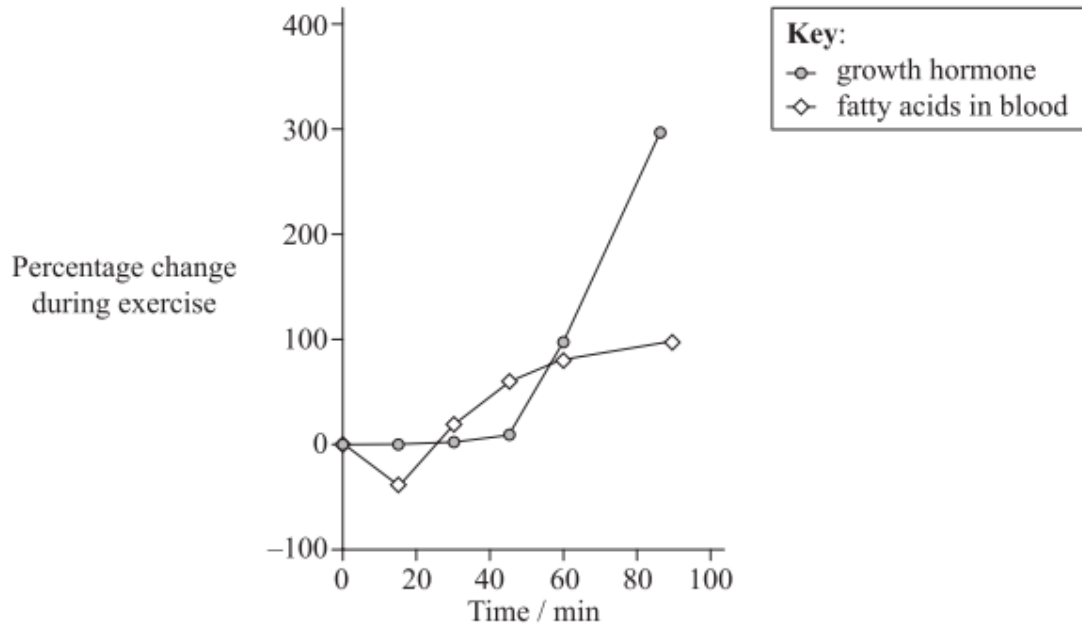


**Option D — Human physiology**

20. The graph shows the responses in levels of growth hormone and free fatty acids to relatively intense exercise combining aerobic and anaerobic components.



[Source: adapted, by permission, from J.H. Wilmore and D.L. Costill, (2004), *Physiology of Sport and Exercise*, 3rd ed., (Champaign, IL: Human Kinetics), page 178]

(a) Identify the level of growth hormone after one hour of exercise. [1]

.....  
.....  
.....  
.....

(Option D continues on the following page)



*(Option D, question 20 continued)*

- (b) (i) State **one** reason that motivates some athletes to take growth hormones. [1]

.....

- (ii) State **one** risk associated with the use of growth hormones in sports. [1]

.....

- (c) Suggest **one** possible use of fatty acids during exercise. [1]

.....  
.....

- (d) Testosterone is a steroid hormone. Outline the mechanism by which steroid hormones affect target cells. [2]

.....  
.....  
.....  
.....

*(Option D continues on the following page)*



*(Option D continued)*

21. (a) The liver produces cholesterol. State **two** other functions of the liver. [2]

1. .... .....
2. .... .....

(b) Compare and contrast cholesterol produced by the liver and dietary cholesterol. [2]

..... ..... ..... .....
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*(Option D continues on the following page)*



(Option D, question 21 continued)

- (c) The CAT scan shows a patient who has a blocked bile duct.



[Source: adapted from <http://upload.wikimedia.org/wikipedia/commons/4/4c/Obstructivebiliarydilation.png>]

The blockage of the bile duct causes a build-up of bilirubin in the blood.

- (i) State **one** consequence of a build-up of bilirubin in the blood. [1]

.....

- (ii) State **one** other possible cause for the build-up of bilirubin in the blood. [1]

.....

