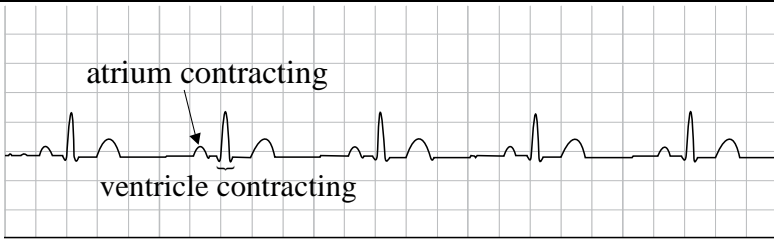


Option D — Human physiology

Question		Marking point	Answers	Notes	Total
20.	a		100 % <greater than initial level> ✓		1
	b	i	build more muscle ✓		1
	b	ii	thyroid damage <i>OR</i> elevated cholesterol <i>OR</i> liver damage ✓		1
	c		source of energy <i>OR</i> used when glycogen stores are running out ✓		1
	d		<i>a</i> fat soluble so can pass through plasma membrane ✓		2 max
			<i>b</i> bind to receptors in the cytoplasm to form receptor-hormone complex ✓		
			<i>c</i> initiate transcription of specific genes ✓		

Question		Marking point	Answers	Notes	Total
21.	a		<i>a</i> detoxifies blood ✓		2 max
			<i>b</i> breaks down erythrocytes ✓		
			<i>c</i> excess cholesterol is converted to bile salts ✓		
	b		<i>a</i> liver decreases synthesis of cholesterol when dietary cholesterol rises ✓		2 max
		<i>b</i> dietary cholesterol inhibits enzyme catalyzing liver cholesterol synthesis ✓			
		<i>c</i> cholesterol from both sources used in body to waterproof skin/synthesize vitamin D/synthesize steroid hormones ✓			
	c	i	jaundice ✓		1
	c	ii	<i>a</i> any cause of increase rate of hemolysis ✓		1 max
			<i>b</i> malaria ✓		
			<i>c</i> genetic ✓		
			<i>d</i> defects in bilirubin metabolism ✓		
			<i>e</i> cirrhosis ✓		
22.	a		<i>a</i> bowed legs <i>OR</i> soft bones ✓		1 max
			<i>b</i> lack of mineralization ✓		
	b		lack of vitamin D/calcium ✓		1

(Question 22 continued)

Question		Marking point	Answers	Notes	Total
	c	a	vitamin: vitamin D ✓		2
		b	hormone: testosterone/androgen/estrogen/progesterone ✓		
23.	a		arrhythmia OR ventricular fibrillation ✓		1
	b		defibrillation ✓		1
	c		image I 		
		a	atrium contracting correctly marked on image ✓		2
		b	ventricle contracting correctly marked on image ✓		
	d		myogenic contractions OR branched ✓		1

Question		Marking point	Answers	Notes	Total
24.	a		iron ✓		1
	b				
		<i>a</i>	correct position to left of adult hemoglobin ✓		2
		<i>b</i>	shape similar to adult hemoglobin ✓		

Question		Marking point	Answers	Notes	Total
25.		<i>a</i>	CO ₂ combines in RBCs with H ₂ O to produce carbonic acid/H ₂ CO ₃ ✓		6 max
		<i>b</i>	catalysed by carbonic anhydrase ✓		
		<i>c</i>	⟨carbonic acid⟩ dissociates to form hydrogencarbonate ions and hydrogen ions/HCO ₃ ⁻ + H ⁺ ✓		
		<i>d</i>	dissociation of carbonic acid is a reversible reaction so can act as a buffer ✓		
		<i>e</i>	$H_2CO_3 \rightleftharpoons H^+ + HCO_3^-$ ✓		
		<i>f</i>	hydrogencarbonate ions move out of RBCs by facilitated diffusion ✓		
		<i>g</i>	the carrier protein moves a chloride ion/Cl ⁻ into RBC ✓		
		<i>h</i>	chloride shift keeps charge balance across membrane stable ✓		
		<i>i</i>	in low pH, tendency to dissociate will be low and equation will shift to left/less hydrogencarbonate plus hydrogen ions formed ✓		
		<i>j</i>	in high pH, tendency to dissociate will be high and equation will shift to right/more hydrogencarbonate plus hydrogen ions formed ✓		
		<i>k</i>	hemoglobin can act as a buffer combining with hydrogen ions to produce hemoglobinic acid ✓		