

**QUESTION 1**

## 1.1

- 1.1.1 C ✓✓
- 1.1.2 D ✓✓
- 1.1.3 B ✓✓
- 1.1.4 A ✓✓
- 1.1.5 D ✓✓
- 1.1.6 D ✓✓
- 1.1.7 B ✓✓
- 1.1.8 B ✓✓

**(8 x 2) (16)**

## 1.2

- 1.2.1 Turgor ✓
- 1.2.2 Xerophytes/succulents ✓
- 1.2.3 Urethra ✓
- 1.2.4 Homeostasis ✓
- 1.2.5 Loop of Henlé ✓
- 1.2.6 Corpus callosum ✓
- 1.2.7 Parasympathetic system ✓
- 1.2.8 Central nervous system ✓
- 1.2.9 Ectotherms ✓
- 1.2.10 Hibernation ✓

**(10)**

## 1.3

- 1.3.1 A only ✓✓
- 1.3.2 Both A and B ✓✓
- 1.3.3 B only ✓✓
- 1.3.4 B only ✓✓
- 1.3.5 A only ✓✓

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

## 1.4

- 1.4.1 (i) To remove any water adhering to the potato discs ✓  
to ensure a more accurate measurement of the mass ✓ (2)
- (ii) Using 10 discs would increase the reliability of the results  
rather than using a single one (2)
- (iii) Allowing enough time ✓  
for osmosis to take place ✓ (2)
- 1.4.2 (i) It increased ✓ (1)
- (ii) It decreased ✓ (1)

- 1.4.3 - The potato discs were placed in a solution that was hypertonic/  
the solution had a lower water potential than that of the cells ✓  
- Water moved out of the potato cells through exosmosis ✓  
- The loss of water led to a decrease in the mass of the potato  
discs ✓ (3)
- 1.4.4 Between 0,3-0,4 ✓ mol/dm<sup>3</sup> ✓ (2)
- 1.4.5 To provide more accurate results /  
the actual change in mass would not be reliable ✓  
since the initial mass of each batch of discs  
was not the same ✓ (2)  
**(15)**
- 1.5
- 1.5.1 Auxins ✓ (1)
- 1.5.2 (i) D ✓ (1)
- (ii) Auxins are produced in the tip of the stem ✓  
but because the plastic doesn't allow the movement  
of auxins downwards ✓  
no cell elongation took place ✓  
thus no growth ✓ (any 3) (3)
- 1.5.3 (i) C ✓ (1)
- (ii) Auxins which are produced in the tip of the stem can move  
through the filter paper ✓  
and cause cell elongation on the shady side ✓  
causing the stem to bend towards light ✓  
and growth took place ✓ (any 3) (3)  
**(9)**

