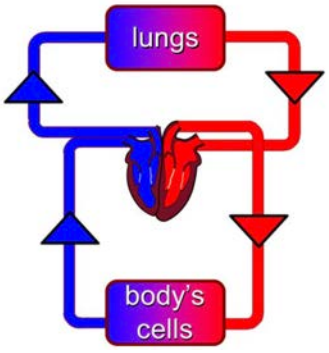
CARDIOVASCULAR AND RESPIRATORY SYSTEM (1.1D)

What do I need to know?	How do I feel about this?		
	Confident	Average	Unsure
Know the double circulatory system (pulmonary and systemic).			
Know types of blood vessel (arteries, capillaries and veins).			
Understand the pathway of blood through the heart (atria, ventricles, septum) Valves: bicuspid, tricuspid and semilunar Major blood vessels: aorta, pulmonary artery, vena cava, and pulmonary vein.			
Know the definition of heart rate, stroke volume and cardiac output.			
Know the role of red blood cells.			
Understand the pathway of air through the respiratory system (nose, mouth, trachea, bronchi, bronchiole, alveoli)			
Know the roles of the respiratory muscles in breathing (diaphragm / intercostal).			
Know the definitions of tidal volume, breathing rate and minute ventilation.			
Understand about alveoli at the sight of gaseous exchange.			
Know the definitions of aerobic and anaerobic exercise.			
Be able to apply practical examples of aerobic and anaerobic exercise in relation to intensity and duration.			

DOUBLE CIRCULATORY SYSTEM

What does this mean?



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What does the pulmonary system do?

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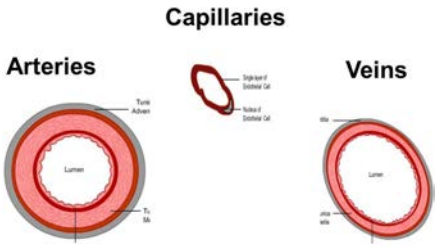
What does the systemic system do?

……

BLOOD VESELS

What is the role of:



Arteries?

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……

……

Capillaries?

……

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……

Veins?

……

……

……

KEY TERMS

Write down the definition of:

Heart Rate

……

Stroke Volume

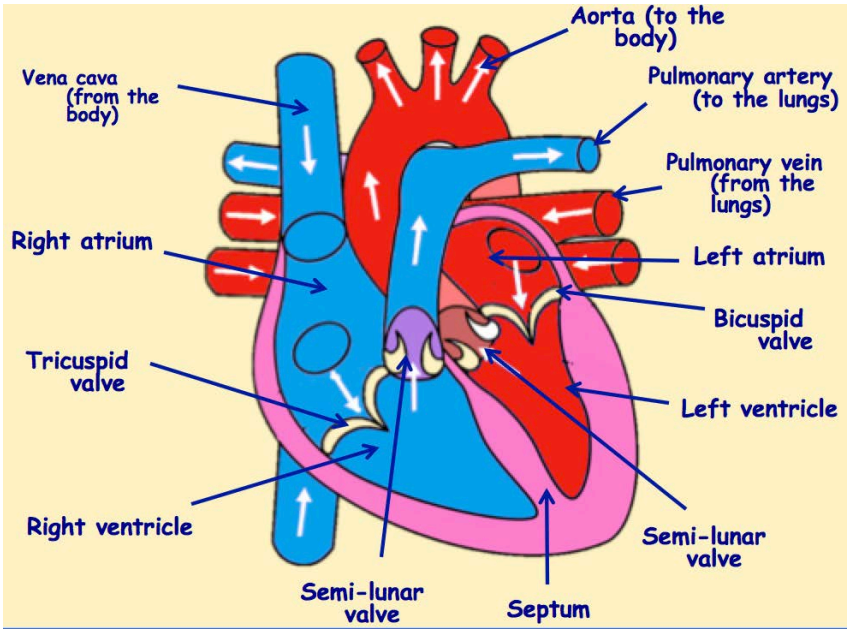
……

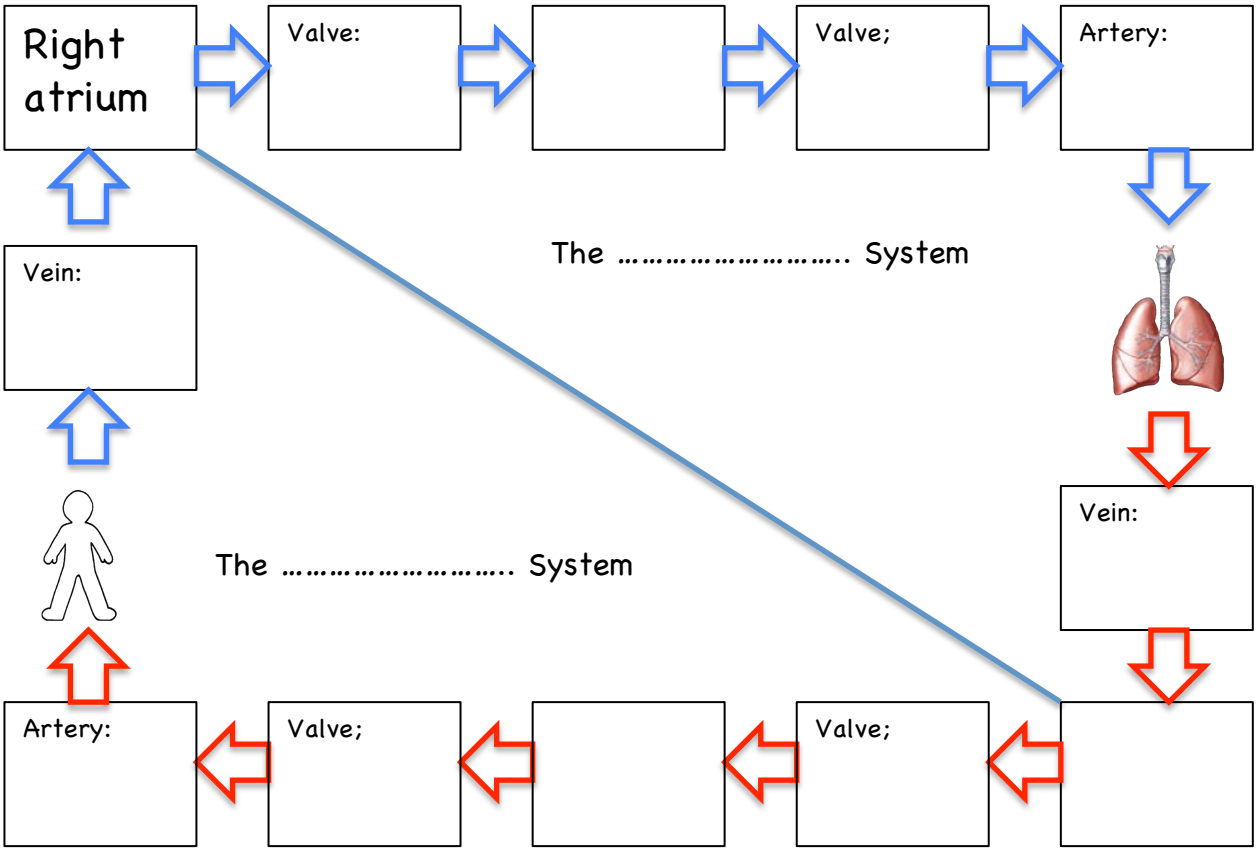
Cardiac Output

……

PATHWAY OF BLOOD AROUND THE HEART

Write down the pathway of blood around the heart using the diagams below. Label the systemic and pulmonary system, use colour to indicate if blood is oxygenated or deoxygenated.





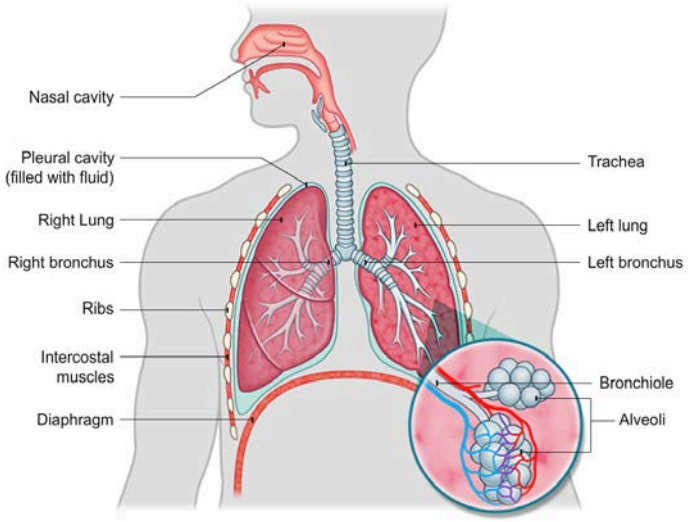
RED BLOOD CELLS

What are the roles of red blood cells?

