Transport in Animals

Mark Scheme 4

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Transport in Animals
Paper Type	(Extended) Theory Paper
Booklet	Mark Scheme 4

Time Allowed: **68 minutes**

Score: **/56**

Percentage: **/100**

Question	E Answers	Marks	Guidance
1 (a) (i)	diffusion ; used in (aerobic) respiration ;	[2]	
(ii)	any *two* from water glucose / simple sugars / named amino acids salts / ions / named ion / minerals vitamins AVP e.g. vitamins	[1]	**NB 2 substances required for one mark.** **R** sugar unqualified **A** protein
(iii)	any *two* from carbon dioxide water protein / amino acids / hormone / named hormone / enzyme urea lactic acid AVP e.g. vitamins	[1]	**NB 2 substances required for one mark.** **R** sugar / waste unqualified **A** metabolic waste / glucose
(b)	**D** pores / holes / gaps in capillary wall / AW ; **E** allows filtration /movement of small molecules (between blood and tissue fluid) ; **D** thin wall / wall is one cell thick / thin lining ; **E** short diffusion distance / AW ; **D** small / thin / narrow / AW ; **E** blood moves slowly (for exchange) / more cells *or* blood close to wall ; **D** large numbers of capillaries /capillary bed ; **E** provide large surface area ;	[2 + 2]	**NB** **Descriptor(D) must be linked to an Explanation(E) for 2 marks** **D alone can gain a point** **E alone cannot score** **1 + 1 and 1 + 1** **R capillary one cell thick**
(c) (i)	lymph (vessel) ;	[1]	not lymphatic system or node IGNORE lacteal
(ii)	squeezed by muscles / AW ; valves, ensure one-way flow / prevent backflow ; passive not pumped ;	[max 1]	**R** valves unqualified
		[Total: 10]	

Question	E Answers	Marks	Additional Guidance
2 (a)	muscles / surrounding tissues, contract / squeeze, vessels ; valves, prevent backflow / ensure one way flow ; ref. to breathing (lowering pressure in chest) ;	[2]	
(b)	**1** fat / fatty acids (and glycerol), absorbed (in ileum) ; **2** ref. to making fat water soluble ; **3** fat enters lacteals ; **4** lacteals, empty into lymph vessels / are part of lymphatic system ; **5** AVP ; e.g. transport of fat in lymph may reduce risk of plaque arteries	[max 2]	other possible AVP *idea that* not overloading blood with fat / by-passes the liver / goes to adipose tissue first
(c) (i)	mitosis ;	[1]	
(ii)	antibody ;	[1]	
(iii)	ref. to antibodies in context of, immobilising / 'marking' / agglutinating, bacteria ; phagocytosis (by cell **R**) ; (bacteria) ingested / engulfed ; into a, vacuole / vesicle ; digested / broken down ; by, enzymes / acid ;	[max 3]	**A** any alternative wording for effect on bacteria **A** cell **R** is a phagocyte **I** 'killed' / destroyed (in question) unless qualified

Question	E	Answers	Marks	Additional Guidance
2 (d)	1 2 3 4 5	positive correlation ; more antibiotics used, more bacteria are resistant ; variation between countries at each dosage ; data quote 1 ; data quote 2 ; e. countries with antibiotic use of <1%, less than 10% bacteria are resistant countries with antibiotic use of 3(+)%, more than 40% bacteria are resistant variation – e.g. some countries at 2.5%, with 4.5% and 32.5%	[max 3]	data quotes must have figure (or range) for use of antibiotics and % resistance
(e)	1 2 3 4 5 6 7 8 9 10	*accept* ora bacteria are resistant to some antibiotic ; ref. to selection ; result of overuse ; some are specific ; some antibiotics used for rare disease(s) ; some only used as last resort ; have (many / unpleasant) side-effects / harmful / cause allergy ; too expensive ; cannot be used on children ; AVP ; ref. to other uses, e.g. on animals	[max 3]	**R** people become, immune / resistant
			[Total: 15]	

