First Semester

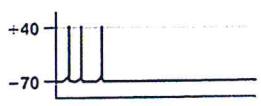
Biology

(الأحياء)

(Answers)

Note: Answer guide in (8) sheets. Total marks:70

Part 1: Multiple Choice **Each Question: 1 mark** **Total: 14 marks**

Q	Ch	Answer	Page Cambr	Page Hodd	Outcome	Level of learning
1	1	RNA modification.	152	132	1.4.3	Knowledge
2		transcribed DNA | RNA strand | RNA polymerase | 3'	151-152	131 - 132	1.4.1	Application
3		2 and 4	145	121	1.1.2	Application
4		*the leading strand is synthesized in the same direction as the DNA unwinding* | *In the lagging strand the newer Okazaki fragments are added closer to the position of DNA unwinding*	149-150	125	1.2.1	Reasoning
5	2	locus	433	344	2.2.1	Knowledge
6		Next stage: Telophase I | Chromosome set: Haploid	431	346	2.1.4	Application
7	3	cDNA	547	460	3.2.1	Application
8		Both insulin and β-glucosidase will not be produced.	552	464	3.2.2	Reasoning
9	4	blood to filtrate.	356	304	4.1.6	Knowledge
10		X: distal convoluted tubule | Y: proximal convoluted tubule	354	303	4.1.5	Application
11		Stomatal aperture: opens | Potassium ion (K^+) direction movement: from epidermal cell to guard cell	374	313	4.4.2	Application
12	5	A	390	320	5.2.1	Knowledge
13		Neurone (1)  | Neurone (2) 	397	325	5.2.2	Reasoning
14		X: Non-Myelinated | Y: Myelinated	398-399	326	5.2.5	Application

Part 2: Extended Response Chapter 1 (15 marks): 5 Knowledge 7 Application 3 Reasoning

Q		Answer	Mark	Page		outcome	Level of learning
				Cambr	Hodd		
15	a.	**(i)** Sugar **OR** pentose **OR** deoxy ribose. ***(1 mark)***	1	145	122	1.1.1	Knowledge
		(ii) The sugar molecule of one nucleotide bonds with a phosphate group of the next nucleotide. ***(1 mark)*** To link each nucleotide with the adjacent nucleotide on DNA strand to form the backbone of the DNA. ***(1 mark)***	2	145 148	123	1.1.3	Knowledge Application
		(iii) (**L**): Cytosine / C ***(1 mark)*** (**T**): Adenine / A ***(1 mark)***	2	148	123	1.1.2	Application
	b.	**(i)** Translation.	1	153	134	1.4.1	Knowledge
		(ii) Because mRNA always begins with a start codon that codes for methionine.	1	151	131	1.4.1	Knowledge
		(iii) - Degenerate **OR** redundant **OR** most amino acids are coded by more than one codon. ***(1 mark)*** - If substitution mutation occurs the amino acid may not alter because of this feature. ***(1 mark)***	2	151 151	131 131	1.3.1 1.3.1	Application Reasoning
	c.	Because in eukaryotes the initial mRNA contains coding exons and non-coding introns ***(1 mark)***. The introns are removed and exons are only used in protein synthesis. ***(1 mark)***.	2	152	132	1.4.3	Reasoning
16	a.	Frame shift mutations.	1	155	138	1.5.2	Knowledge
	b.	GCU	1	151	131	1.4.1	Application
	c.	**(i)** TTC	1	153-154	135-136	1.4.1	Application
		(ii) Val	1	153-154	135-136	1.4.1	Application

Part 2: Extended Response. Chapter 2 (8 marks): 2 Knowledge 4 Application 2 Reasoning

Q		Answer	Mark	Page		outcome	Level of learning
				Cambr	Hodd		
17	a.	Epistasis.	1	445	362-363	2.4.3	Reasoning
	b.	- Rrli - White	2	445	362-363	2.4.3	Application
	c.	Rl , Ri , rl, ri	1				
18	a.	Structural gene: Code for proteins used by the cell. Regulatory gene: Control the expression of the gene.	2	453-454	375	2.6.1	Knowledge
	b	**(i)** RNA polymerase.	1	453-454	375	2.6.1	Application
		(ii) The RNA polymerase cannot bind to DNA at the promoter region; as a result, the transcription will not take place.	1	454	375	2.6.1	Reasoning

Part 2: Extended Response. Chapter3 (9 marks): 3 Knowledge 4 Application 2 Reasoning

Q		Answer	Mark	Page		outcome	Level of learning
				Cambr	Hodd		
19	a.	Step 3.	1	555	461	3.3.1	Application
	b.	Primer DNA is added after cooling which matches the end sequence of the DNA fragment to be copied.	1	555	461	3.3.1	Application
	c.	**(i)** Separation of chains will not occur **or** DNA will not denature.	1	555	461	3.3.1	Reasoning
		(ii) DNA polymerase can not begin synthesising DNA without an existing strand on which to build.	1				
20	a.	**(i)** 2 ***(1 mark)*** All of the nucleotide sequences matched the length of the cs sequences. ***(1 mark)***	2	557	468	3.3.2	Application
		(ii) Separation occurs by the size, small particles can move quickly, whereas larger molecules move much more slowly.	1	557	468	3.3.2	Knowledge
	b	**(i)** To make crops resistant to insect pests.	1	571	484	3.5.1	Knowledge
		(ii) ***Only one of the following:*** - The evolution of resistance by insect pests. - A damaging effect on other insect species. - The transfer of the added gene to other plant species.	1	571	484	3.5.1	Knowledge

