BLANK PAGE

SECTION A: The Skeletal System for Sports Performance

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

1 Complete **Table 1** by naming the **three** bones in the shoulder joint. 3 Q01

Joint	Name of bone
Shoulder	humerus
	scapula
	clavicle

Table 1

(Total for Question 1 = 3 marks) **3**

Carmen is a long jumper. The functions of different bone types are vital to ensure that she can participate in the long jump. Two of these bone types are short bones and sesamoid bones.

2 Explain how short bones **and** sesamoid bones support Carmen when performing the long jump. 0 Q02

Short Used for leverage, these will allow carmen to progress further in her long jump by jumping higher / further

Sesamoid the patella / knee this will allow carmen to bend her knees and jump, allowing her to get good height when travelling through the air.

(Total for Question 2 = 4 marks) **0**

Figure 1 shows a gymnast on the beam.

Figure 1

3 (a) (i) State the movement taking place at the ankle joint circled in **Figure 1**.

(1) 1 Q03ai

Plantarflexion

(ii) State the type of joint found at the ankle.

(1) 1 Q03aii

~~hinge~~ gliding

(b) State the movement taking place at the shoulder joints in **Figure 1**.

(1) 1 Q03b

~~Circumduction~~ abduction

abduction

fluid friction

bursa shock

(c) Explain why the ligaments in the knee are important when the gymnast lands from the beam.

(3) 0 Q03c

The ligaments are important, as they act as a shock absorber. The bursa acts as a shock absorber. The synovial fluid found in the synovial joint, lubricates the joint to prevent friction. The ligaments as shock absorbers are important because they prevent the gymnast from breaking a bone or injuring themselves.

(Total for Question 3 = 6 marks) 3

TOTAL FOR SECTION A = 13 MARKS

SECTION B: The Muscular System for Sports Performance

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

Figure 2 shows the muscles in the upper body.

4 Identify the muscles labelled **A–C**.

2 Q04

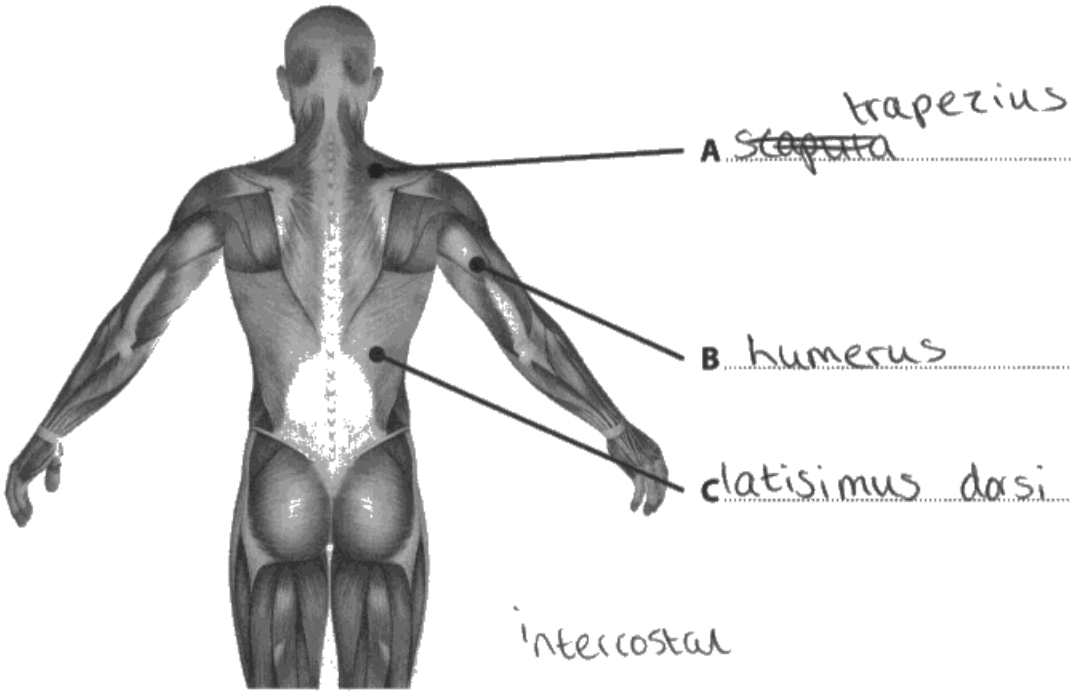
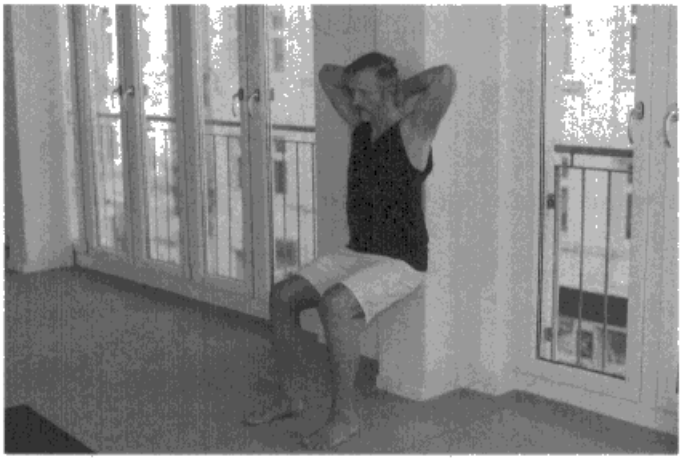


