the temperature of the muscles
- ☐ Increase in stroke volume
- ☐ Increase in slow twitch muscle fibres
- ☐ Increase in muscle mass

[1]

7 Which one of the following is an appropriate value for an average person's tidal volume at rest?

Put a tick (✓) in the box next to the correct answer.

- ☐ 0.1 litres
- ☐ 0.5 litres
- ☐ 1.0 litres
- ☐ 5.0 litres

[1]

8 What term is used for the amount of air that is inspired or expired in one minute?

..... **[1]**

9 Calculate the cardiac output of an individual with a heart rate of 100 beats per minute and a stroke volume of 100 millilitres.

..... **[1]**

10 How many molecules of ATP are produced in the ATP/PC system from one molecule of PC?

..... **[1]**

Section B

11 Fig. 1 shows a synovial joint.

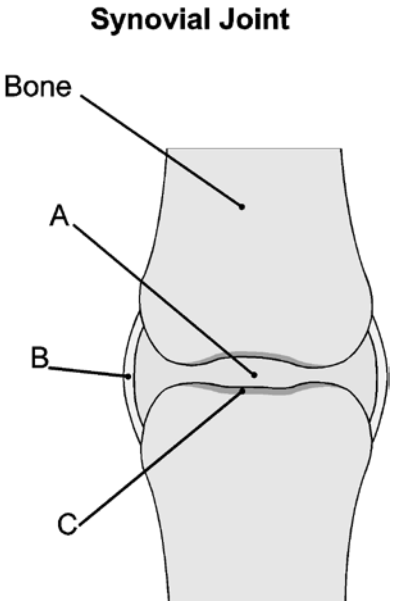

Fig. 1

(a) Identify A, B and C on the diagram.

A ..... **[1]**

B ..... **[1]**

C ..... **[1]**

(b) Describe the function of ligaments and synovial membrane at a synovial joint.

.....

.....

.....

..... **[2]**

12 Fig. 2 shows a sprinter in action.

Fig. 2

Apply your knowledge of the skeletal and muscular systems to complete the following table.

Joint	Joint movement	Muscle acting	Type of contraction
Knee	Flexion		
		Iliopsoas	Concentric
		Biceps brachii	

[7]

13 Table 1 shows the structural characteristics of slow oxidative muscle fibres.

Structural characteristic	**Slow oxidative fibres**
Size	Small
Capillaries	Many
Mitochondria	Many
Oxidative enzymes	High
Myoglobin content	High
Triglyceride stores	High
Phosphocreatine store	Low

Table 1

Explain how the structures of slow oxidative fibres aid muscle function.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... **[6]**

14 Select the appropriate term from the list provided to complete each of the following statements:

tricuspid valve pulmonary artery left ventricle

aortic valve venae cavae bicuspid valve

(a) ..... allows blood to pass from the right atrium to the right ventricle but prevents backflow of blood. **[1]**

(b) ..... pumps oxygenated blood into the aorta. **[1]**

(c) ..... carries deoxygenated blood to the lungs. **[1]**

15 Explain the vascular shunt mechanism using the following terms:

vasoconstrict vasodilate precapillary sphincters arterioles

.....

.....

.....

.....

.....

.....

.....