Part 2: Extended Response. Chapter 4 (11 marks): 3 Knowledge 6 Application 2 Reasoning

Q		Answer	Mark	Page		outcome	Level of learning
				Cambr	Hodd		
21	a.	(W) distal convoluted tubule. ***(1 mark)*** (Y) Cortex. ***(1 mark)***	2	354	304	4.1.5	Application
	b.	Make it more permeable to water than usual.	1	310	361	4.2.1	Application
	c.	From (X) to medulla. ***(1 mark)*** The water potential decreases and the Na^+ ion concentration increases in the cells which cause the release of ADH. ***(1 mark)***	2	360-361	310	4.2.1	Reasoning
22	a	**(i)** Pancreas.	1	367	297	4.3.2	Knowledge
		(ii) G-protein.	1	367	297	4.3.2	Application
		(iii) Initiation of an enzyme cascade **OR** activation of the protein kinase which leads to an enzyme cascade.	1	367	297	4.3.2	Application
		(iv) The biosensor reading will be higher because the glucose concentration will increase in the blood.	1	367	297	4.3.2	Application
	b	Contain the glucose oxidase and peroxidase enzymes, ***(1 mark)*** which catalyses the glucose in chemical reactions into glucenic acid and hydrogen preoxides. The peroxidase catalyses the result to form brown compound. ***(1 mark)***	2	369	299	4.3.3	Knowledge

Part 2: Extended Response. Chapter 5 (13 marks):4 Knowledge 7 Application 2 Reasoning

Q		Answer	Mark	Page		outcome	Level of learning
				Cambr	Hodd		
23	a.	<table><tr><th></th><th>Nervous system</th><th>Endocrine system</th></tr><tr><td>Transmission method</td><td>Electrically **OR** electrical pulses</td><td>Chemically **OR** hormones</td></tr><tr><td>Transmission speed</td><td>quick</td><td>slow</td></tr></table> "Electrically **OR** electrical pulses" **and** "Chemically **OR** hormones" ***(1 mark)*** "quick" **and** "slow" ***(1 mark)***	2	388-389	318-319	5.1.1	Knowledge
	b.	**(i)** Auxin.	1	415-416	339	5.4.1	Application
		(ii) ***Any three of the following (in correct sequence):*** When auxin binds to the receptor, ***(1 mark)*** it leads to the activation of the membrane protein ***(1 mark)***, which stimulates proton pumping into the cell wall, ***(1 mark)*** where the lower PH break bonds ***(1 mark)*** wall resistance to stretching is decreased ***(1 mark)*** and the turgor of the cell causes stretching/elongation of the cell wall. ***(1 mark)***	3	415-416	339	5.4.1	Application
24	a.	Calcium ions bind to troponin, so the binding sites are exposed, ***(1 mark)*** which allows actin to act with myosin. ***(1 mark)***	2	410-411	334	5.3.2	Knowledge
	b.	motor neurone.	1	390-391	320	5.2.1	Application
	c.	Filament (**C**): Doesn't change. ***(1 mark)*** Filament (**D**): Becomes shorter/closer/narrower. ***(1 mark)***	2	410	331-332	5.3.2	Application
	d.	Blocks the transmission of impulse. ***(1 mark)*** Because it blocks the receptor to bind to Ach. ***(1 mark)***	2	403-404	326-328	5.2.7	Reasoning

END OF THE MARKING GUIDE

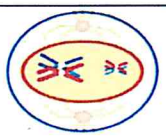
نموذج إجابة امتحان دبلوم التعليم العام- المدارس الخاصة
للعام الدراسي: 1444هـ - 2024/2023م
الفصل الدراسي: الأول - الدور: الثاني
المـادة: الأحيـاء

مركز القياس والتقويم التربوي
The Center for Educational Assessment and Measurement (CEAM)

سلطنة عمان
وزارة التربية والتعليم

Note: Answer guide in (7) sheets. Total marks: 70

Part 1: Multiple Choice Each Question: 1 mark Total: 14 marks

Q	Ch	Answer	Page		Outcome	Level of learning
			Cambr	Hodd		
1	1	Translation	152	134	1.4.1	Knowledge
2		3 → 4 → 1 → 2	149	125	1.2.1	Application
3		The enzyme ligase joins the disconnected fragments of the developing mRNA.	151	131	1.4.2	Application
4		Anticodons are found on rRNA and amino acids are added accordingly and joined with a peptide bond	152-153	134-36	1.4.1	Reasoning
5	2	loss of normal protein's function	451-452	369-371	2.5.1	Knowledge
6			430-431	346-347	2.1.4	Application
7	3	Transcription will not take place	552	464	3.2.2	Application
8		fragment: R; direction: - → +	557	468	3.3.2	Reasoning
9	4	Blood cells	357	305	4.1.6	Knowledge
10		Mechanism: Secondary active transport; Explanation: Diffuses the molecules down the concentration gradient	357	305	4.1.6	Application
11		A decrease of water potential in the body cell	361	310-311	4.2.1	Application
12	5	Allows another action potential to generate during this period.	397	325	5.2.4	Knowledge
13		Z: W; Ca^+: ACh	402-403	327-328	5.2.7	Application
14		C	410	334	5.3.2	Reasoning