**Total Question 1: 60**

**TOTAL SECTION A: 60**

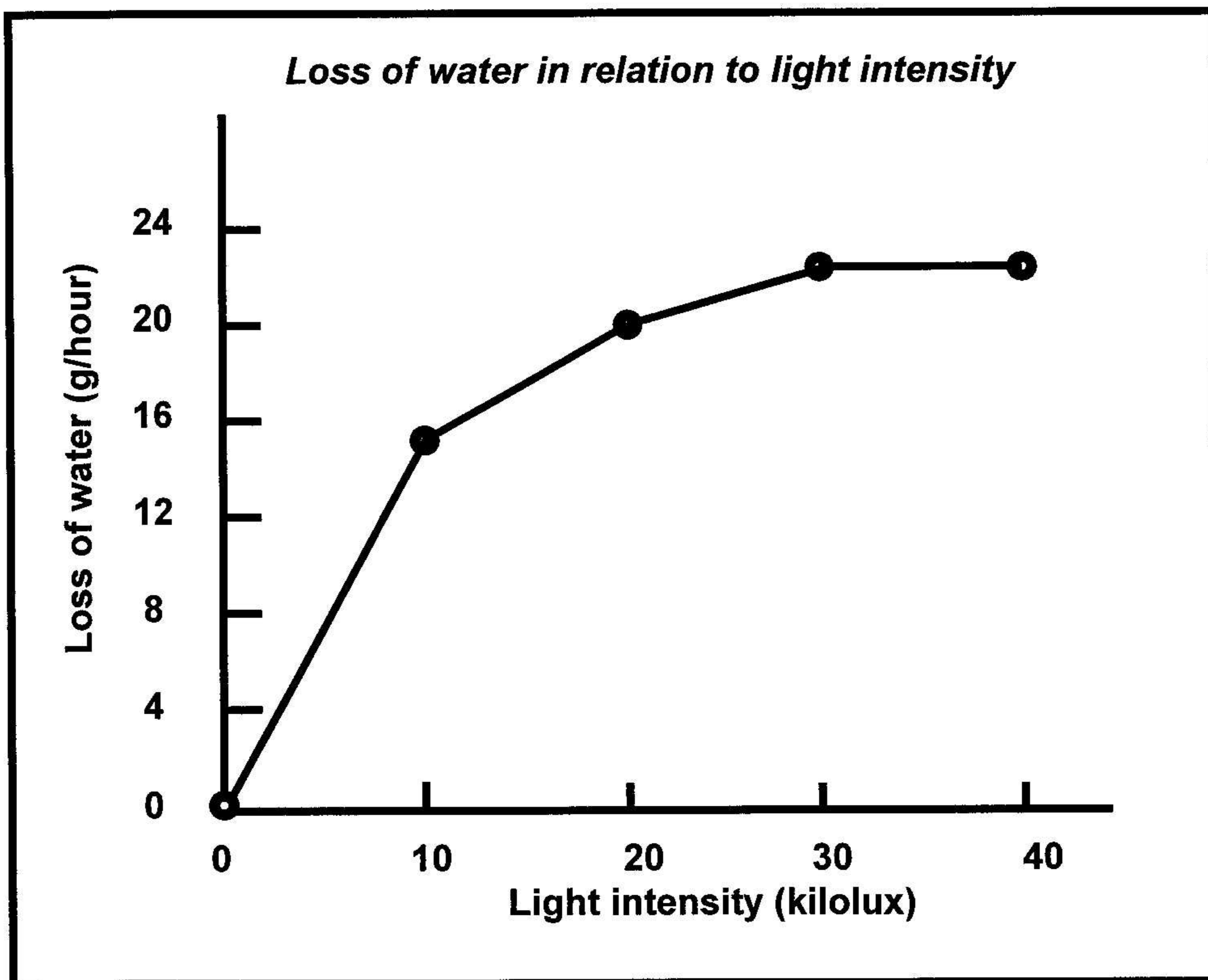
**SECTION B**

**QUESTION 2**

2.1

2.1.1 More than one reading could be taken at each light intensity ✓  
and the average loss calculated ✓ (2)

2.1.2



Correct type of graph	1
Title of graph	1
Correct choice and label for x - axis	1
Correct choice and label for y – axis	1
Correct unit for light intensity	1
Correct unit for loss of water	1
Appropriate scale for x- axis (constant intervals)	1
Appropriate scale for y- axis (constant intervals)	1
Plotting of points	2: plotted all 4 points; 1: plotted 2 or 3 points; 0: plotted less than 2 points
All plotted points joined	1

(11)

- 2.1.3 - At a light intensity of 30 kilolux and higher ✓  
 - the radius of the stomatal pore is at a maximum /  
 no further increase in the size of the stomatal pore ✓  
 - other limiting factors preventing further increase in pore size ✓  
 - thus no further increase in the rate of transpiration ✓  
 - thus water loss remain constant ✓
- (any 3) (3)  
**(16)**

## 2.2

- 2.2.1 The water potential of the epidermal cells remains constant ✓  
 and that of the guard cells varies ✓ (2)
- 2.2.2 - 1 400 ✓ kPa ✓ (2)
- 2.2.3 Open ✓ (1)