Figure 2

(Total for Question 4 = 3 marks) 2

Figure 3 shows Dave performing a wall sit.



(Source: © stockfour/Shutterstock)

Figure 3

5 Describe the type of muscle contraction taking place in Dave's quadriceps when he performs a wall sit. 0 Q05

Quadriceps are contracting concentrically as they are getting shorter while contracting.

(Total for Question 5 = 2 marks) 0

There are three muscle fibre types: Type I, Type IIa and Type IIx.

6 Explain the main fibre type used in long-distance running. 1 Q06

Type 1 is normally used as these provide energy for a long time to reduce fatigue. Type 1 doesn't have much explosive energy and is therefore used for endurance.

(Total for Question 6 = 3 marks) 1

One characteristic of cardiac muscle is that it is involuntary.

7 (a) State **one other** characteristic of cardiac muscle.

(1) 0 Q07a

Thick wall

(b) State **one** reason why it is important that cardiac muscle is involuntary.

(1) 0 Q07b

heart needs to be able to pump blood at all times

Priya is a cyclist. Over a long period of time, Priya's muscular system has adapted causing an increase in myoglobin stores. - transport + store oxygen blood

(c) Explain the impact of an increase in myoglobin stores on Priya's performance in a cycling race.

(3) 2 Q07c

Myoglobin transports and stores oxygen which will allow for more oxygen to go to the working muscles through the blood. This will allow her to work for longer without fatiguing, improving her endurance while cycling.

(Total for Question 7 = 5 marks) **2**

TOTAL FOR SECTION B = 13 MARKS

SECTION C: The Respiratory System for Sports Performance

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

Figure 4 is an incomplete flow diagram of the route that air passes through when breathing in.