Part 2: Extended Response

Chapter 1 (15 marks): 5 Knowledge 7 Application 3 Reasoning

Q		Answer	Mark	Page Cambr	Page Hodd	Out come	Level of learning
15	a	**(i)** F	1	149 - 150	125 - 126	1.2.1	Application
		(ii) Okazaki fragment	1				
		(iii) ligase	1				
	b	<table><tr><td></td><td>DNA</td><td>mRNA</td></tr><tr><td>Shape</td><td></td><td>Single strand</td></tr><tr><td>Unique nitrogen base</td><td>Thymin[1]</td><td>Uracil[2]</td></tr><tr><td>Type of genetic code</td><td>Triplet code</td><td>codon</td></tr></table> One mark for each cell. [1]: if the students mentioned all of the four bases of DNA including thymine this is also a correct answer. [2]: if the students mentioned all of the four bases of RNA including uracil this is also a correct answer.	5	149	128	1.4.1	Knowledge
	c	**(i)** Molecule B (**1 mark**), because it has more G-C pairs and therefore more Hydrogen bonds (**1 mark**).	2	148	123	1.1.3	Reasoning
16	a	**(i)** mRNA modification	1	152	133	1.4.3	Application
		(ii) It copies the information found in the DNA molecule to the mRNA molecule.	1	151	131	1.4.1	Application
		(iii) Because they do not have coding sequence or codons. **Or** they have non-sense codons.	1	152	133	1.4.3	Application

	b	**(i)** This will change the sequence of amino acids in the protein and therefore will change its primary structure	1	152 - 154	134 - 136	1.4.1	Application
		(ii) Will alter the function of the protein or the protein may become nonfunctional.	1	152 - 154	134 - 136	1.4.1	Reasoning

Part 2: Extended Response.

Chapter2 (8 marks): 2 Knowledge 4 Application 2 Reasoning

Q		Answer	Mark	Page		Out come	Level of learning
				Cambr	Hodd		
17	a	**(i)** Dihybrid cross	1	441	360	2.4.2	Knowledge
		(ii) RrLl	1	437	357	2.3.1	Application
		(iii) Black lobed tail	1	441 - 443	360-361	2.4.2	Application
	b	<table><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td>1. rrLl</td></tr><tr><td></td><td>2. Rrll</td><td></td></tr></table> One mark for individual 1. and another mark for individual 2.	2	437 444	352 360-361	2.3.1 2.4.3	Application
18	a	Enables the transcription of the enzymes that are needed to digest the lactose.	1	453 - 455	375	2.6.2	Knowledge
	b	Lactose will not be able to bind to the repressor protein **(1 mark)** and the cell will not be able to use lactose when glucose is absent **(1 mark)**.	2	453 - 455	375	2.6.2	Reasoning

Part 2: Extended Response.

Chapter3 (9 marks): 3 Knowledge 4 Application 2 Reasoning

Q		Answer	Mark	Page		Out come	Level of learning
				Cambr	Hodd		
19	a	To denature DNA / separate DNA chains.	1	555	461	3.3.1	Application
	b	step 3 (**1 mark**) Because it is heat-stable that isn't destroyed by a high temperature. (**1 mark**)	1	556	461	3.3.1	Application
	c	To begin synthesising DNA .	2	556	461	3.3.1	Application
20	a	**(i)** It help couples to assess how likely they are to have children who have cystic fibrosis (if they are a carrier).	1	564 - 565	474	3.4.2	Knowledge
		(ii) B (**1 mark**) Thick layer of mucus outside means the CF protein is not functional. (1 **mark**)	2	564	474	3.4.2	Reasoning
	b	GM salmon Herbicide resistant sugar beet crop Insect-resistant crop such as cotton (**Any two**) (**1 mark each**)	2	570 - 571	484 - 486	3.5.1	Knowledge

Part 2: Extended Response.

Chapter 4 (11marks): 3 Knowledge 6 Application 2 Reasoning

Q		Answer	Mark	Page		outcome	Level of learning
				Cambr	Hodd		
21	a	Glomerulus.	1	354	303	4.1.6	Application
	b	Salt, ions, amino acids (any **two**).	2	354	304 - 305	4.1.6	Application
	c	Will decrease (**1 mark**). The blood pressure will be less (**1 mark**).	2	354	304	4.1.6	Reasoning
22	a	**(i)** Negative feedback	1	364	294	4.3.1	Knowledge
		(ii) B-cells	1	364	296	4.3.1	Application
		(iii) No glycogen breakdown. Increased uptake and use of glucose.	2	364	296	4.3.1	Application
	b	The K^+ channel will open causing K^+ ions to diffuse in to the guard cells down an electrochemical gradient. H2O will move to the guard cell by osmosis down the water potential gradient, causing an opening of the stomata aperture	2	374	313 - 314	4.4.3	Knowledge

Part 2: Extended Response.