At Y the water potential of the guard cells is higher ✓  
 thus the guard cells are turgid ✓  
 Thin outer walls of guard cells will bulge out ✓  
 Thick inner walls of guard cells will be pulled apart ✓

(any 2) (2)  
**(7)**

## 2.3

- 2.3.1 (i) Root pressure ✓
- (ii) Guttation ✓ (2)
- 2.3.2 - To prevent the loss of water ✓  
 through evaporation ✓ (2)
- 2.3.3 - Wet soil ✓  
 - High humidity ✓  
 - Low temperature ✓  
 - Low light intensity ✓  
 - Wind still/calm conditions ✓ **(Mark first four only)**
- (any 4) (4)
- 2.3.4 A high ✓ root pressure  
 will increase/favour ✓guttation  
 because of hydrostatic pressure building up ✓  
 in the xylem vessels ✓  
 water droplets are forced out at the edges and margins of  
 the leaves ✓ (any 4) (4)  
**(12)**

**Total Question 2: 35**

**QUESTION 3**

## 3.1

- 3.1.1 To create a greater surface area√  
for the movement of substances into the dialysis fluid√ (2)
- 3.1.2 It must be selectively permeable/have small holes√  
to allow filtration of substances√ (2)
- 3.1.3 It should contain the same amount √  
of useful substances like mineral salts, glucose, amino acids etc  
than the blood of the patient√  
It should not contain any√  
excretory wastes such as urea, creatine, uric acid etc√ (4)
- 3.1.4 Blood needs to be filtered continuously√  
The kidney machine can only be used from time to time√  
If kidney machine is used continuously√  
it will negatively affects the patient's life style√ (any 2)(2)  
(10)

## 3.2

- 3.2.1 - Water √  
- Salt √ (2)
- 3.2.2 - The production of sweat by the skin is determined by the need to  
control body temperature√  
- and not according to the water content of the body√  
- The kidney contains mechanisms that control the water content√  
- under the influence of ADH√  
- and aldosterone√  
- ADH changes the permeability of the renal tubule√  
- The sodium pump mechanism/aldosterone in the kidney√  
- creates a gradient for water absorption√  
- more salt √  
- and water √ lost by the kidney than through the skin every day  
(any 6) (6)
- 3.2.3  $3000 \text{ cm}^3 \checkmark - 400 \text{ cm}^3 - 1100 \text{ cm}^3 - 200 \text{ cm}^3 \checkmark = 1300 \checkmark \text{ cm}^3 \checkmark$   
or  
 $(1\ 100 - 900) \text{ cm}^3 = 200 \text{ cm}^3 \checkmark$   
Thus  $200 \text{ cm}^3$  less urine  
Thus  $(1\ 500 - 200) \text{ cm}^3 \checkmark = 1300 \checkmark \text{ cm}^3 \checkmark$  (4)
- 3.2.4 (i) Exercise √  
High environmental temperatures √  
Fever / illness √ (any 2) (2)

- (ii) - More  $\checkmark$  ADH is secreted  
 - which increase  $\checkmark$   
 - the permeability  $\checkmark$   
 - of the distal convoluted tubules  $\checkmark$   
 - and the collecting ducts  $\checkmark$   
 - which cause more re-absorption  $\checkmark$   
 - of water  $\checkmark$   
 - into the blood  $\checkmark$   
 - and thus the water content of the urine decreases  $\checkmark$  (any 6) (6)

3.2.5 With heart failure the blood pressure drops  $\checkmark$   
 thus not enough pressure in the glomerulus  $\checkmark$   
 no ultrafiltration / not enough blood reaches kidneys  $\checkmark$  (3)

3.2.6 More water can be reabsorbed  $\checkmark$   
 less water is lost in urine  $\checkmark$   
 Urine is more concentrated  $\checkmark$   
 and water is conserved  $\checkmark$  (any 2) (2)  
**(25)**