8 Identify the **three** respiratory structures needed to complete the flow diagram shown in **Figure 4**. 3 Q08

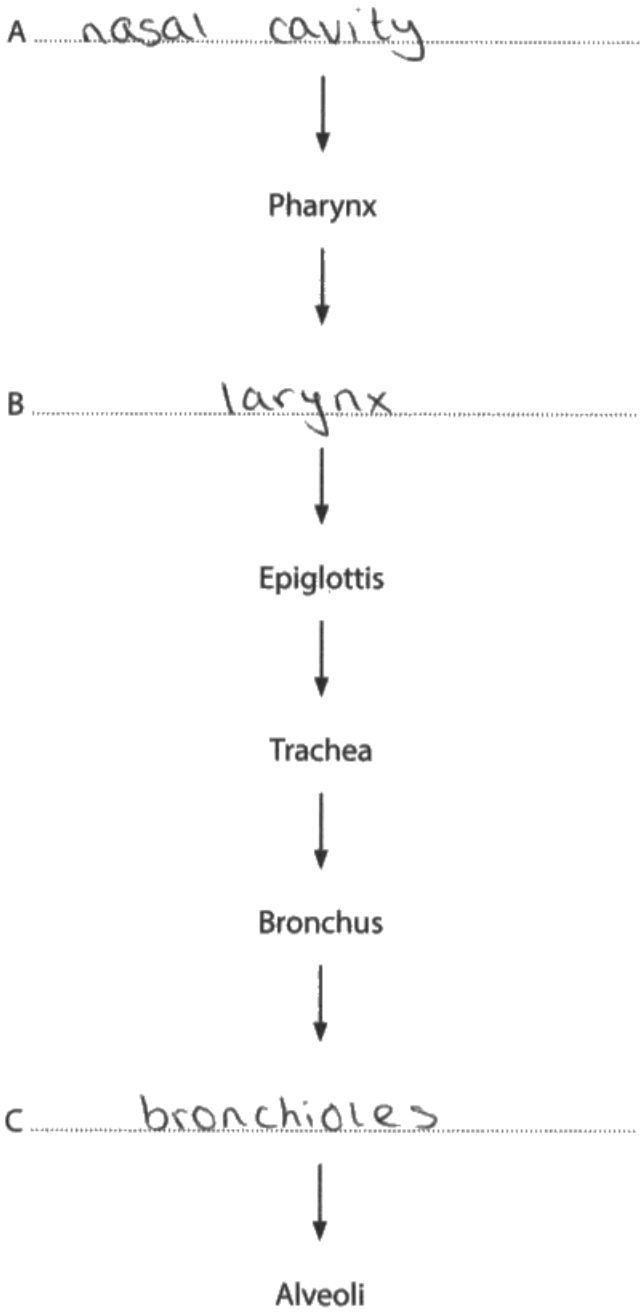


Figure 4

(Total for Question 8 = 3 marks) 3

9 (a) Describe how the medulla oblongata increases breathing rate during exercise.

(2) 0 Q09a

The medulla oblongata sends signals and receives signals telling it that the body needs more oxygen. Therefore, breathing rate increases during exercise as a result of needing more oxygen to go to the working muscles.

(b) (i) Describe the process of diffusion of carbon dioxide at the alveoli.

(4) 1 Q09bi

During inhalation, O_2 goes to the alveoli where it diffuses in + out with the capillaries carrying CO_2. Diffusion happens across a high concentration gradient. O_2 diffuses into the capillaries to head to working muscles and CO_2 diffuses into the alveoli, to be exhaled as a waste product.

(ii) Describe the role of the internal intercostal muscles during expiration when exercising.

(2) 0 Q09bii

The internal intercostal muscles are found in the ribs and they relax during expiration to move ribcage down and release CO2.

Dexter is a hockey player. He has completed a continuous training programme over a number of weeks. He now runs for 45 minutes, five times a week.

His training has led to an increase in the oxygen diffusion rate at his muscles.

- gaseous exchange

(c) Assess the effect of an increase in oxygen diffusion rate at his muscles on Dexter's hockey performance.

(6) 3 Q09c

An increase in diffusion rate allows for more oxygen to go to the working muscles in order to provide energy and prevent fatigue. This will allow for dexter to play for longer at a higher intensity during his hockey match. Oxygen diffusion rate at the muscles has happened as due to his continuous training, he has now got a denser capillary network as a result of capillarisation.