……

PATHWAY OF AIR THROUGH THE RESPIRATORY SYSTEM

In the boxes below write down the pathway of air through the respiratory system.



Nose / Moth	⇨		⇨		⇨		⇨	

KEY TERMS

Write down the definition of:

Minute Ventilation

……

Tidal Volume

……

Breathing Rate

……

ROLES OF THE RESPIRATORY MUSCLES IN BREATHING

What are the two muscles?

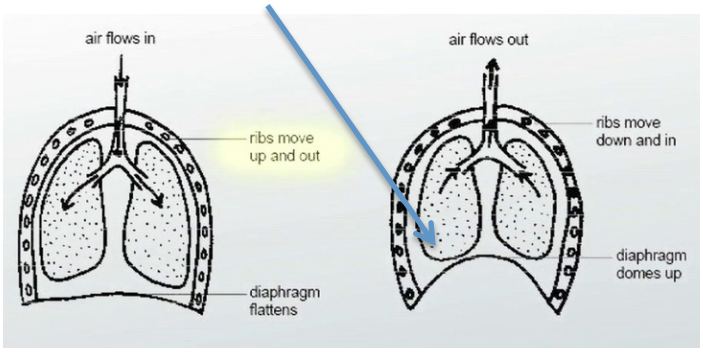
……

What can they do?

……

If you are asked to write about inspiration or expiration always remember four things: **M**uscles, **M**ovement, **V**olume and **P**ressure. (Michael McIntyre's Very Pleasant!)

When breathing out the diaphragm makes a sad face!



INSPIRATION (IN)

Muscles: diaphragm and intercostals ……

Movement: The rib cage moves ……
The diaphragm ……

Volume: The volume ……

Pressure: The pressure: ……

So air moves ……

Imagine your lungs filling up with air.

EXPIRATION (OUT)

Muscles: diaphragm and intercostals ……

Movement: The rib cage moves ……
The diaphragm ……

Volume: The volume ……

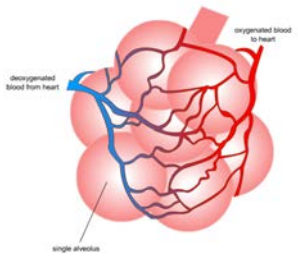
Pressure: The pressure: ……

So air moves ……

Imagine your lungs when empty.

GASEOUS EXCHNAGE

Explain what happens at the alveoli during gasesous exchange.



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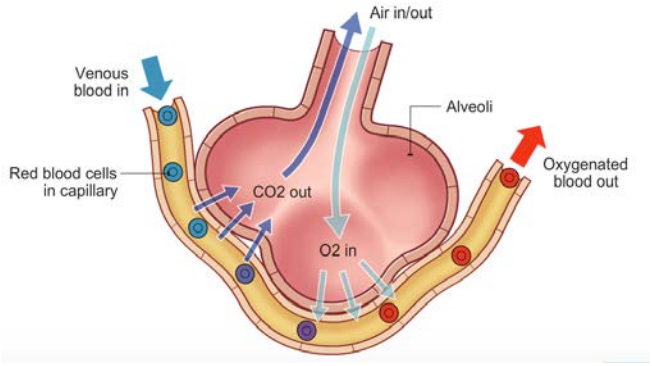

AEROBIC TRAINING

What is this? Give a sporting example.

……

……

……

ANAEROBIC TRAINING

What is this? Give a sporting example.

……

……

CARDIOVASCULAR AND RESPIRATORY SYSTEM EXAM QUESTIONS

Answer **all** the questions.

1. Which one of the following best describes anaerobic training?

(a) Sprinting during interval training ☐

(b) Long intervals of moderate exercise ☐

(c) Swimming over a long distance ☐

(d) A ten mile jog along local roads ☐

[1]

2. Fig. 2 below shows the passage of air from when oxygen is breathed in through the mouth or nose until oxygen is passed to the red blood cells.

