# GCSE
# BIOLOGY

Topic Paper: 5 Homeostasis and response Section 2
Part 1 & 2 Mark Scheme

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# MARK SCHEME

**83 Marks**

**M1.** (a) (concentration high) in the hepatic portal vein is blood with glucose absorbed from the intestine

**1**

concentration is lower in the hepatic vein because insulin

**1**

(has caused) glucose to be converted into glycogen

**1**

**or**

allows glucose into liver cells

(b) (i) (after 6 hours) most of the glucose has been <u>absorbed</u> from the intestine **or** from food into the blood

**1**

(ii) because glucagon (made in the pancreas) causes

*if biological terms incorrectly spelt they must be phonetically accurate*

*do **not** accept glucagon <u>made</u> / <u>produced</u> by the liver*

**1**

glycogen to be converted into glucose

**1**

glucose released into blood

*allow the liver maintains the correct / constant level of glucose in the blood*

**1**

**[7]**

**M2.** (a) (i) thermoregulatory centre

*allow thermoregulation centre*

*allow hypothalamus*

**1**

(ii) it has receptors

*ignore receptors in skin*

**1**

reference to temperature of <u>blood</u>

*allow plasma for blood*

**1**

(b) muscles <u>contract</u>

*ignore relax / expand*

**1**

increased respiration **or** more heat released

*allow more heat produced*

*if more not given allow respiration releases / produces heat*

**1**

(c) (i) (blood vessels / arteries / arterioles) dilate / widen

*do **not** accept capillaries dilate*
*ignore blood vessels get bigger / expand*
*do **not** accept idea of blood vessels moving*

**1**

(ii) more blood close to / near surface

*allow blood is closer to the surface*
*do **not** accept idea of blood vessels moving*

**1**

more heat lost **or** heat lost faster **or** cools faster

*do **not** allow for idea of evaporation*

**1**

**[8]**

**M3.** (a) (i) A

**1**

(ii) (protein molecule is) too large to pass through the filter / cannot pass through the filter

**1**

(b) RBC is too big to / cannot pass through filter

**1**

haemoglobin released when RBC bursts
**or**
haemoglobin inside RBC in a healthy person

**1**

haemoglobin is small enough to / can pass through filter
**or**
haemoglobin diameter < pore diameter
**or**
haemoglobin only 5.5 nanometres

**1**

**[5]**

**M4.** (a) any **two** from

reference to role of thermoregulatory centre detecting rise in temperature (of blood or skin) **or** / causing increase in sweating

more evaporation

*need to refer to more at least once to gain **both** marks*

more cooling / heat loss

*without reference to more only award max **1** mark if both ideas given, eg cooling alone gets no marks*

**2**

(b) blood vessels supplying (skin) capillaries

*do **not** accept capillaries / veins*

1

**or**

arteries

**or**

arterioles

1

dilate / widen

*allow vasodilation*
*do not accept idea of blood vessels moving*
*note: marks are awarded independently*
*accept shunt vessels close for **2** marks*

1

(c) (i) muscle contraction

*ignore relaxing*
*do **not** allow vasoconstriction*

1

(ii) respiration

(respiration) releases / produces heat

*reference to respiration is required for this mark*

1

**[7]**

**M5.** (a) any **two** from:

*allow 2 correctly named substances for **2** marks*
*ignore water*

urea

ions / salt(s) / correct named example

*ignore minerals*

second correct named example

hormones / named example

allow ammonia

allow creatinine

allow uric acid

allow bile pigment

2

(b) (i) glucose filtered (into kidney tubule)
*accept Bowman's capsule*
**1**

glucose reabsorbed **or** glucose taken back into blood
**1**

all glucose taken back into blood / all reabsorbed
**1**

(ii) not all glucose reabsorbed
**1**

because not enough time / length **or** too high
a concentration in tubule / not enough carriers
**1**

**[7]**

**M6.** (a) in rainforest:
*accept converse*

(water from) sweat does not evaporate (as much)
*max **1** if not clear whether desert or rainforest*
**1**

any **one** from:

(due to) less wind / higher moisture / humidity

less cooling effect
*ignore references to temperature*
**1**

(b) blood vessels supplying capillaries dilate / widen **or** vasodilation
*do **not** award mark if candidate refers only to blood vessels dilating **or** to capillaries dilating.*
*accept 'arteries' or 'arterioles' for 'blood vessels supplying, capillaries' but do **not** accept 'veins'.*
*ignore expand / get bigger / relax / open*
*do **not** accept idea of blood vessels moving*
**1**

more blood (through skin / surface capillaries) leads to greater heat loss
**1**

**[4]**

**M7.** (a) proteins are not filtered
**1**

glucose is filtered and (re)absorbed
*allow glucose (completely) <u>re</u>absorbed*
**1**

ions are filtered and some (re)absorbed
*allow some ions are <u>re</u>absorbed*
**1**

urea is filtered [and some / none (re)absorbed]
*allow some / no urea is <u>re</u>absorbed*
**1**

