

# **BIOLOGY P2 SG**

**MARCH 2005**

# **MEMO**

**NOTE:** This memorandum must be read in conjunction with the document entitled “ PRINCIPLES RELATED TO MARKING HG & SG BIOLOGY 2004”

**SECTION A****QUESTION 1**

1.1

1.1.1 B

1.1.2 C

1.1.3 B

1.1.4 D

1.1.5 A

**(5 x 2) (10)**

1.2

1.2.1 Tympanic membrane/eardrum

1.2.2 Perilymph

1.2.3 Xylem

1.2.4 Guttation

1.2.5 Capillarity

1.2.6 Xerophytes

1.2.7 Diffusion/Osmosis

1.2.8 Cuticle / hair (1)

**(8)**

1.3

1.3.1 D

1.3.2 E

1.3.3 A

1.3.4 F

1.3.5 C

**(5 x 2) (10)**

## 1.4

1.4.1 The level of the mercury in the glass tube will be higher (1) (1)

1.4.2 - Heavy substance (1) to show the strength of the suction force  
 - Does not mix with water (1)  
 - It is coloured (1) for clear observation (any 2) (2)

1.4.3 - Cut twig under water (1)  
 to prevent the entry of air into the xylem (1)  
 - Connection should fit tightly (1)  
 to prevent entry of air which will make movement of mercury impossible (1)  
 - Use sharp knife (1) to cut twig  
 to prevent damage (1) of xylem vessels  
 - treat mercury with great care (1)  
 since it is poisonous(1) (any 2 x 2) (4)  
**(7)**

## 1.5

1.5.1 (i) A (1) }  
 C (1) } Mark first 3 only (3)  
 I/F (1) }

(ii) B (1) }  
 D (1) } Mark first 3 only (3)  
 G (1) }

(iii) D (1) }  
 F (1) } Mark first 3 only (3)  
 K (1) }

1.5.2 (i) Eye muscle (1) (1)

(ii) Retina (1) (1)

1.5.3 - Circular muscles (1)  
 - contract (1)  
 - Radial muscles (1)  
 - relax (1)  
 - pupil becomes smaller (1)  
 - less light (1) enters eye (any 4) (4)  
**(15)**

**TOTAL QUESTION 1: 50**

**TOTAL SECTION A: 50**

**QUESTION 2**

2.1

2.1.1 (i) A: Vacuole/cell sap (1)

C: Root hair (1) (2)

(ii) B: Cortex cell /Parenchyma (1) (1)

2.1.2 - Thin/permeable cell wall (1)

- Large vacuole (1)

- Large surface area (1) (any 2) (2)

2.1.3 - The cell sap of the root hair has a lower (1) water potential

- while the surrounding soil water has a higher (1) water potential

- Water enters (1) the root hair

- by osmosis (1) (4)

**(9)**2.2.1 (i) Diagram 2 **(1)** (1)

(ii) Leaves have wilted(1) (1)

(iii) - rate of transpiration (1)

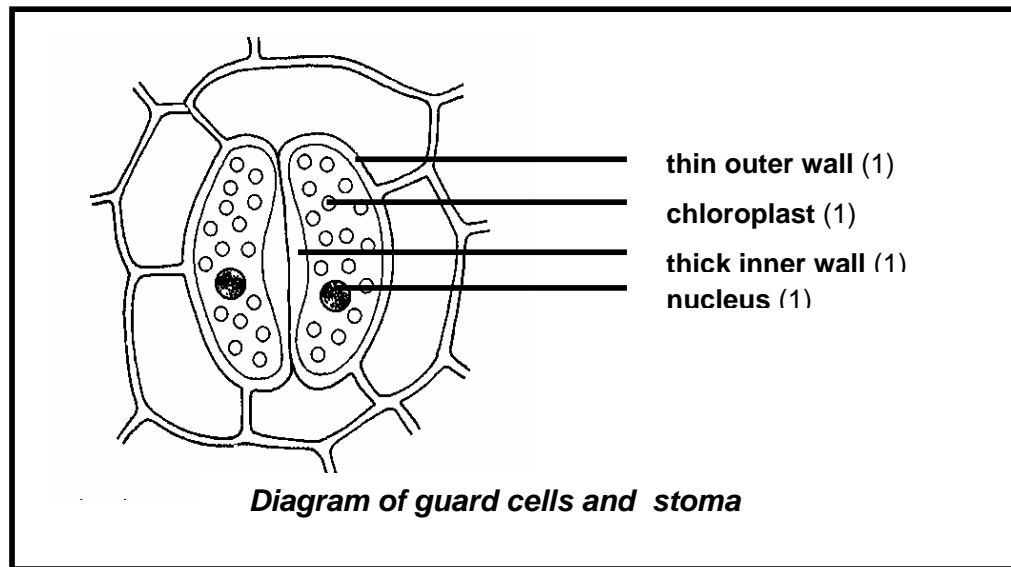
- exceeded absorption of water (1)

- because the temperature (1) at 12:00 is higher

- and the light intensity (1) is also higher

(any 3) (3)

## 2.2.2

**Criteria:**

Pore closed (1)

Neatness (1)

Any three correct labels (3)

(5)

**(10)**

## 2.3

2.3.1 Water molecules (1)

(1)

2.3.2 - Bladder is differentially permeable (1)  
 - pores in the bladder are too small (1) for sugar molecules to pass through