Put the following words in the correct order to complete Fig. 2.
Bronchi
Alveoli
Trachea
Bronchiole

Fig. 2

Fig. 2

[1]

3. Describe **one** role of red blood cells during exercise.

[1]

4. Arteries have a thick layer of muscle compared to the thin muscular walls of veins.
Other than thickness, describe **two** other differences between arteries and veins.

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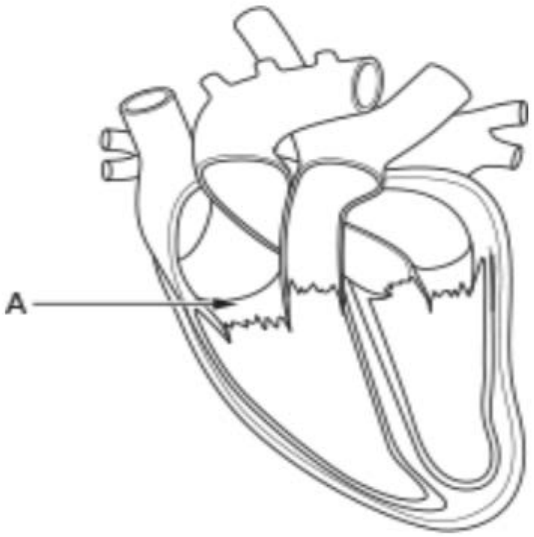
[2]

5(a). Draw and label an arrow on **Fig. 2** below, indicating the location of the aorta in the heart.

Fig. 2



[1]

(b). Arrow A in **Fig. 2** above shows the location of the tricuspid valve.
Describe the function of the tricuspid valve.

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[1]

6. The heart is divided into the left and right ventricles, which prevents the mixing of oxygenated and deoxygenated blood.

Name the part of the heart that allows this to happen.

---

[1]

7. Describe the role of the diaphragm during inspiration and expiration whilst taking part in physical activity.

---

[2]

8. The heart is responsible for pumping blood around the body.

Describe how the double circulatory system performs this function.

---

[4]

9. Give **one** practical example of an anaerobic physical activity.

____

[1]

10. Describe what happens during inspiration.

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____

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[4]

11. Describe what happens at the alveoli during gaseous exchange.

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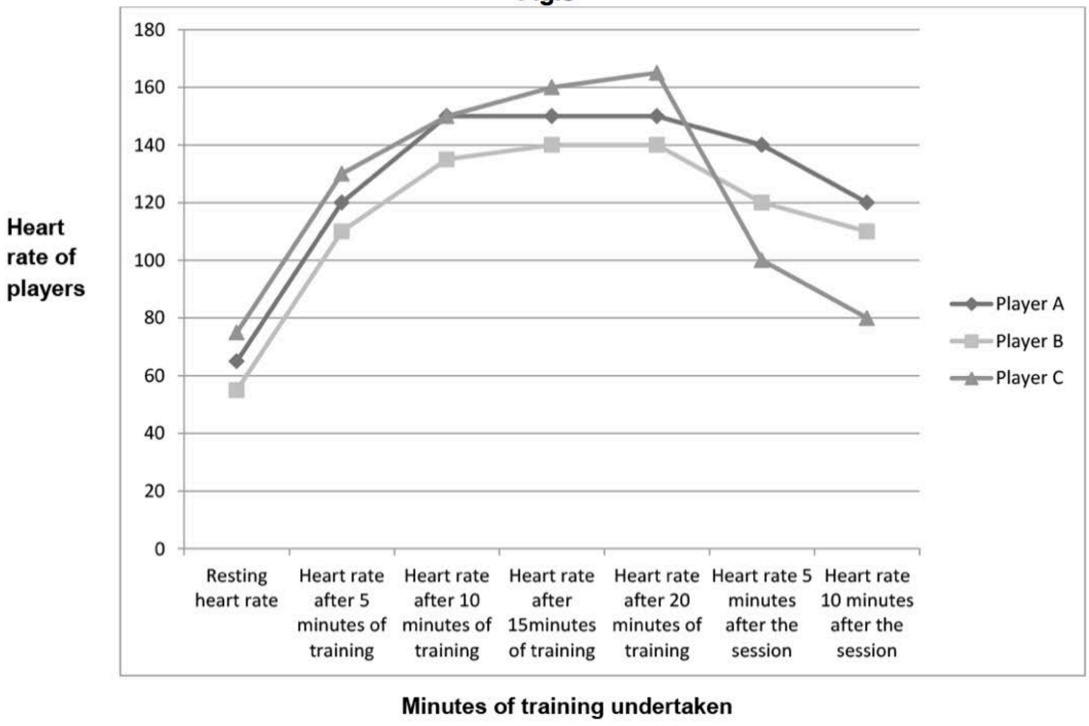
12. As part of their 8 week pre-season football training programme, players are monitored in terms of the changes in heart rate that occur during and after a training session.