Question	E	Answers	Marks	Additional Guidance
3 (a)		**A** – hair **;** **B** – (temperature) receptor **;** **A** (sensory) nerve ending **C** – sweat gland **;** **D** – fat (cell) **;**	[4]	**R** follicle **A** neuron **R** nerve **A** fat layer / fat tissue / adipose / lipid **R** 'fat droplet'
(b)		*marking points are linked 1 + 2, etc.*		**NB** if structures in (a) labelled incorrectly allow *ecf*
		*hair / **A***		
	1	raises hair + traps air **;** **A** ORA		**if** structure is not on the mark scheme, but correct and appropriate function is given, allow **one** mark (*ecf*)
	2	air is (good) insulator **;**		
		*temperature receptor / **B***		
	3	detects change in temperature **;**		(**BUT** if unqualified letters are used must link to what is given in (a)) *e.g.* ***D** is an artery/blood vessel in (a) – ✗* ***D** vasodilates if too hot in (b) – ✓*
	4	impulses to the, CNS / brain / spinal cord **;**		
		*sweat gland / **C***		
	5	secretes / produces, sweat + evaporates from surface of skin **;** ORA		
	6	heat lost from the body / blood cooled / AW **;** ORA		**R** 'signals/messages' in MP 4
		*fat / **D***		
	7	insulator **;**	[max 4]	

Question	E	Answers	Marks	Additional Guidance
3 (c)		*mark **(i)** and **(ii)** together to max 5*		
(i)	1	(vaso)constriction ;		**R** vasoconstriction of veins/capillaries
	2	shunt / AW, opens ;		**Do not accept** 'capillaries move away' / AW *or* ref to muscles in capillaries
	3	less blood flows through the capillaries ;		
	4	blood diverted away from, skin / surface ;		
(ii)	5	*idea that* blood distributes heat ;		
		less heat loss		
	6	by radiation ;		
	7	by convection ;		
	8	accept by conduction (to the air) ;	[max 5]	
(d)		change in, body / skin, temperature ;		**I** ref. to external temperature changes
	2	acts as a stimulus ;		
	3	to keep temperature , constant / at 37 °C / within limits / near set point / at the norm / AW ;		**A** correct ref. to homeostasis
	4	corrective / opposite / AW, action by the body ; e.g. qualified ref to sweating / vasodilation vasoconstriction / AW ;	[max 3]	the example needs to show how it brings about the corrective action
			[Total: 16]	

4 **(a** **(i)** gut / alimentary canal / oesophagus / small intestine / ileum / duodenum / large (**A** big) intestine / colon / rectum / intestine / AW **;** stomach **[1]**

(ii) <u>hepatic portal vein</u> **;** **A** hephatic **R** HPV **[1]**

(b) **(i)** *answers may be in space below question*
A – nucleus **;**
B – cell / plasma, membrane **;** **A** plasmalemma
C – cytoplasm **;** **[3]**

(ii) *award two marks if correct answer (between 1983 – 2017) is given, ignore units*
award one mark if incorrect measurement is divided by 0.06
allow +/- 1 mm in reading the line

120 (mm) / 0.06 (mm) 12 (cm) / 0.006 (cm)
2000 **;;** **A** 1983 – 2017 **[2]**

4 **(c)** *award in either section*

1 ref to enzymes (within liver cells) **;**
2 ref to negative feedback / homeostasis **;**
A 'concentration returns to normal' / 'reduces glucose level' / AW

penalise once if insulin / glucagon are described as acting like enzymes – MP5/7
ignore incorrect source of hormone(s)
penalise once if starch is given instead of glycogen and if glycogen is misspelt

blood glucose concentration is higher than normal

3 insulin **;**
4 glucose, enters / diffuses into / goes into / absorbed (by liver / cells) **;**
5 (liver cells) store glucose as glycogen / convert glucose to glycogen **;**
A increase respiration / increase metabolism of glucose / storage of fat / AW

blood glucose concentration is lower than normal

6 glucagon **;**
7 (liver cells) convert / break down, glycogen to form glucose **;**
8 glucose, goes out of cells / enters the blood **;** **[5 max]**

(d) **1** makes (named) protein / protein synthesis / forms peptide bonds / are assimilated **;**
2 (excess are) broken down / deaminated **;**
3 removal of, amino group / $–NH_2$ / nitrogen-containing part **;** **R** nitrogen unqualified
4 (to form) ammonia **;**
5 converted to urea **;A** amino acids are, broken down / converted, to urea
6 rest of molecule (**A** carbohydrate), is respired / used to provide energy / stored **;**
7 transamination / described **;** **[3 max]**

[Total: 15]