(2)

2.3.3 - Osmosis (1) occurred  
 - along the water potential gradient (1)  
 - from the beaker to the bladder (1)

(3)

**(6)****TOTAL QUESTION 2: 25**

**QUESTION 3**

## 3.1

- 3.1.1 In the cortex (1) (1)
- 3.1.2 Diffusion / glomerular/ultra-/pressure filtration (1) (1)
- 3.1.3 Glomerulus/blood capillary (1) (1)
- 3.1.4 - Walls made up of a single/thin layer (1)  
to facilitate diffusion (1) of substances  
- Many tiny pores (1) act as micro-filters  
restricting large substances such as proteins/blood corpuscles(1)  
- Lots of capillaries (1)  
to ensure large surface area (1) (any 2 x 2) (4)
- 3.1.5 To create a high pressure (1) in C. (1)
- 3.1.6 Podocytes(1) (1)
- 3.1.7 ADH(1) (1)
- 3.1.8 - Makes collecting duct/distal convoluted tubule (1)  
- more permeable to water (1) (2)  
**(12)**

## 3.2

- 3.2.1 (i) C (1) (1)
- (ii) B (1) (1)
- (iii) A (1) (1)
- 3.2.2 (i) C - decreases at the collecting tubule(1)  
since most of the water is reabsorbed(1) (2)
- (ii) B - no glucose present in the collecting tubule(1)  
- all reabsorbed(1) (2)
- (iii) A - will increase as it reaches the tubules(1)  
- since none will be reabsorbed from the tubule(1)  
- and since it is a metabolic waste (1)  
- more of it will be added by tubular secretion (1) into  
tubules (any 2) (2)

- 3.2.3 - like B (1)  
 - all amino acids are reabsorbed (1) (2)
- 3.2.4 - Proteins are large/macromolecules (1)  
 - that cannot filter through (1) the small pores of capillaries/wall of Bowman's capsule. (2)  
**(13)**

**TOTAL QUESTION 3: 25**

**QUESTION 4**

- 4.1.1 A Dendrite (1)  
 B Axon (1)  
 C Cell body (1)  
 D Dendron/dendrite (1)  
 E Interneuron/connector neuron/axon (1)  
 F Receptor (sense organ) (1) (6)

- 4.1.2 (i) Sensory / monopolar/afferent/unipolar neuron (1) Diagram 2 (1) (2)  
 (ii) Motor / multipolar/efferent neuron (1) Diagram 1 (1) (2)

- 4.1.3 (i) Conducts impulses from the connector neuron / spinal cord (1)  
 to the effector/muscle (1)

**OR**

Links sensory (1) to motor (1) neuron. (2)

- (ii) Conducts impulses from the receptor (1)  
 to the spinal cord/connector neuron (1) (2)

- 4.1.4 - Area where impulses pass (1)  
 - from one neuron to the next (1)

**OR**

- Communication site/area or space (1)  
 - between two neurons (1) (2)

- 4.1.5 Reflex arc / neuron(1) (1)  
**(17)**

4.2

- 4.2.1 (i) Hormones (1)  
 (ii) Target organs (1)

4.2.2 Endocrine system / Nervous system (1) (1)

4.2.3

Endocrine system	Nervous system
Operates with bloodstream/ hormones /chemicals(1)	Operates with neurons/ electrochemical (1)
Slow responses (1)	Rapid responses (1)
Response lasts longer(1)	Response short lived (1)
Effect may be widespread(1)	Localised effect (1)

(any 2 x 2 + 1 for table) (5)  
**(8)**

**TOTAL QUESTION 4: 25**

### QUESTION 5

5.1

5.1.1 Pituitary / hypophysis (1) (1)

5.1.2 At the base of the brain (1) (1)

5.1.3 Stimulates normal growth (1) of the skeleton and muscles of the body (1)

5.1.4 Thyroid (1) (1)

5.1.5 Thyroxin (1) (1)

5.1.6 Regulates metabolic rate/promotes absorption of glucose/conversion  
of glycogen into glucose/accelerates heartbeat/essential for normal  
functioning of the nervous system (1) (1)

5.1.7 Adrenal (1) (1)

5.1.8 At upper end of kidney (1) (1)

5.1.9 Adrenalin (1) (1)  
**(9)**



5.2

5.2.1 - Erector/hair muscle (1)  
- Controls position of hair (1) (2)

5.2.2 (i) Diagram 1 (1) (1)

(ii) Diagram 2 (1) (1)

5.2.3 - Blood vessels in skin constrict (1) to conserve heat (1) in cold weather  
- hence less blood (1) reaches skin (any 2) (2)

5.2.4 - Diagram 2 (1)  
  
- Panting (1) takes place in hot weather  
- and hairs lie flat (1) in hot weather  
- to facilitate loss (1) of body heat (any 2) (3)

5.2.5 - Body heat used (1)  
- to bring about evaporation (1) of liquid from tongue  
- also warm liquid leaves (1) body  
- thus cooling (1) down body (any 3) (3)  
**(12)**

5.3

5.3.1 (iii)/Has a larger surface area to volume ratio than the elephant (2) (2)

5.3.2 - They have a higher metabolic rate (1)  
- to release more heat energy (1) per unit mass than larger animals (2)  
**(4)**

**TOTAAL QUESTION 5: 25**

**TOTAL SECTION B: 100**

**GRAND TOTAL: 150**