(Total for Question 9 = 14 marks) 4

TOTAL FOR SECTION C = 17 MARKS

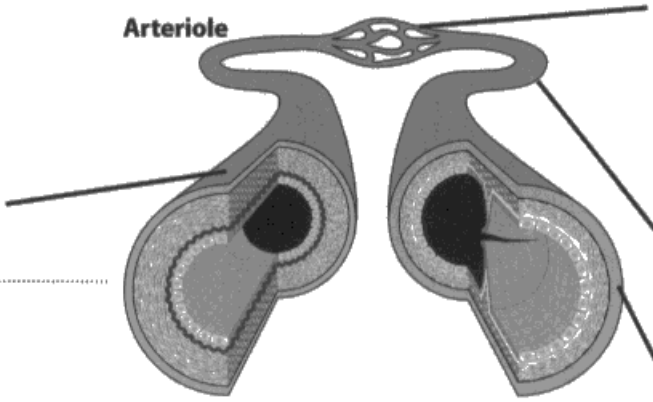
SECTION D: The Cardiovascular System for Sports Performance

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

Figure 5 shows the various types of blood vessel.

2 Q10

10 Name the blood vessels labelled **A–D** in **Figure 5.**



A artery

B capillary

C vein

D venule

(Source: © Blamb/Shutterstock)

Figure 5

(Total for Question 10 = 4 marks) 2

Emma is a netballer. During a match some of her blood vessels vasodilate.

11 (a) Explain why vasodilation helps Emma perform in the netball match on a very hot day.

(2) 1 Q11a

Blood vessels getting larger
Allow for more oxygen, preventing fatigue
Help reduce temperature to ensure she doesn't overheat

During the match, one response of Emma's cardiovascular system is redirection of blood flow.

(b) State **three other** responses of the cardiovascular system during the match.

(3) 2 Q11b

1 increased Stroke volume
2 increased BPM
3 increased cardiac output

(Total for Question 11 = 5 marks) **3**

12 Describe the role of the tricuspid valve in the cardiac cycle. 2 Q12

Tricuspid valve found between the right atrium and right ventricle. It stops the backflow of blood so that once it travels into the Ventricle, it doesn't seep back into the atrium.

(Total for Question 12 = 2 marks) **2**

Semi lunar valve

Leah is a footballer. She relies on her cardiovascular system to allow her to play a full match. 4 Q13

13 Analyse the flow of blood as it returns to the heart through the vena cava until it is pumped out to the body **and** how this helps Leah last the full match.

Once it reaches the vena cava, it travels into the right atrium, through the tricuspid valve and into the right ventricle. It then travels through the pulmonary artery to the lungs where gaseous exchange takes place, which allows for ~~the~~ the blood to be oxygenated. It then returns through the pulmonary ~~vein~~ artery into the left atrium and travels through the bicuspid valve into the left ventricle where it then gets pushed up through the semi lunar valve to the aorta where it travels through veins to head towards the working muscles to provide them with oxygen. This will allow Leah to last the full match as it prevents fatigue.

(Total for Question 13 = 6 marks) **4**

TOTAL FOR SECTION D = 17 MARKS

SECTION E: Energy Systems for Sports Performance

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

14 State the **two** by-products of the electron transport chain. 0 Q14

1 lactic acid

2 CO_2

(Total for Question 14 = 2 marks) 0

15 Describe the process of **anaerobic** glycolysis. 10-45 sec 0 Q15

Anaerobic glycolysis lasts 10-45 seconds ~~and this is where~~ Due to it being anaerobic, this is where lactic acid builds up.

(Total for Question 15 = 4 marks) 0

Erin is a rugby player. She has been training for five years. Over this time her aerobic energy system has adapted.

16 Assess the impact of adaptations to the aerobic energy system on Erin's rugby performance. 1 Q16

Aerobic glycolysis, kreb cycle, electron transport chain

Capillarisation, allowing for more CO_2 + O_2 to be diffused, allowing for more oxygen to go to working muscles. Allowing Erin to work for longer, without fatiguing.

