

Question 1

Feature	Haemoglobin	Myoglobin
Is carried in the blood.	✓	✗
Transports oxygen	✓	✗
Acts as an oxygen store in muscle	✗	✓
Transports carbon dioxide	✓	✗

Total 4 marks

Any two correct boxes for one mark

Question 2

- (a) **A** right atrium ; [accept right auricle]
 B (pulmonary) semilunar valve ;
 C mitral / bicuspid / (left) av, valve ;

3 marks

- (b) 1 Reference to, pacemaker / SA node / SAN ;
 2 (Wave of) excitation / eq, in (walls) of atria ;
 3 Causes contraction of (muscle in) atria (walls) ;
 4 Delay at, AV node / AVN ;
 5 Conducted to ventricles via, bundles of His / Purkyne fibres ;

Max 4 marks**Total 7 marks**

Question 3

- (a) A – villus ; [accept villi]
B – lymph vessel / lacteal ; [accept lymph capillary]
C – crypt (of Lieberkuhn) ;

3 marks

- (b) (Villi / microvilli, provide) large surface area ;
To increase rate of absorption / uptake;

Simple / single layered, epithelium / single layer of cells;
Provides short (diffusion) pathway / distance ;

Presence of capillaries ;
To absorb / transport, amino acids / glucose / any other correctly named substance
or
To maintain, diffusion gradient / concentration gradient;

Capillaries near surface ;
Provides short (diffusion) pathway / distance;

Presence of lacteal ;
To absorb / transport, fatty acids / lipids / fats / oils / fat soluble vitamins ;

Presence of (smooth) muscle ;
To assist, contact with contents / mixing;

2 + 2**Max 4 marks**

- (c) Amylase ;

Lining / epithelium / mucosa, of small intestine / ileum / duodenum ;

Glucose + galactose ;

Glucose + fructose ;

4 marks**Total 11 marks**

Question 4

- (a) One peak before day 14 ;
One peak after day 14 ; **2 marks**
[If more than 2 peaks, 1 mark only]
- (b) Corpus luteum / yellow body / ovary ; **1 mark**
- (c) Maintenance of, endometrium / lining of uterus /
secretory phase / inhibits, LH / FSH secretion /
inhibits the, LH / FSH releasing hormone /eq ; **1 mark**
- (d) Regression / degeneration / eq, of corpus luteum /
yellow body ;
Because less LH present / secretion of LH inhibited /
inhibition of LH releasing factor ; **2 marks**
- (e) Remains high / continues to increase / does not
decrease ;
Because, corpus luteum / yellow body, persists / eq ;
Correct reference to human chorionic gonadotrophin
/ HCG ; **Max 2 marks**
- Total 8 marks**

Question 5

Note: Do not credit 'reduce water loss' alone, as this is stated in the question.

Thick cuticle ;
Impermeable to water *or*
Reduces, transpiration / diffusion of water (vapour) /
reduces evaporation ;

Few stomata / stomata on inside of leaf ;
Reduces, transpiration / diffusion of water (vapour) /
reduces evaporation ;

Leaf rolled / eq ;
Reduces (exposed) surface area / stomata open into
enclosed space / maintains high humidity inside leaf /
reduces transpiration / reduces evaporation ;

Stomata in pits / sunken stomata ;
Reduce air movement / increase humidity / reduces
transpiration / reduces evaporation ;

Presence of hairs / eq ;
Reduce air movement / trap moist air (next to leaf) /
reduce diffusion (gradient) / reduces transpiration /
reduces evaporation ;

Presence of hinge cells ;
To curl leaf ;

2+2+2 marks

Total 6 marks

Question 6

(a) Transfer of pollen (grains) ;

From anther to stigma ;

By named agent, e.g. wind / water / insect / animal ;

Max 2 marks

(b) Large anthers ;

Large numbers of pollen (grains) produced ;

Exposed / swinging / versatile, anthers / long filaments /
exposed stamens ;

Pollen shed into air / shaken by wind ;

Exposed / feathery, stigmas ;

Large surface area to, catch / trap, pollen (grains from the
air) ;

2+2 marks

Max 4 marks

(c) Protandry / male /eq parts ripen before female /eq ;

Protogyny / female /eq parts ripen before male /eq;

[male and female parts ripen at different times = 1 mark]

Dioecious plants / individual plants either male or female ;

Max 3 marks

Total 9 marks

Question 7

- (a) *Tubifex* / sludgeworm / rat-tailed larva / midge larva /
Chironomus larva / bloodworm / gnat larva /
mosquito larva;

1 mark

- (b) Haemoglobin / respiratory pigment (in blood) ;
Picks up oxygen (at low external oxygen
concentrations) / very high affinity for oxygen ;

Very thin body wall ;
Short oxygen (diffusion) pathway ;

Blood (vessels) near body surface ;
Short oxygen (diffusion) pathway ;

Waving tail ;
Circulates water next to body / eq. ;

Reference to breathing tube / eq ;
Goes to surface / to obtain oxygen from the air ;

Presence of hairs / wing cases / elytra ;
To trap an air bubble ;

[Credit other correct example]

2 + 2

Max 4 marks

Total 5 marks

Question 8

- (a) To provide oxygen ;
For aerobic respiration ;
Reference to requirement for ATP (produced by respiration) ; **Max 2 marks**
- (b) $38.1 \div 7.29$;
 $= 5.2$; [accept 5.23] **2 marks**
- (c) They are taken up, by active transport / active uptake / actively ;
Because the concentration in cell sap is higher than concentration in culture solution / ions are taken up against a concentration gradient ; **2 marks**
- (d) (i) Concentrations of ions increases as temperature increases ;
Credit any quantitative description ; **2 marks**
- (ii) (Increase in temperature) increases, kinetic energy / movement (of ions);
Increases enzyme activity ;
Increases, (rate of) respiration / production of ATP ;
Increases (rate of) collisions of ions with transporter protein / eq ;

Max 2 marks**Total 10 marks**

Question 9

Accept points only in correct context

- 1 Carbon dioxide in and oxygen out during, day / light *and* carbon dioxide out and oxygen in during, night / darkness ;
- 2 Photosynthesis and respiration during day but only respiration at night ;
- 3 (During day) photosynthesis provides (more than enough) oxygen for respiration/ eq ;
- 4 Gases / oxygen / carbon dioxide, enter / leave, through stomata ;
- 5 (Passive) movement, down concentration gradient / by diffusion ;
- 6 Guard cells control opening of stomata ;
- 7 Description of mechanism of, opening / closing ; [e.g. changes in turgor / movement of potassium / protons / pH / water]
- 8 Influence of an environmental factor on, opening / closing stomata ;
- 9 Large surface area provided by, flat leaf / spongy mesophyll cells ;
- 10 Air spaces allow, rapid / easy, diffusion within leaf ;
- 11 Thin leaf for, rapid diffusion / short (diffusion) pathway ;
- 12 Thin cell walls (in mesophyll) for, rapid diffusion / short (diffusion) pathway;
- 13 Moist, cell surface / walls (of mesophyll), to enable gases [accept named gas] to dissolve ;
- 14 Reference to gas exchange in roots ;
- 15 Reference to lenticels in woody stems / eq ;

Credit any point from well drawn and annotated drawings

Total 10 marks