..... **[4]**

16 Fig. 3 shows a diagram of the lungs.

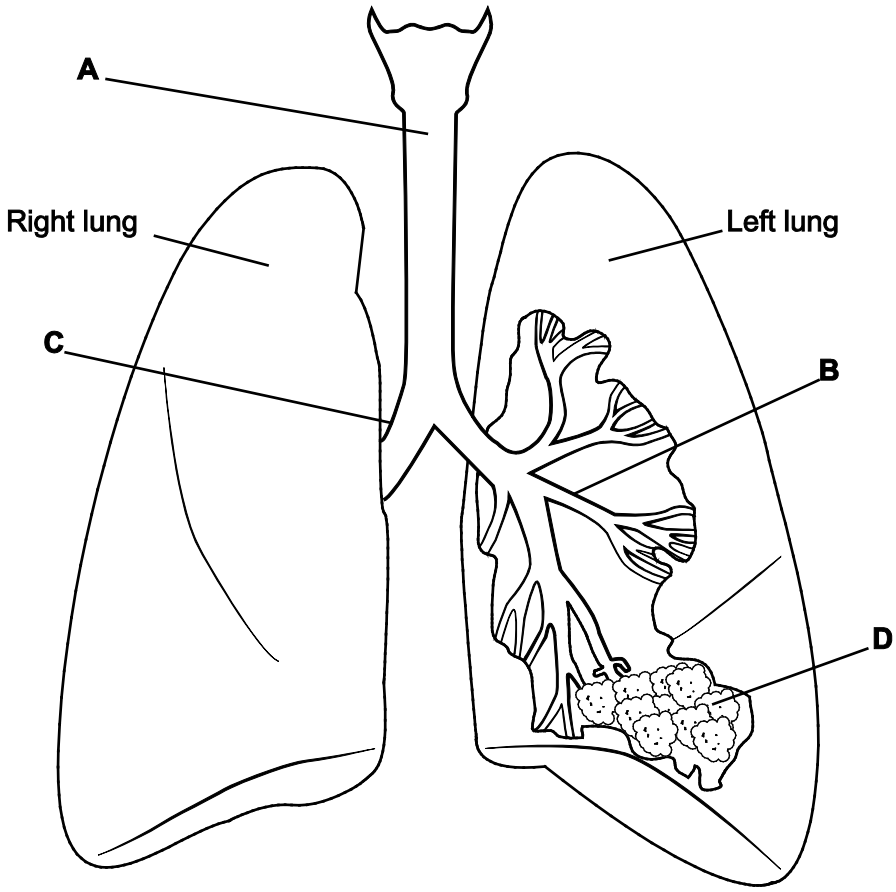

Fig. 3

Identify A, B, C and D on the diagram

A ..... **[1]**

B ..... **[1]**

C ..... **[1]**

D ..... **[1]**

17 The following paragraph describes the mechanics of breathing during inspiration:

(a) Complete the paragraph by filling in the missing words. **[5]**

The diaphragm and the external intercostal muscles ..... .

This causes the rib cage to move ..... and out.

The volume of the thoracic cavity .....

This means that the pressure in the lungs ..... , causing air to ..... the lungs.

(b) Explain how the rectus abdominus helps in expiration during exercise.

.....

.....

.....

..... **[2]**

18 Fig. 4 shows an example of the energy continuum with three sporting activities indicated.

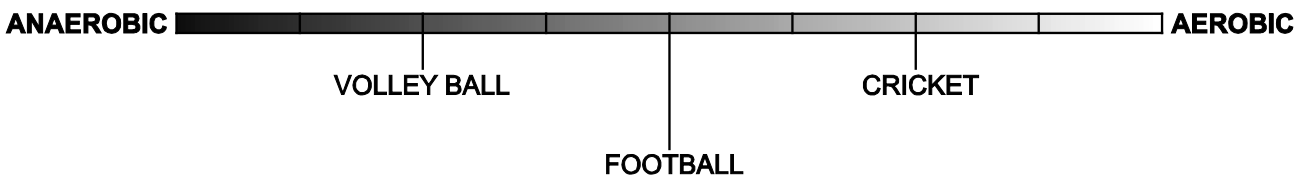

Fig. 4

(a) Show your knowledge of energy systems by placing the following athletics events accurately on the continuum above.

A Marathon

B Shot put

C 1500 m race

[3]

(b) Justify your placement of each event on the continuum.

Marathon .....

.....

Shot put .....

.....

1500 m race.....

..... **[3]**

19 The following statement describes the lactic acid energy system.

Glycogen is broken down into glucose which is then converted into pyruvic acid in the sarcoplasm of the muscle cell. The reaction produces ATP which enables muscular contraction to take place.

(a) What type of reaction is taking place in this system – aerobic or anaerobic?

..... **[1]**

(b) Identify the substance that pyruvic acid is converted into in this system.

..... **[1]**

(c) What effect does this substance have on muscular contractions?

..... **[1]**

20 An active, healthy lifestyle has positive effects on the skeletal system but can also be potentially damaging.

Describe the benefits and drawbacks of exercise on the skeletal system.