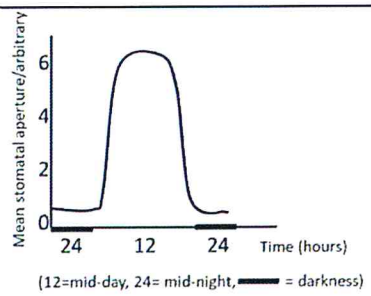
Chapter 5 (13 marks):4 Knowledge 7 Application 2 Reasoning

Q		Answer	Mark	Page Cambr	Page Hodd	Out come	Level of learning
23	a	i. Transmission method: nervous system transmitted the impulse chemically but the endocrine system transmitted it by blood. ii. Transmission speed: nervous system transmitted impulse more rapidly than the endocrine system.	1 1	388-389	318 - 319	5.1.1	Knowledge
	b	**(i)** Period (1): during resting potential the ions channel Na^+ ions and K^+ are both closed. **(ii)** Period (2): Na^+ channels open and Na^+ ions rush in (by diffusion).	1 1	393-396	324	5.2.4	Knowledge
24	a	**(i)** Sensory neurone	1	390-391	320	5.2.1	Application
		(ii) (Y) cell body (**1 mark**) (w) myelin (**1 mark**)	2	391	320	5.2.1	Application
		(iii) Action potential (**1 mark**) Because the voltameter shows -55 Mv (**1 mark**)	2	392-393	323	5.2.3	Reasoning
	b	**(i)** Taste bud	1	401	322	5.2.3	Application
		(ii) Sensory neuron (**1 mark**) Because it carries the impulse from the chemoreceptor to the brain (**1 mark**).	2	400-401	322	5.2.3	Application
		(iii) Entry of calcium ion stimulates the movement of vesicles and the release of neurotransmitter. This leads to action potential if stimulation is above threshold.	1	401	322	5.2.3	Application

END OF THE MARKING GUIDE

MARKING GUIDE

Part 1: Multiple Choice Each Question: 1 mark Total: 14 marks

Q	Ch	Answer	Outcome	Page Number		Level of learning
				Cambr	Hodd	
1	1	The link reaction	1.2.1	315	251	Knowing
2		8 | 8 | 8	1.2.2	314	250	Applying
3		Pathway 1: B | Pathway 2: A	1.1.8	323-324	246-259	Applying
4		4	1.2.6	316-318	252-254	Reasoning
5	2	CO_2 is reduced.	2.1.7	337-339	280	Knowing
6		Calvin cycle | photolysis | Calvin cycle	2.1.6 2.1.7	340-341	282-285	Applying
7		plant X | plant X	2.2.2	340-341	283	Reasoning
8	3	Distal convoluted tubule.	3.1.13	354	303	Knowing
9		an increase in the level of insulin represented by curve **A**.	3.1.7	365	296	Applying
10			3.1.18	372-374	312-313	Applying
11	4	W and Z.	4.1.2	389	319	Knowing
12		depolarisation | Na^+ ions in | repolarisation | K^+ ions out	4.1.10	396	324	Applying
13		Synaptic knob | Vesicle | Dendrite | Neurotransmitter	4.1.13	390	327	Applying
14		Z → Y → X	4.1.6	393	321	Reasoning

Part 2: Extended Response (56 marks) **Chapter 1** (14 marks)

Q		Answer	Mark	Page Cambr	Page Hodd	outcome	Level of learning
15 (5m)	a.	Synthesis of ATP by using energy provided directly by chemical reaction (involving substrate).	1	313	250	1.1.12	Knowing
	b.	**(i)** glycolysis **(ii)** pyruvate	2	314	250	1.2.1	Applying
	c.	**(i)** provides electrons and hydrogen protons for electron transport chain **(ii)** 6 ATP	2	316	252	1.2.5 1.2.6	Applying
16 (5m)	a.	Source of energy.	1	312	240	1.1.11	Knowing
	b.	**(i)** ADP **(ii)** O_2	1 1	312 316	242 249	1.1.11 1.2.5	Applying
		(iii) glucose will not pass through the mitochondrial membrane. **OR** the enzymes required for glycolysis are located in the cytoplasm only. **(iv)** pyruvate.	1 1	319	257	1.2.3 1.2.6	Reasoning
17 (4m)	a.	Lactate fermentation.	1	321	259	1.2.9	Knowing
	b.	shortage of Oxygen. **OR** absence of Oxygen.	1	320	259	1.2.9	Knowing
	c.	**(i)** 2NAD **(ii)** because of Oxygen debt (more oxygen is required to oxidize or remove lactate) which is harmful to muscle cells.	2	321	260	1.2.9	Applying

***Chapter 1** (14 marks): 4Knowing 8Applying 2Reasoning*

C. Part 2: Extended Response. **Chapter 2** (13 marks)

Q		Answer	Mark	Page Cambr	Page Hodd	outcome	Level of learning
18 (6m)	a.	**(i)** Thylakoid membrane **OR** grana. And lamellae (Any of them).	1	334	269	2.1.3	Knowing
		(ii) Absorb light to excite electrons for photophosphorylation.	1	334	270-273	2.1.3	Knowing
		(iii) Chromatography.	1	335	271-273	2.1.5	Knowing
	b.	**(i)** (X): Light-independent reactions. (Y): Light-dependent reactions.	2	339	275 280	2.1.2	Applying
		(ii) Starch grains.	1	339	280	2.1.5	Knowing
19 (7m)	a.	Photosystem I: ATP; Photosystem I & II: ATP and reduced NADP	4	337-338	277-279	2.1.6	Applying
	b.	GP: decreases. TP: decreases. RuBP: increases.	3	339	280	2.1.7	Reasoning