(Option D continues on the following page)



*(Option D continued)*

22. The X-ray shows the legs of a young boy who suffers from rickets.



[Source: [www.millathomeopathy.com/images/disease-cd-rickets.jpg](http://www.millathomeopathy.com/images/disease-cd-rickets.jpg)]

(a) State the symptom of rickets evident in the X-ray. [1]

.....

(b) State the main cause of rickets. [1]

.....

(c) Identify **one** vitamin and **one** hormone that are based on a steroid ring. [2]

Vitamin: .....

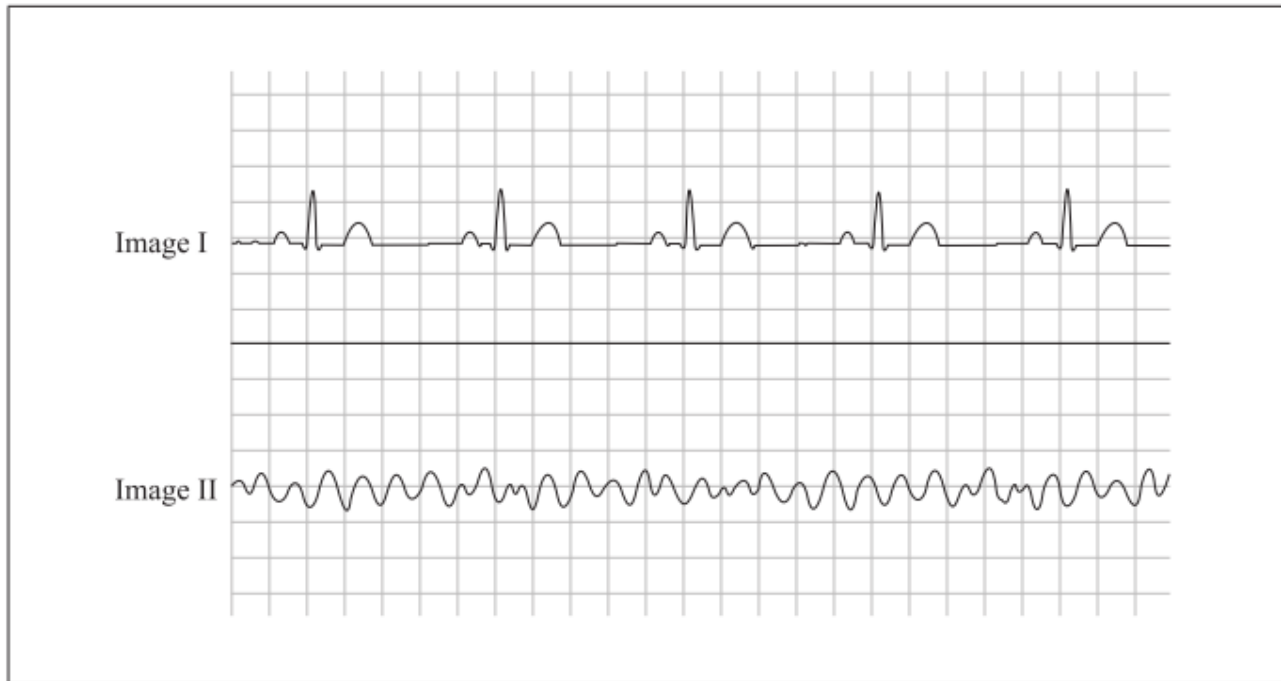
Hormone: .....

*(Option D continues on the following page)*



(Option D continued)

23. Image I represents a normal heart rhythm and image II represents an abnormal heart rhythm.



[Source: adapted from [www.homeheart.co.uk/ecg\\_example.jpg](http://www.homeheart.co.uk/ecg_example.jpg)]

(a) State the name given to the abnormal rhythm pattern. [1]

.....

(b) State a **named** technique used to restore the normal heart rhythm. [1]

.....