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... **[5]**

Section C

21 A sports team that you are coaching is not taking warm ups seriously before training sessions.

Explain the effects of a warm up on the cardiovascular and muscular systems and how they may be beneficial to the individuals you are coaching.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... **[10]**

END OF QUESTION PAPER

BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE

BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE

OCR
Oxford Cambridge and RSA

SPECIMEN

Sample Assessment Material

LEVEL 3 CAMBRIDGE TECHNICAL IN SPORT AND PHYSICAL ACTIVITY

Unit 1: Body systems and the effects of physical activity

MARK SCHEME

Duration: 1 hour 30 minutes

MAXIMUM MARK 70

Question			Answer	Marks	Guidance
1			Long bone	1	
2			Sternum	1	
3			Shot put	1	
4			White blood cells	1	
5			Platelets	1	
6			Increase in the temperature of the muscles	1	
7			0.5 litres	1	
8			Minute ventilation	1	Accept minute volume
9			10 litres per minute/10,000 millilitres per minute	1	Must specify units
10			1 (ATP)	1	
11	**(a)**		A – Synovial fluid B – Joint capsule C – Articular/hyaline cartilage	3	
	(b)		1. (Ligaments) attach bone to bone/stabilise the joint/prevent dislocation 2. (Synovial membrane) secretes/produces synovial fluid/increases mobility	2	

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>12</td><td></td><td></td><td>
<table>
<tr><th>Joint</th><th>Joint movement</th><th>Muscle acting</th><th>Type of contraction</th></tr>
<tr><td>Knee</td><td>Flexion</td><td>Biceps femoris/ semimembranosus/ semitendonosus</td><td>Concentric</td></tr>
<tr><td>Hip</td><td>Flexion</td><td>Iliopsoas</td><td>Concentric</td></tr>
<tr><td>Elbow</td><td>Flexion</td><td>Biceps brachii</td><td>Isometric</td></tr>
</table>
</td><td>7</td><td>Missing words are bold and italicised in table.</td></tr>
<tr><td>13</td><td></td><td></td><td>1. (Many capillaries) means good supply of oxygenated blood to muscles
2. (Many mitochondria) means lots of sites/places where aerobic energy is produced
3. (Oxidative enzymes high) means improved ability to work aerobically
4. (Myoglobin content high) means muscles can receive more oxygen from blood
5. (Triglyceride stores high) means greater store of aerobic energy
6. (Phosphocreatine store low) means limited ability to produce energy anaerobically
7. (Muscle fibre type) has high endurance/high aerobic capacity
8. (Muscle fibre type) has high resistance to fatigue
9. (Muscle fibre type) has limited ability to produce strength/speed/power</td><td>6</td><td></td></tr>
<tr><td>14</td><td>(a)</td><td></td><td>Tricuspid valve</td><td>1</td><td></td></tr>
<tr><td></td><td>(b)</td><td></td><td>Left ventricle</td><td>1</td><td></td></tr>
<tr><td></td><td>(c)</td><td></td><td>Pulmonary artery</td><td>1</td><td></td></tr>
</table>

Question			Answer	Marks	Guidance
15			1. Arterioles to the working muscles vasodilate 2. Arterioles to non-essential organs/stomach/gut vasoconstrict 3. Precapillary sphincters to working muscles are **opened/dilated** 4. Precapillary sphincters to non-essential organs are **closed/constricted**	4	NB. Underlined words must be present in answer to gain mark. Words in bold can have acceptable alternatives i.e. synonyms.
16			A – Trachea B – Bronchiole C – Bronchus D – Alveolus	4	Accept plurals for C and D.
17	**(a)**		The diaphragm and the external intercostal muscles ***contract.*** This causes the rib cage to move ***up/upwards*** and out. The volume of the thoracic cavity ***increases.*** This means that the pressure in the lungs ***decreases***, causing air to ***enter*** the lungs.	5	Accept synonyms for missing words.
	(b)		1. (During exercise) rectus abdominus contracts 2. This helps to move the ribs downwards/inwards 3. Reduces the volume of the thoracic cavity 4. Increases the pressure in the lungs 5. Forces **more** air out of the lungs	2	For point 5 there must be a suggestion of more air leaving lungs than at rest.
18	**(a)**		A Marathon must be near to aerobic end of continuum B Shot put must be at the anaerobic end of continuum C 1500m must be in central third of continuum	3	Marathon does have some anaerobic elements.
	(b)		A Marathon an endurance event/low intensity/long duration B Shot put involves (explosive) strength/power/speed/high intensity/short duration C 1500 m race has elements of speed/muscular endurance and lower intensity/lasts more than three minutes	3	For 1500 m answer must cover both aerobic and anaerobic elements. NB. Do not accept use of 'aerobic/anaerobic' for justification, e.g. Marathon is an aerobic event.