(b) <u>more / a lot of</u> sweating occurred
*accept converse arguments for cold day*
**1**

<u>more / a lot of</u> water loss (by sweating)
**1**

<u>more / a lot of</u> water reabsorption / <u>more</u> water absorption by the kidney
**1**

lower volume of urine
*allow less urine / less water in urine*
**1**

**[8]**

**M8.** (a) (i) defence against **or** destroy pathogens / bacteria / viruses / microorganisms
*do **not** allow 'destroy disease'*
*accept engulf pathogen / bacteria / viruses / microorganism*
*accept phagocytosis*
*accept produce antibodies / antitoxins*
*allow immune response*
**1**

(ii) they are small fragments of cells
**1**

(b) liver
*in this order only*
**1**

kidney(s)
**1**

(c) any **two** from:

that it doesn't cause an immune response **or** isn't rejected / damaged by white blood cells
whether it is a long lasting material / doesn't decompose / corrode / inert
if it is strong (to withstand pressure)
it will open at the right pressure
that it doesn't cause clotting
that it doesn't leak **or** it prevents backflow
non toxic

*ignore correct size*

**2**

**[6]**

**M9.** (a) if body temperature too high blood vessels supplying skin (capillaries) dilate / widen

*do **not** accept capillaries / veins dilate/constrict*

**1**

if body temperature is too low blood vessels supplying skin (capillaries) constrict / narrow

*do **not** accept idea of blood vessels moving (through skin)*

**1**

*ignore expand*
*accept arteries / arterioles for 'blood vessels'*
*if no reference to skin allow blood vessels dilate and blood vessels constrict for one mark*

so more / less blood flows through skin (capillaries) or nearer the surface of the skin

*must correctly relate to dilation or constriction*

**1**

so more / less heat is lost (from the skin by radiation)

*must correctly relate to dilation or constriction*

**1**

(b) sweat released

**1**

cannot evaporate because of high humidity / all the water vapour in the air

**1**

so less heat lost / less cooling

**or**

it is evaporation of sweat that cools the body

**1**

**[7]**

**M10.** (a) (i) **A**

**1**

(ii) (protein) molecule is large

*ignore letters*

**1**

cannot pass through filter
*(protein is) too big to get through the filter = 2 marks*
1

(b) **B** is taken back into the blood **or**
**B** is reabsorbed
1

reabsorbed completely

**or** reabsorbed after filtration
1

(c) RBC is too big to pass through filter
1

Haemoglobin is inside red blood cells
**or** haemoglobin released when RBC bursts
1

Haemoglobin is small enough to pass through filter

**or** haemoglobin diameter < pore diameter
1
**[8]**

**M11.** (a) (i) 1 hour 15 mins / 1.25 hours / 75 mins
*allow 1:15*
*ignore 1.15 hours*
1

(ii) increase in (core / body) temperature
*ignore numbers*
1

(due to an) increase in <u>respiration</u> **or** more <u>muscle</u> contraction
1

releasing energy (as a waste product)
*allow produces 'heat'*
*do **not** allow making energy*
1

skin temperature decreases
1

(because there is) sweating
1

(which) evaporates and cools the skin
*ignore references to vasodilation or vasoconstriction*
1

(iii) (there is) dilation of vessels (supplying skin capillaries)

*allow vasodilation*

*allow blood vessels widen*

*ignore expand*

*do **not** accept dilating capillaries or moving vessels*

**1**

(so) more blood flows (near skin) (surface) **or** blood is closer (to the skin)

*ignore ref to heat*

**1**

(c) pancreas detects (low) blood glucose

**1**

produces glucagon

*do **not** allow glucagon made in the liver*

**1**

(so) glycogen is converted to glucose

*allow adrenaline released which increases conversion of glycogen to glucose*

***or***

*reduced insulin production so less glucose into cells / less glucose converted to glycogen*

*for 1 mark*

**1**

**[12]**

**M12.** (a) Pancreas

*allow phonetic spelling*

**1**

(b) any **three** from:

***max 2** if any one process goes on in wrong organ*

(amino acids) broken down

(amino acids) form urea

(amino acids broken down / converted **or** urea formed) in liver

(urea / broken down amino acids) removed / filtered by kidney

*do **not** allow amino acids filtered / removed by kidney*

(urine / urea / broken down amino acids) stored / held in bladder

*do **not** allow amino acids stored / held in bladder*

**3**

**[4]**