***Chapter 2** (13 marks): 4Knowing 6Applying 3Reasoning*

C. Part 2: Extended Response. Chapter 3 (15 marks)

Q		Answer	Mark	Page Cambr	Page Hodd	outcome	Level of learning
20 (5m)	a.	**(i)** The control of blood glucose concentration. **(ii)** insulin.	2	349	291	3.1.1	Knowing
	b.	- L - M	2	365, 367	296	3.1.7	Applying
	c.	The body will not be able to bring the glucose level up to normal in the blood through) gluconeogenesis / glycogenolysis when there is shortage of glucose supply.	1	365	296	3.1.6	Reasoning
21 (6m)	a.	high temperature. **OR** very dry weather. **OR** less water availability in soil \ drought.	1	375	313 -314	3.1.18 3.1.17	Knowing
	b.	guard cells.	1				
	c.	(T): Ca^{+2} (W): anions e.g. Cl^- or negatively charged ions (X): K^+	3	375	314	3.1.19	Applying
	d.	because it will lead to low uptake of CO_2 and this might lead to low rates of photosynthesis. **OR** it might reduce the rate of photosynthesis.	1	371-372	313-314	3.1.16	Reasoning
22 (4m)	a.	proximal convoluted tubule.	1	354	303	3.1.13	Knowing
	b.	A: facilitated diffusion. B: active transport.	2	357	305	3.1.14	Applying
	c.	lower reabsorption rate. **OR** slower reabsorption. **OR** inefficient reabsorption.	1	357	305-306	3.1.14	Reasoning

Chapter 3 *(15marks): 5Knowing 7Applying 3Reasoning*

C. Part 2: Extended Response. Chapter 4 (14 marks)

Q		Answer	Mark	Page Cambr	Page Hodd	outcome	Level of learning
23 (6m)	a.	sensory neurone.	1	389	320	4.1.4	Applying
	b.	(Z) terminal branches OR dendrites (Y) node of Ranvier.	2	390	320	4.1.2	Knowing
	c.	The electrical resistance of the myelin sheath prevents depolarisations. Consequently, the action potentials are forced to jump from node to node.	2	391	326	4.1.12	Applying
	d.	To provide ATP for sodium-potassium pump.	1	393	323	4.1.10	Reasoning
24 (8m)	a.	**(i)** Embryo synthesizes gibberelline in response to water uptake.	1	417	340	4.2.4	Applying
		(ii) X: gibberelline Y: starch Z: maltose	3	417	340	4.2.4	Applying
	b.	**(i)** A: Sarcomere. B: Z line.	2	409	331	4.1.18	Knowing
		(ii) Calcium ions bind to troponin. This stimulates troponin molecules to remove the blocking molecules tropomyosin, so the binding sites are exposed to charged myosin head.	2	411	332	4.1.19	Reasoning

Chapter 4 *(14 marks): 4Knowing 7Applying 3Reasoning*

END OF MARKING GUIDE

Note: Answer guide in (5) sheets. Total marks: 70

Question 1: Multiple Choice — Each Question: 1 mark — Total: 14 marks

Q	Ch	Answer	Outcome	Page Number		Level of learning
				Cambr	Hodd	
1	1	ribose	1.1.11	312	242	Knowing
2		0.696	1.1.17	323	246-247	Applying
3		The CO_2 produced will cause swelling and rising of dough.	1.2.8	320	259	Applying
4		4	1.2.6	318	260	Reasoning
5	2	ATP is produced.	2.1.6	337-339	275	Knowing
6		Calvin cycle | Calvin cycle	2.1.6+7	340-341	283-284	Applying
7		Light intensity | Temperature	2.2.2	340-341	284	Reasoning
8	3	re-absorption of water by creating osmotic gradient	3.1.14	358	306	Knowing
9		Exit of the proton particles labeled (W) against their concentration gradient.	3.1.18	374-375	313-314	Applying
10		The stomatal apertures are opened during the day with maximum size at midday.	3.1.16	373	312-313	Applying
11	4	X and Y.	389	319	4.1.2	Knowing
12		Repolarisation | Refractory period | Resting potential	4.1.10	396	324	Applying
13		Cell body | Axon | Dendrites	4.1.3	390	320	Applying
14		Controls the response to environmental stress.	4.2.2	415	337	Reasoning

Question 2: Extended Responses. (56 marks) Chapter 1 (14 marks)

Q		Answer	Mark	Page		outcome	Level of learning
				Cambr	Hodd		
15 (5m)	a.	The link reaction	1	315	249	1.2.3	Knowing
	b.	(L): O_2 (M): reduced NAD	2	314-315	250	1.2.6	Applying
	c.	(R): CO_2 (S): water	2	316-318	257	1.2.6	Applying
16 (5m)	a.	The inner membrane of mitochondria	1	316	252	1.2.6	Knowing
	b.	(X): ADP (Y): ATP	2	317-318	245, 254	1.1.14	Applying
	c.	**(i)** 56 molecules. One molecule of glucose produces 28 molecule of ATP by chemiosmosis from reduced NAD and reduced FAD. 2 molecules of glucose. 2*28 = 56 ATP molecules **(ii)** pyruvate	1 1	318 320-321	260 259	1.2.6 1.2.8	Reasoning
17 (4m)	(a)	102 molecules.	1	323	246-247	1.1.17	Knowing
	(b)	A greater proportion of hydrogen atoms in their molecules.	1	322	247	1.1.15	Knowing
	(c)	RQ = no. of CO_2/ no. of O_2 *(1 mark)* 102/145 = 0.7 *(1 mark)*	2	323	246	1.1.17	Applying

***Chapter 1** (14 marks): 4Knowing 8Applying 2Reasoning*

Question 2: Extended Responses. Chapter 2 (13 marks)