Fig. 3 shows a graph of heart rate results for three players during the first training session of the programme.

Fig.3



Using the information in Fig.3, analyse the players' fitness levels, performance in training and recovery.

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_ _

_ _

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[3]

EFFECTS OF EXERCISE ON BODY SYSTEMS (1.1E)

What do I need to know?	How do I feel about this?		
	Confident	Average	Unsure
Understand the short term effects of exercise on: • Muscle temperature • Heart rate, stroke volume, cardiac output • Redistribution of blood flow during exercise • Tidal volume, respiratory rate, minute ventilation • Oxygen to the working muscles • Lactic acid production			
Apply the effects of short-term exercise to examples in sport.			
Be able to collect and use data relating to the short-term effects of exercise.			
Understand the long term-effects of exercise on: • Bone density • Hypertrophy of muscle • Muscular strength • Muscular Endurance • Resistance to fatigue • Hypertrophy of the heart • Resting heart rate / stroke volume • Cardiac output • Rate of recovery • Aerobic capacity • Respiratory muscles • Tidal volume and minute ventilation • Capilliarisation			
Apply the effects of long-term exercise to examples in sport.			
Be able to collect and use data relating to the long-term effects of exercise.			

SHORT TERM EFFECTS OF EXERCISE

Write down the short-term effects of exercise on:

Muscle temperature

……

Heart rate

……

Stroke volume

……

Cardiac output

……

Tidal volume

……

Respiratory (breathing) rate

……

Minute ventilation

……

What else happens?
Oxygen to the working muscles
Lactic acid production

What is the vascular shunt?
It is the redistribution of blood flow during exercise to the working muscles.

LONG TERM EFFECTS OF EXERCISE

Write down the long-term effects of exercise on:

Bone density

……

Muscles

……

Muscular strength

……

Muscular Endurance

……

Resistance to fatigue

……

The heart

……

Resting heart rate

……

Stroke volume

……

Cardiac output

……

Rate of recovery

……

Aerobic capacity

……

Respiratory muscles

……

Tidal volume

……

Minute ventilation

……

Capilliarisation

……

What else happens?

Overall the cardiovascular and respiratory systems become more **efficient** which means the body can supply more oxygen to the working muscles and performers can work at a **higher intensity** and **duration**, so their performance is better.

EFFECTS OF EXERCISE EXAM QUESTIONS

Answer **all** the questions.

1. Which one of the following is a long-term effect of exercise on the muscular system?

(a) An increase in tidal volume in muscles ☐

(b) A decrease in blood flow to muscle fibres ☐

(c) An increase in muscle fatigue ☐

(d) An increase in tolerance to lactic acid ☐

[1]

2. When does the build-up of lactic acid occur? Identify **two** effects of the build-up of lactic acid.

---

[3]

3. Describe **three** long-term effects of exercise on the heart and **three** long-term effects of exercise on the lungs.