Question			Answer	Marks	Guidance
19	**(a)**		Anaerobic	1	
	(b)		Lactic acid/lactate	1	
	(c)		Causes fatigue	1	
20			(Describe the benefits and drawbacks of exercise on the skeletal system). (benefits)(submax 3) Increased strength of bones Increased range of movement around joints Increased bone density/increased calcium/collagen storage Prevention of osteoporosis/reduced risk of (osteo)arthritis Increased stability of joint Increased strength of ligaments/connective tissue Increased thickness of articular/hyaline cartilage Improved posture/body alignment (drawbacks)(submax 3) Overuse injuries/stress fractures/tendonitis/bursitis Shin splints/Osgood Schlatters/tennis elbow/runners knee/golfers elbow Growth plate injuries Back strains/postural problems (linked to weight training or incorrect techniques) Fractures/dislocations/torn ligaments (linked to contact sports) Osteoarthritis	5	
21			Explain the effects of a warm up on the cardiovascular and muscular systems and how they may be beneficial to the individuals you are coaching.	10	
			(Cardiovascular …) 1. Light jog/cardiovascular exercise/submaximal exercise increases heart rate/stroke volume/cardiac output 2. Increases blood flow to muscles More oxygenated blood to muscles Reduced lactic acid build up in muscles Reduces DOMS/muscle soreness		**Level 3 (8–10 marks)** **A comprehensive answer:** Detailed knowledge and understanding Effective analysis/evaluation and/or discussion/explanation/development

Question			Answer	Marks	Guidance
			3. Activates vascular shunt mechanism Vasomotor (control) centre/VCC Redistributes blood from nonessential organs to the working muscles Vasodilation/vasoconstriction of arterioles Opening/closing of precapillary sphincters 4. Increases blood temperature Reduces blood viscosity Increases diffusion of oxygen from haemoglobin to muscles Steeper diffusion gradient 5. Increases venous return (skeletal) Muscle pump squeezes veins forcing blood back towards the heart (pocket) Valves in veins ensure one-way blood flow Starling's law of the heart/increased venous return increases stroke volume (muscular …) 6. Reduces risk of injury (type of injury) muscle strains/pulls/tears increased elasticity of muscle tissue 7. Increased flexibility/extensibility of muscle/connective tissue longer term/plastic effect 8. Increases temperature of muscle decreases muscle viscosity increases speed/strength of contraction 9. Increases enzyme/metabolic activity Increases ATP production Increases activation of neural pathways		Clear and consistent practical application of knowledge Accurate use of technical and specialist vocabulary High standard of written communication. **At Level 3 responses <u>are likely</u> to include:** Detailed knowledge and understanding of the effects of a warm up on both the cardiovascular and muscular systems Most points are developed Cardiac, vascular and muscular factors are both covered. **Level 2 (5–7 marks)** **A competent answer:** Satisfactory knowledge and understanding Analysis/evaluation and/or discussion/explanation/development attempted with some success Some success in practical application of knowledge Technical and specialist vocabulary used with some accuracy Written communication generally fluent with few errors. **At Level 2 responses <u>are likely</u> to include:** Satisfactory knowledge and understanding of the effects of

Question			Answer	Marks	Guidance
					a warm up on cardiovascular and muscular systems Points made but generally not developed There may be a lack of balance between the two parts of the question. **Level 1 (1–4 marks)** **A limited answer:** Basic knowledge and understanding Little or no attempt to analyse/evaluate and/or discuss/explain/develop Little or no attempt at practical application of knowledge Technical and specialist vocabulary used with limited success Written communication lacks fluency and there will be errors, some of which may be intrusive. **At Level 1 responses <u>are likely</u> to include:** Basic knowledge of the effects of a warm up on the cardiovascular and/or the muscular systems. **[0 marks]** No response or no response worthy of credit.