**Total Question 3: 35**

#### QUESTION 4

4.1

4.1.1 37.6  $\checkmark$  °C  $\checkmark$  (2)

4.1.2 40  $\checkmark$  minutes  $\checkmark$  (2)

4.1.3 - Heat is lost  $\checkmark$   
 - from the skin  $\checkmark$   
 - to the cold water  $\checkmark$  (any 2) (2)

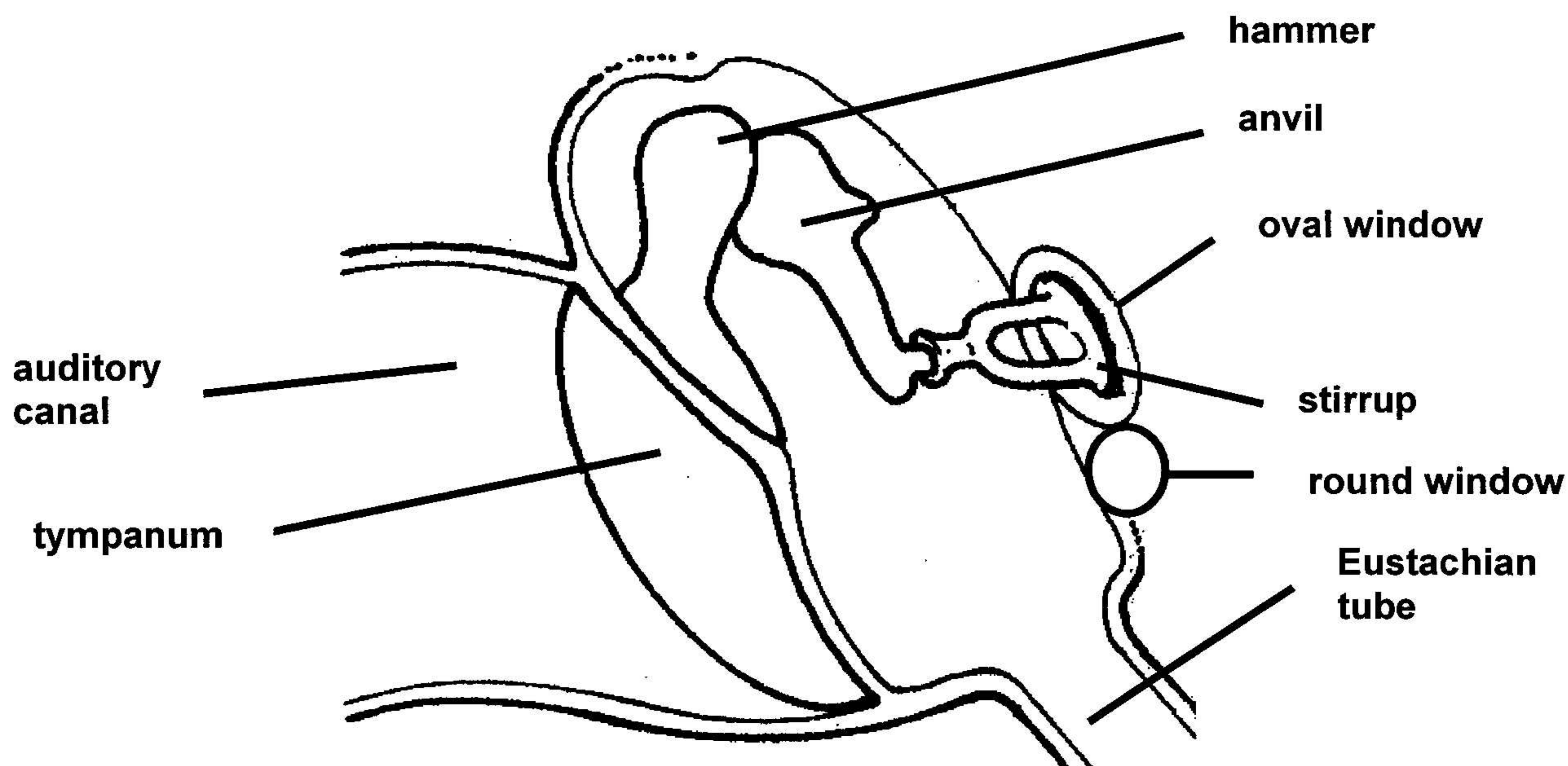
4.1.4 Shivering cause an increase in muscle activity  $\checkmark$   
 which produces heat  $\checkmark$   
 to increase body temperature  $\checkmark$   
 back to normal  $\checkmark$  (any 3)(3)