Long-term effects of exercise on the heart

1)

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2)

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3)

Long-term effects of exercise on the lungs

1)

2)

3)

[6]

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

(a) Decrease in stroke volume ☐

(b) Increase in the temperature of the muscles ☐

(c) Decrease in blood flow from the heart ☐

(d) Increase in muscle mass ☐

[1]

5. Which one of the following is an effect of lactic acid?

(a) Gives you a feeling of excitement ☐

(b) Causes extreme hunger pains ☐

(c) Helps to create oxygen in the lungs ☐

(d) Causes muscle fatigue during exercise ☐

[1]

6. Using practical examples, describe the redistribution of blood during exercise.

[5]

7. Which one of the following is a long-term effect of exercise on the respiratory system?

(a) Increase in stroke volume ☐

(b) Increase in tidal volume ☐

(c) Decrease in minute volume ☐

(d) Decrease in rate of recovery ☐

[1]

8. Which one of the following is an example of a long term effect of exercise on the heart?

(a) Increase in tidal volume ☐

(b) Decrease in resting heart rate ☐

(c) Increase in heart disease ☐

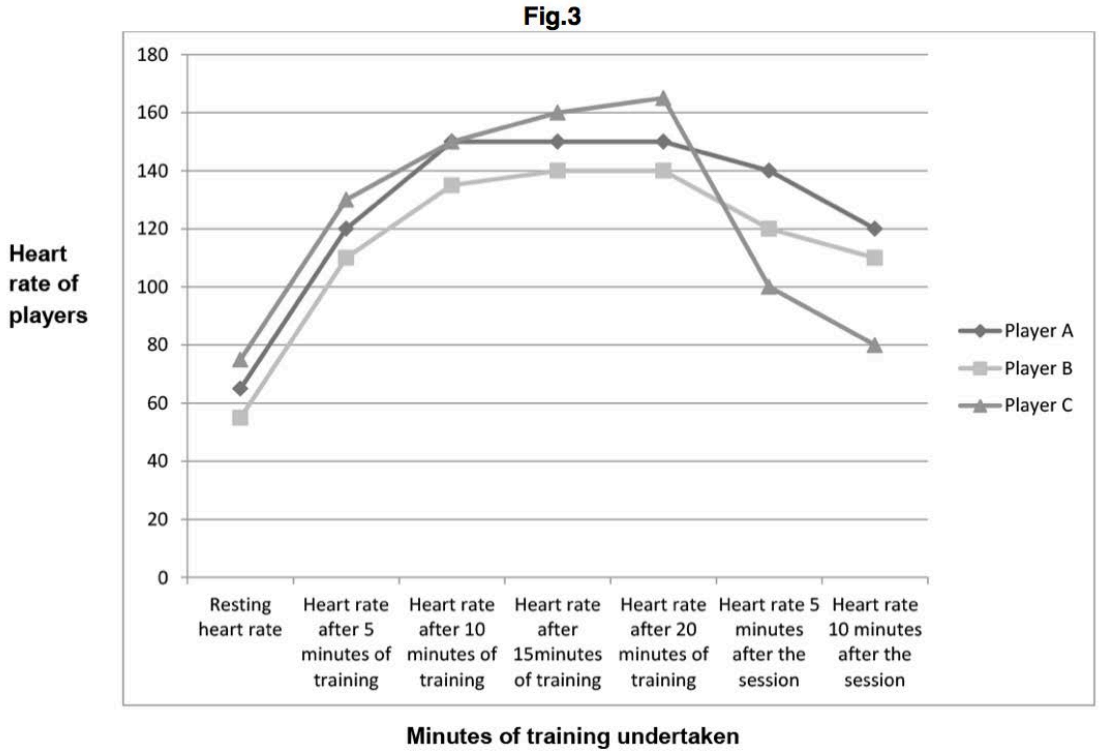
(d) Decrease in stroke volume ☐

[1]

9(a). As part of their 8 week pre-season football training programme, players are monitored in terms of the changes in heart rate that occur during and after a training session.

Fig. 3 shows a graph of heart rate results for three players during the first training session of the programme.

Fig.3



Describe **two** short term effects which the pre-season training programme could have on the players' hearts.

1

2

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[2]

(b). Evaluate how the long term effects of exercise on the muscular system could be beneficial to a footballer.

---

[5]

10. Explain what heart rate means and give and describe what a lower resting heart rate could indicate.

[2]

11. A short-term effect of exercise is the hypertrophy of muscle.

Is this statement true or false? Draw a circle around your answer.

True False

[1]

12. Which one of the following is a short term effect of exercise on muscles?

(a) An increase in muscle temperature ☐

(b) A decrease in hypertrophy of muscle fibres ☐

(c) An increase in rate of recovery ☐

(d) A decrease in minute volume ☐

[1]

END OF QUESTION PAPER