Q		Answer	Mark	Page		outcome	Level of learning
				Cambr	Hodd		
18 (4m)	a.	Stroma.	1	337	275	2.1.2	Applying
	b.	Light-independent reactions.	1	333	269	2.1.2	Applying
	c.	increases.	1	339	280	2.1.7	Reasoning
	d.	12	1	290	270	2.1.7	Reasoning
19 (3m)		- Water is photolyzed to produce electrons and hydrogen ions to reduced NADP.	1	338	277	2.1.6	Knowing
		- Carbon fixation.	1	339	280	2.1.7	Knowing
		- Absorb light to excite electrons for photophosphorylation.	1	338	276	2.1.3	Applying
20 (6m)	a.	W: H_2O X: O_2 Y: reduced NADP	3	339-340	280	2.1.7	Applying
	b.	Stroma.	1	333	269	2.1.2	Knowing
	c.	Photolysis.	1	338	277	2.1.6	Knowing
	d.	because respiration uses oxygen.	1	338	277	2.1.6	Reasoning

***Chapter 2** (13 marks): 4Knowing 6Applying 3Reasoning*

Question 2: Extended Responses. Chapter 3 (15 marks)

Q		Answer	Mark	Page Cambr	Page Hodd	outcome	Level of learning
21 (5m)	a.	- Pituitary gland - Aquaporin	2	360-362	308-311	3.1.15	Knowing
	b.	- T - S	2	361-362	311	3.1.15	Applying
	c.	- It will stimulate the secretion of ADH	1	360-362	308-311	3.1.15	Reasoning
22 (10m)	a.	**(i)** monitor the glucose level in the urine.	1	349	293	3.1.2	Knowing
		(ii) diabetes mellitus.	1	368	299	3.1.8	Knowing
		(iii) (X): glucagon. (Y): liver (Don't accept muscles). (Z): conversion of glycogen to glucose.	3	365	296	3.1.7	Applying
		(iv) Because the muscle cells are in continuous need of glucose to provide energy through respiration	1				Reasoning
	b.	**(i)** To detect the presence of glucose in urine.	1	368	299	3.1.9	Knowing
		(ii) K: glucose oxidase L: peroxidase	2	368-9	299-300	3.1.9	Applying
		(iii) less Oxygen is available on elevated places. Therefore, less oxidation rate of glucose will affect the results and will show less H_2O_2 and will result in a color falsely indicating less glucose. **OR** less glucose will be detected in the sample and may cause false negative result.	1	369	300	3.1.9	Reasoning

***Chapter 3** (15marks): 5Knowing 7Applying 3Reasoning*

Question 2: Extended Responses. Chapter 4 (14 marks)

Q		Answer	Mark	Page Cambr	Page Hodd	outcome	Level of learning
23 (6m)	a.	(X): Sensory neurone. (Y): Motor neurone.	1 1	393	321	4.1.4	Applying
	b.	**Rapid**: Only involves three neurones and a few synapses. *(1mark)* **Automatic;** does not necessarily involve passage to brain / only spinal cord. *(1 mark)*	2	393	321	4.1.2	Reasoning
24 (8m)	a.	**(i)** Gibberellins.	1	417	340	4.2.4	Knowing
		(ii) seeds / young leaves / stems. *(only one)*	1	416	340	4.2.4	Knowing
		(iii) hydrolyses starch in endosperm to maltose / glucose which used by embryo for respiration / growth.	2	417	340	4.2.4	Knowing
	b.	**(i)** (V): myelin sheath. (W): axon or motor neurone. (Y): pre-synaptic membrane.	1 1 1	409	332	4.1.18	Applying
		(ii) Provide ATP for contraction process.	1	411	332	4.1.19	Reasoning
		(iii) Actin and myosin.	2	409	331	4.1.16	Applying

Chapter 4 *(14 marks): 4Knowing 7Applying 3Reasoning*

END OF MARKING GUIDE

MARKING GUIDE

Part 1: Multiple Choice Each Question: 1 mark Total: 14 marks

Q	Ch	Answer	Outcome	Page Number		Level of learning
				Cambr	Hodd	
1	1	Ribose.	1.2.2	270	236	Knowing
2		lipids	1.2.8	279	٢٤١	Applying
3		Final product: Lactic Acid; Site of production: W	1.3.9	277	245	Applying
4	2	X: Carotenoids; Y: Chlorophyll a; Z: Chlorophyll b	2.1.5	296	264	Knowing
5		18	2.1.7	290	270	Applying
6		Leaf (X): High concentration of TP; Leaf (Y): Low concentration of TP	2.1.7	290	268-271	Reasoning
7	3	W	3.1.13	306	300	Knowing
8		Vasodilation	3.1. 3	302	290	Applying
9		(W) and (Y) represent glucose and insulin concentration a non-diabetic person.	3.1.3 3.1.7	315-318	292-294	Reasoning
10	4	Cell body	4.1.3	331	313	Knowing
11		Neurone: Relay; Location: Central nervous system	4.1.4	331	313	Applying
12		There is a sense with no response.	4.1.8	333	314	Applying
13		Stage (1): Y; Stage (2): Z; Stage (3): X	4.1.9	335	317	Applying
14		Axon's state: polarized; Na+ and K+ pump: Working; Na+ channels: Close; K+ channels: Close	4.1.10	334	316	Reasoning

Part 2: Extended Response (56 marks) Chapter 1 (14 marks)