4.1.5 (i) Ear  $\checkmark$  (1)

(ii) The ear has a larger surface area  $\checkmark$   
 with more superficial blood capillaries  $\checkmark$   
 through which heat is lost to the surroundings  $\checkmark$   
 through radiation  $\checkmark$  (any 2) (2)  
**(12)**

4.2 Sclera  $\checkmark$   
 Choroid  $\checkmark$   
 Retina  $\checkmark$  (3)

4.3 The human middle ear and associated structures ✓



Correct diagram	1
Size	1
Shape	1
Quality of line	1
Correct proportions	1
Caption	1
Labels	any 3

(9)

4.4

- 4.4.1 (i) D ✓✓ (2)
- (ii) C ✓✓ (2)
- (iii) A ✓✓ (2)
- (iv) B ✓✓ (2)

- 4.4.2 - The bony skull/cranium ✓
- Meninges/membranes ✓
- Cerebrospinal fluid ✓ (3)
- (11)

Total Question 4: 35

TOTAL SECTION B: 105

**SECTION C****QUESTION 5**

5.1

- 5.1.1 Iris ✓ (1)
- 5.1.2 (i) - Between the second ✓  
- and third ✓ intervals (2)
- (ii) - Between the sixth ✓  
- and seventh ✓ intervals (2)
- 5.1.3 The electric bulb was at the same distance ✓ from the eye (1)
- 5.1.4 - At the five ✓  
- minute ✓ interval  
**or**  
Between 4 – 5 ✓ minutes ✓ **or** between 5-6 ✓ minutes ✓  
- At this interval the size of the pupil was the largest ✓  
- It was opened wider to adapt to the dim light ✓ (4)
- 5.1.5 - At the 8 minute interval the eye is adjusted for bright light ✓  
- At the 9 minute interval the eye is exposed to dim light ✓  
the radial muscles contract ✓  
- and the pupil dilates ✓  
- and more light enters the eye ✓ (any 4) (4)
- 5.1.6 - The closer any bright light source is to the eye ✓  
- the smaller the diameter of the pupil ✓  
and **vice versa** (2)
- 5.1.7 Constricts in bright light/prevents excess light from entering the eye ✓ (1)

**(17)**



- 5.2 - Balancing on one leg takes place through the sensitive hair cells ✓  
 found in the ampullar ✓  
 cupulae ✓  
 - at the base of the semi circular canals ✓  
 - and otoliths ✓  
 - found in maculae ✓  
 - of the utricle ✓  
 and saccule ✓  
 - and are responsible for dynamic equilibrium ✓  
 - and register the position ✓  
 and movement of the head in any direction ✓  
 - Impulses are generated ✓  
 and transmitted to the cerebellum ✓  
 - which also receive impulses from proprioceptors ✓  
 - in muscles and joints ✓  
 and reacts to the tension or tonus of the muscles ✓  
 - by transmitting the information to the cerebrum ✓  
 - which brings about a co-ordinated reaction ✓  
 - and enabling the person to maintain balance and body position ✓

(any 15)

**Synthesis**

Not attempted	0
Significant gaps in the logic and flow of the answer	1
Minor gaps in the logic and flow of the answer	2
Well structured – demonstrates insight and understanding of the question	3

(3)

(18)

**Total Question 5: 35****TOTAL SECTION C: 35****GRAND TOTAL: 200**