

MARK SCHEME

GCSE

BIOLOGY

AQA - COMBINED SCIENCE

B 5 - TEST 3

HOMEOSTASIS AND RESPONSE

Intermediate

Mark schemes

1.	(i)	liver	1	
	(ii)	liver or B stores glycogen or pancreas or D makes insulin	1	
		clear description of link	1	
				[3]
2.	(a)	<i>allow lower case</i> <i>answers can be in either order</i>		
		FSH		
		<i>accept follicle stimulating hormone</i> <i>ignore FHS</i>	1	
		LH		
		<i>accept luteinising hormone</i> <i>do not accept oestrogen / progesterone</i>	1	
	(b)	(i) the older the woman, the less successful the treatment <i>OWTTE</i> <i>relationship needed to obtain mark</i>	1	
		(ii) <i>answer must relate to data in table</i>		
		(many) embryos die / destroyed / do not survive <i>allow low success rate / often does not work</i> <i>allow could lead to multiple births</i> <i>ignore older women should not have babies</i> <i>ignore not natural / finance</i> <i>ignore religion / 'against God's will'</i>	1	
				[4]
3.	(a)	any two for one mark each <i>answers should relate to the ideas in the list</i>		
		birth control pills are 99 % effective in preventing pregnancy		
		the hormones in the pills give protection against some women's diseases <i>condom (neutral)</i>		
		the woman's monthly periods become more regular	2	

(b) any **two** for one mark each

answers should relate to the ideas in the list

the hormones in the pills have some rare but serious side effects

only 99% effective

this method of birth control provides no protection against sexually transmitted disease

a woman has to remember to take a pill every day

2

[4]

4.

(a) B

1

less / no insulin (produced) **or** insulin produced in pancreas

allow pancreas can't monitor (blood) sugar (level)

ignore pancreas can't control (blood) sugar (level)

allow increased glucagon production

*allow A as liver stores less glucose / sugar for **2** marks only*

1

(b) (i) (it / protein / insulin) digested / broken down

if ref to specific enzyme must be correct (protease / pepsin)

ignore denatured

*do **not** accept digested in mouth / other incorrect organs*

1

(ii) any **two** from:

ignore injections

- (attention to) diet

*accept examples, eg eat less sugar(y food) **or** eat small regular meals*

allow eat less carbohydrate / control diet

ignore cholesterol or balanced / healthy diet

- exercise

ignore keep fit / healthy

- (pancreas) transplant / stem cells / genetic engineering

2

[5]

5.	A – receptor	<i>ignore organ / nerve</i>	1	
	B – sensory	<i>allow sensor</i>	1	
	C – CNS / central nervous system	<i>accept spinal cord</i> <i>allow coordinator</i> <i>ignore brain</i> <i>do not accept spine</i>	1	
	D – motor		1	
	E – effector		1	[5]
6.	(a) (i)	in blood or the circulation system or plasma <i>accept arteries and veins or blood vessels</i> <i>do not accept slowly or in blood cells</i>	1	
	(ii)	glands <i>accept endocrine glands or endocrine</i> <i>do not accept a named gland</i>	1	
	(b)	the pancreas <i>accept islets of Langerhans</i>	1	
		any one from		
		does not produce (sufficient) insulin (blood) sugar is not (properly) controlled	1	
		insulin injections or inhalers <i>accept diet or tablets to make the pancreas produce insulin</i>	1	[5]

- 7.** (a) pressure / temperature / hot / cold / touch / pain
 ear / cochlea
 chemicals / taste / named taste e.g. salt
 (*reject skin receptors e.g. hot, cold*)
for 1 mark each

3

- (b) impulses / electrical pulse / electrical signal
 (*reject information, message, pulse, signal*)
 via sensory neurones (*ignore relay neurone, synapse*)
 (in) optic nerve
 (*allow 1 mark for via nerves or neurone if neither second nor third mark scored, reference to spinal cord disqualified route mark*)
for 1 mark each

3

[6]