(c) Annotate image I to indicate **one** phase where the atrium is contracting and **one** phase where the ventricle is contracting. [2]

(Option D continues on the following page)



40EP37

Turn over

*(Option D, question 23 continued)*

(d) State **one** unique characteristic of cardiac muscle cells.

[1]

..... .....
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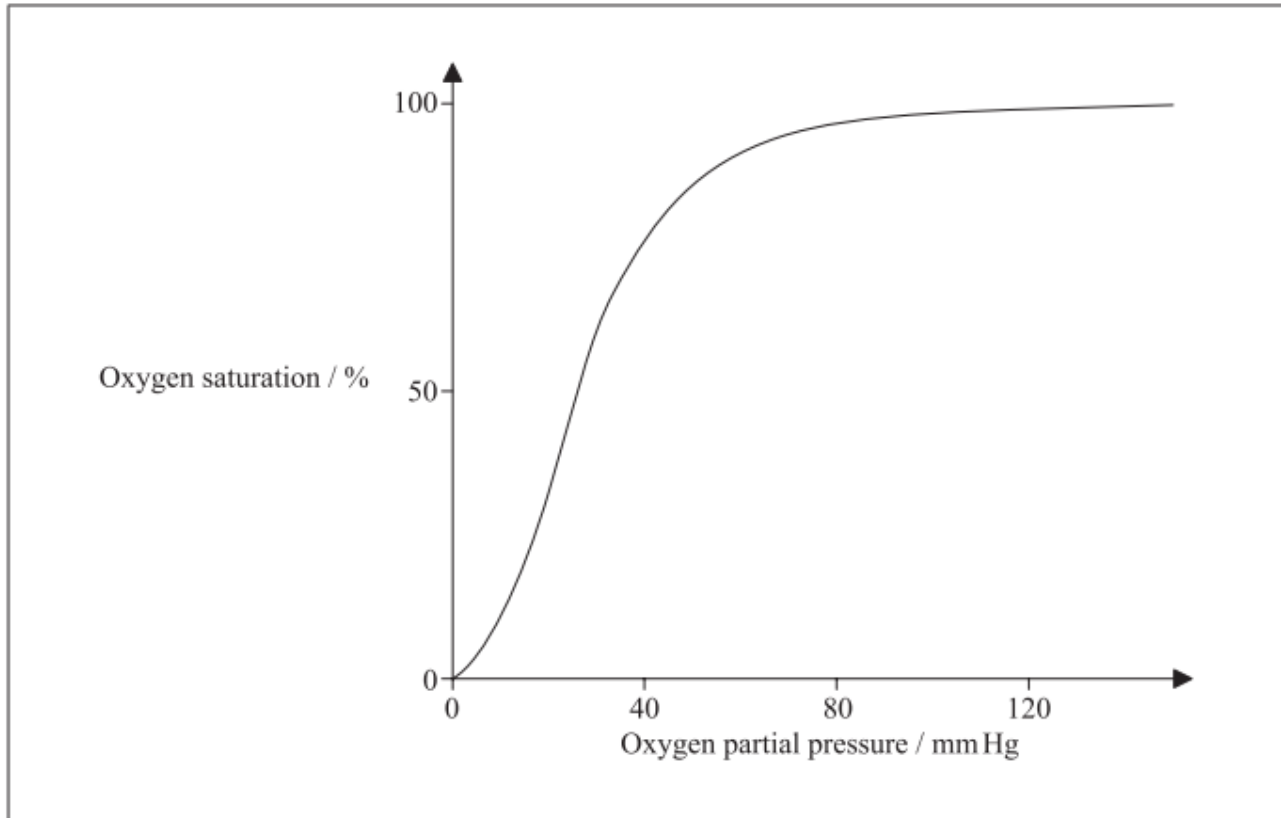
*(Option D continues on the following page)*





(Option D continued)

24. Gas exchange between maternal blood and fetal blood occurs in the placenta. The graph shows the dissociation curve of oxygen from the mother.



- (a) State which mineral ion is found in hemoglobin. [1]

.....

- (b) On the graph, draw the dissociation curve for fetal hemoglobin. [2]

(Option D continues on the following page)