Q		Answer	Mark	Page Cambr	Page Hodd	outcome	Level of learning
15 (5m)	(a)	Hydrolysis.	1	270	237	1.2.2	Knowing
	(b)	it is used to break down the bond between the phosphate groups in ATP	1				Applying
	(c)	Lipids or fats | carbohydrates | protein	3			1.2.6	Reasoning
16 (5m)	(a)	Cytoplasm or cytosol.	1	272	244	1.3.2	Knowing
	(b)	i) the process will be stopped. ii) production of reduced NAD that will carries H^+ and e^- from carbonic compound to oxidative phosphorylation for ATP synthesis. iii) it will be used to provid energy for body excesice and hydrolysed to ADP.	1 1 1				Applying
	(c)	Reaction **(A)** is anaerobic OR in abcence of oxygen, while reaction **(B)** is aerobic OR in presence of oxygen.	1	272& 277	244 254	1.3.2 + 1.3.3	Reasoning
17 (4m)	(a)	yeast	1	277	254	1.3.8 + 1.3.9	Knowing
	(b)	CO_2	1				Knowing
	(c)	X: dehydrogenation or oxidation Y: reduction	2				Applying

C. Part 2: Extended Response. Chapter 2 (14 marks)

Q		Answer	Mark	Page Cambr	Page Hodd	outcome	Level of learning
18 (7m)	(a)	i. B. In high light intensity photosynthesis rate does not increase.	1 1	292	274-276	2.2.2	Applying
		ii. Light intensity.	1	291-292	274-275	2.2.2	Reasoning
		iii. Light intensity is no longer the limiting factor **OR** Some other factor becomes limiting, CO_2 or temperature.	1	291-292	275	2.2.2	Reasoning
	(b)	30	1	275	292	2.2.2	Reasoning
	(c)	Light independent reactions involves biochemical reactions which are catalyzed by enzymes that are highly temperature sensitive.	2	266	292	2.2.2	Knowing
19 (7m)	(a)	(T): CO_2. (U): O_2. (V): glucose.	1 1 1	289-290	266-271	2.1.1	Applying
	(b)	Hydrolysis of water provides electrons to replace those removed from chlorophyll in photosystem II, **and** water produces oxygen as well as reduces NADP to NADPH by liberating H^+ ions.	2	288	268	2.1.6	Knowing
	(c)	ATP and reduced NADP from the light dependent stages are used to reduce GP to triose phosphate, which will be used in production of carbohydrate in photosynthesis.	1	290	270	2.1.7	Applying
	(d)	Stroma.	1	290	270	2.1.2	Knowing

C. Part 2: Extended Response. Chapter 3 (13 marks)

Q		Answer	Mark	Page		outcome	Level of learning
				Cambr	Hodd		
20 (9m)	(a)	(W): Renal Capsule. (R): the distal convoluted tubule	1 1	306	299	3.1.13	Knowing
	(b)	i. active transport to outside. ii. non permeable walls to water.	1 1	310-311	302	3.1.14	Applying
	(c)	Reabsorbtion of: amino acids, sugar and some ions. (*one substance is enough*).	1	306-308	299-301	3.1.12	Knowing
	(d)	Y: high. Z: low.	1 1	311	302	3.1.13	Applying
	(e)	The pearmebility to water in the part C will decrease, therefore the retention or reabsorption of water will decrease and more water will be excreted out of the kidney.	2	310-311	302	3.1.14	Reasoning
21 (4m)	(a)	The pancreas.	1	315-317	293-294	3.1.5	Knowing
	(b)	i. Glucagon. ii. Gluconeogenesis.	1 1			3.1.6-3.1.7	Applying
	(c)	Beta cells.	1			3.1.6	Reasoning

Part 2: Extended Response. Chapter 4 (15 marks)

Q		Answer	Mark	Page Cambr	Page Hodd	outcome	Level of learning
22 (6m)	(a)	X: neurotransmitter vesicles. W: axon.	1 1	341-342	320-321	4.1.14	Knowing
	(b)	Z: Channels for passage of Ca^{2+} ions Y: Protein Ion channels OR Na^{+} channels	1 1			4.1.14 - 4.1.15	Applying
	(c)	i . The transmitter substance will not bind and the impulse will not be transmitted. ii. No action potential.	1 1			4.1.15 - 4.1.16	Reasoning
23 (4m)		<table><tr><th>Site</th><th>Status of the membrane potential</th><th>Type of the membrane transport for Na^{+} ions</th></tr><tr><td>D</td><td>rest potential</td><td>Active transport</td></tr><tr><td>E</td><td>Action potential</td><td>Facilitated diffision</td></tr></table>	4	333-336	316-318	4.1.9 4.1.10	Knowing Applying
24 (5m)	(a)	X: relay neurone or intermediate neurone. Y: motor neurone. Z: sensory neurone.	1 1 1	333	312	4.1.3	Applying
	(b)	involuntary action.	1	333	414	4.1.6	Knowing
	(c)	Very useful way of responding to danger signals such as the touch a very hot object.	1	333	414	4.1.6	Knowing