(Total for Question 16 = 6 marks) 1

TOTAL FOR SECTION E = 12 MARKS

BLANK PAGE

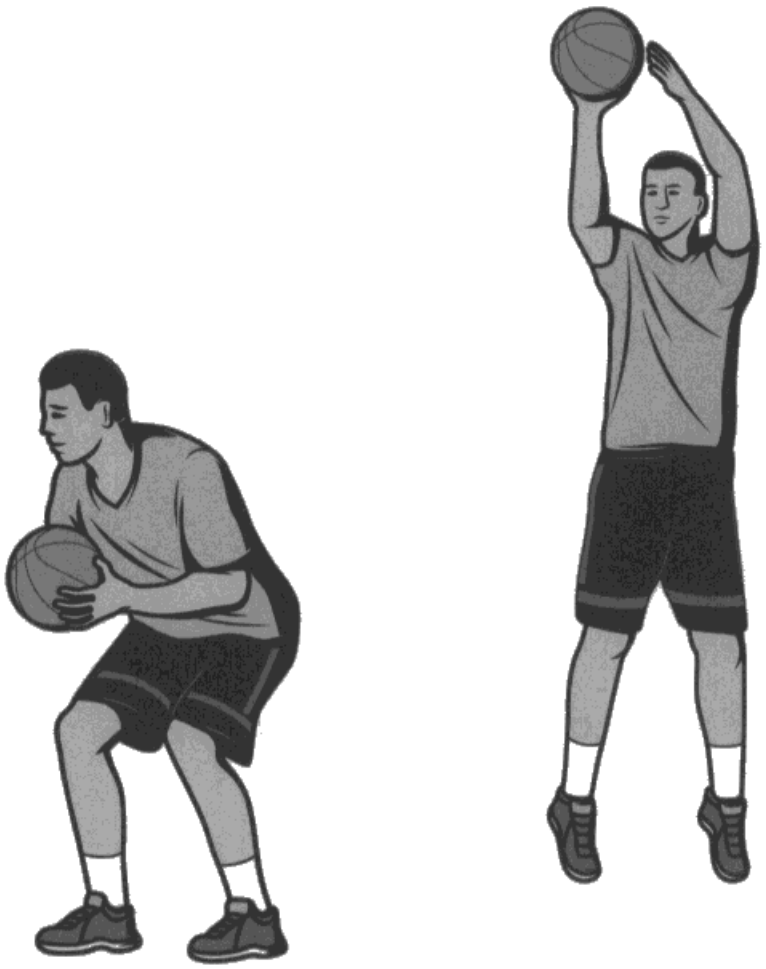
QUESTION 17 BEGINS ON THE NEXT PAGE.

SECTION F: Interrelationships between Body Systems for Sports Performance

Answer the question. Write your answer in the space provided.

Josh is a basketballer.

Figure 6 shows the preparation phase (position A) and the shooting phase (position B) of his jump shot.



Position A Position B

(Source: © Seamartini/Alamy Stock Vector)

Figure 6

17 Analyse how the skeletal and muscular systems interact to enable movement of the knee, hip and elbow from position A to position B in **Figure 6**.

(8) 3 Q17

The knee is a sesamoid bone, this will allow for the legs to bend and straighten when needing to jump. In order to jump the quadriceps will contract in position A while

the hamstrings relax, where as in position B the quadriceps will relax while the hamstrings contract.* The patella is a hinge joint and flexion is performed in position A and extension in position B. The hip/pelvis is a ball and socket joint and ~~this allows~~ in position A it is performing flexion ~~where~~ as he is bent over, where as in position B, it is showing ~~Fle~~ extension as he is straight up.
The elbow is made up of the humerus, radius and ulna and it is a hinge joint. During position A ~~it is~~ the elbow is performing flexion as the arm is bent where as in position B, it is performing extension as the arms are straight. This allows for Josh to get better aim when shooting and be closer to the net to try and shoot.

*This allows Josh to jump higher and be closer to the net, in order to increase his likelihoodness of shooting.

(Total for Question 17 = 8 marks) 3

TOTAL FOR SECTION F = 8 MARKS
TOTAL FOR PAPER = 80 MARKS