- 8.** (a) detect changes in surroundings **or** detect stimuli
allow any named stimulus for skin

1

convert information to impulse
allow send impulse to sensory neurones / brain

1

- (b) (i)

muscle	contract(ion)
gland	release / secrete / produce chemical / hormone / enzyme

1 mark for each effector
1 mark for each response
response must match type of effector (if given)
ignore examples
ignore relax(ation) / movement for contraction
*do **not** allow expansion for muscles*

4

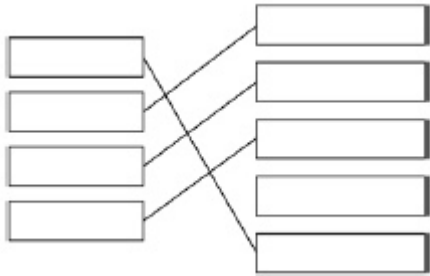
- (ii) any **one** from:

- (maintain temperature at which) enzymes work best
 - so chemical reactions are fast(est)
 - prevent damage to cells / enzymes
- allow prevent enzymes being denatured (by temperature being too high)*

1

[7]

9. (a)



4 correct = 3 marks
 3 correct = 2 marks
 2 correct = 1 mark
 (4-5)

3

(b) time awake

1

(c) description of how to do a 'ruler drop'

1

how to measure length in cm

1

a control measure taken

or

how to use a conversion chart to get reaction time

1

(d) any **one** sensible reason:

for ruler drop test:

- have lots of equipment
- inexpensive equipment
- many students can do it at same time

for computer test:

- more accurate
- more repeatable
- students can cheat on ruler drop test

1

(e) 0.556..... or

$$(0.44+0.49+0.83+0.27+0.75)/5$$

1

0.56

an answer of 0.56 scores 2 marks

1

- (f) at first stays same / has slight dip (until 12 hours)
12 hours only needed once 1
- increases from 12 hours awake
ignore 'increases' alone 1
- (g) **either:**
 does support, because overall goes up
or
 does not support, because it goes down / stays the same at first and only goes up after 12 hours 1
- (h) any **two** from:
 • use more volunteers
 • make sure they all do the same activities at the same time
 • give them the same food and coffee/tea at the same time
 • control the age / gender of volunteers
 • make sure they all had a good night's sleep the night before the investigation began 2

[15]

10.

- (a) homeostasis 1
- (b) in sequence:
- pancreas 1
- liver 1
- glycogen
correct spelling only 1
- glucagon
correct spelling only 1

- (c) (i) broken down / digested 1
- further detail eg into amino acids / by enzymes / by proteases 1
- (ii) diet / eating less sugar / less fat
ignore balanced diet
or
ignore 'dieting' / slimming diet
- exercise
accept pancreas transplant 1
- (d) (i) sensible suggestion
eg (owner's) smell / sweating / change in owner's behaviour / dizziness / tiredness 1
- (ii) any **five** from:
allow 1 mark for justified conclusion
do not allow full marks unless at least 1 pro and 1 con.
- Pro:
- % below normal decreases
 - % in normal increases
 - reliable / repeatable / valid data as large number of samples
do not allow accurate / precise
 - patients express satisfaction.
- Con:
- may not be reliable as blood glucose measurements for only 5 patients / survey of only 16 (dog owners)
 - % above normal increases / dogs are less good at detecting high glucose. 5

(e) glucose in urine of diabetic (and not in the non-diabetic)

1

urea and Na⁺ ions are similar in each / slightly lower in diabetic

1

+ any **three** from:

- no protein in either urine sample because protein too large / does not pass through filter
- glucose passes through filter in kidney
ignore glucose is reabsorbed
- non-diabetic: the / all glucose is reabsorbed / taken back into blood
- diabetic: (too much glucose so) cannot all be reabsorbed
- because diabetic has high concentration of glucose in blood
- urea and Na⁺ lower in diabetic because less water is reabsorbed (due to extra glucose in filtrate).

3

[19]