END OF MARKING GUIDE

MARKING GUIDE

Part 1: Multiple Choice Each Question: 1 mark Total: 14 marks

Q	Ch	Answer	Outcome	Page Number		Level of learning
				Cambr	Hodd	
1	1	5	1.2.2	275	236	Knowing
2		glucose	1.2.8	279	241	Applying
3		Site of respiration: Z; Number of ATP: 6	1.3.8	277	243	Reasoning
4	2	X	2.1.2	290	266	Knowing
5		Light-dependent reactions: H_2O; Light-independent reactions: Reduced NADP	2.1.6	288-290	266	Applying
6		Point (S): Light intensity; Point (T): CO_2 concentration	2.2.2	292	275	Reasoning
7	3	ureter	3.1.13	306	299	Knowing
8		Adjustment of K^+ ions concentration.	3.1.14	311	303	Applying
9		B and C.	3.1.17	315	294	Reasoning
10	4	relay.	4.1.2	331	312 - 313	Knowing
11		Neurone: Sensory; Location: Peripheral nervous system	4.1.3			Applying
12		The name: Dark band; State: No change	4.1.17	346	326	Applying
13		1: X; 2: Z; 3: Y; 4: W	4.1.15	342	320	Applying
14		K^+ ions will diffuse out of the axon.	4.1.10	336	317	Reasoning

Part 2: Extended Response (56 marks) Chapter 1 (14 marks)

Q		Answer	Mark	Page Cambr	Page Hodd	outcome	Level of learning
15 (5m)	(a)	Glycolysis.	1	272	244	1.3.2	Knowing
	(b)	W: NAD^+ X: reduced NAD	2				Applying
	(c)	**(i)** 5 X 2 = 10	1				Reasoning
		(ii) phosphorylation.	1				
16 (5m)	(a)	Matrix of mitochondria.	1	273	245	1.3.4	Knowing
	(b)	It will accumulate.	1				Applying
	(c)	Reduction.	1				
	(d)	Decarboxylation.	1				
	(e)	4 x 4 = 16 C	1				Reasoning
17 (4m)	(a)	Oxidative phosphorylation.	1	274	248	1.3.5	Knowing
	(b)	Facilitated diffusion.	1			1.3.6	Knowing
	(c)	**(i)** last acceptor of H^+ ions and electrons.	1				Applying
		(ii) 12 ÷ 0.5 = 24 molecules.	1				

C. Part 2: Extended Response. Chapter 2 (14 marks)

Q		Answer	Mark	Page		outcome	Level of learning
				Cambr	Hodd		
18 (4m)	(a)	(X): RuBP. (Y):CO_2. (Z): GP or PGA	3	290	270	2.1.7	Applying
	(b)	3 C.	1	290	270	2.1.7	Knowing
19 (6m)	(a)	Light is absorbed and the energy is used to drive electrons from water to generate reduced NADP and to drive protons across a membrane. These protons return through ATP synthase to make ATP.	2	288-289	267-268	2.1.6	Applying
	(b)	Temperature can be increased by heater, reduced by ventilation. Increase CO_2 concentration using sodium bicarbonates.	2	292	276	2.2.3	Reasoning
	(c)	Photosynthesis reaction. Light dependent. Light in-dependent.	2	290	266-270	2.1.1	Knowing
20 (4m)	(a)	Chlorophyll a.	1	295	265	2.1.3	Reasoning
	(b)	The observed rate of photosynthesis is due to light independent reactions or calvin cycle. The compounds required for this stage (NADP and ATP) are produced from light reactions.	2	295	265	2.1.4	Reasoning
	(c)	Chromatography.	1	296	263	2.1.5	Knowing

C. Part 2: Extended Response. Chapter 3 (13 marks)

Q		Answer	Mark	Page		outcome	Level of learning
				Cambr	Hodd		
21 (5m)	(a)	L: Pancreas. M: Liver.	2	315	293	3.1.3, 3.1.5	Knowing
	(b)	1: increases. 2: decreases.	2	317	294	3.1.7	Applying
	(c)	Glucagon.	1	315-317	293-294	3.1.7	Reasoning
22 (8m)	(a)	**(i)** Afferent arteriole.	1	306	300	3.1.13	Knowing
		(ii) O: Sugar **OR** amino acids P: metabolic waste OR harmful substance.	2	308	301	3.1.14	Applying
		(iii) It will decrease.	1	306-307	300	3.1.14	Reasoning
	(b)	**(i)**Thermoregulation.	1	302	289	3.1.3	Knowing
		(ii) Thyroxin.	1	301	291	3.1.2-3.1.3	Applying
		(iii) Negative feedback.	1				
		(iv) Failure to control body temperature.	1	302	289-291	3.1.3	Reasoning

C. Part 2: Extended Response. Chapter 3 & 4 (15 marks)

Q		Answer	Mark	Page Cambr	Page Hodd	outcome	Level of learning
23 (6 m)	(a)	(X): Repolarisation. (Y): refractory period.	2	333	316	4.1.9	Knowing
	(b)	- Active transport of k^+ and Na^+ (Na^+ out and k^+ in). -Membrane more permeable to potassium ions than to sodium ions. **OR** -Potassium ions diffuse out faster than sodium ions diffuse in.	2	336	318	4.1.10	Applying
	(c)	-Membrane impermeable to sodium ions / sodium ion channels closed. -Sodium ions cannot enter axon. -Membrane becomes more negative than resting potential.	2				
24 (9m)	(a)	**(i)** - A neurone. - Action potential.	2	335	317	4.1.10	Knowing
		(ii) - Because in the period G , the cell is in the refractory period OR more time is needed to restore the rest potential and then reestablish action potential. - The strength of the stimulus is below the value of threshold.	2	336	318	4.1.11	Reasoning
	(b)	**(i)** dendrites.	1	331	312	4.1.3	Knowing
		(ii) - a relay neurone **OR** an intermediate neurone. - an effector organ (e.g. a muscle Or a gland)	2	332 337	313 & 319	4.1.13	Applying
		(iii) - faster. - slower .	2	338 341			

End