This marking guideline consists of 10 pages.
SECTION A

QUESTION 1

1.1 1.1.1 C ✓✓

1.1.2 A ✓✓

1.1.3 D ✓✓

1.1.4 D ✓✓

1.1.5 B ✓✓

1.1.6 D ✓✓

1.1.7 C ✓✓

1.1.8 B ✓✓

1.1.9 C ✓✓

1.1.10 B ✓✓

(10 x 2) (20)

1.2 1.2.1 Obesity ✓

1.2.2 Starch ✓

1.2.3 Community ✓

1.2.4 Emigration ✓

1.2.5 Alcoholic fermentation ✓

1.2.6 Light energy / Solar energy / Radiant energy ✓

1.2.7 Competitive exclusion ✓

1.2.8 Interspecific competition ✓

1.2.9 Niche ✓

(9 x 1) (9)

1.3 1.3.1 None ✓✓

1.3.2 B only ✓✓

1.3.3 A only ✓✓

(3 x 2) (6)
1.4 1.4.1  (a) C ✓
      (b) A ✓
      (c) B ✓
1.4.2  B ✓
1.4.3  A ✓ and C ✓

1.5 1.5.1  Oesophagus ✓
1.5.2  Peristalsis ✓
1.5.3  P Liver / Pancreas ✓ (Any order)
       Q Pancreas / Liver ✓ (Any order)
1.5.4  Stomach ✓

1.6 1.6.1  (a) Stroma ✓
      (b) Ribosome ✓
1.6.2  It stores the starch ✓
1.6.3  Granum / Grana / Thylakoid ✓

TOTAL SECTION A: 50
SECTION B

QUESTION 2

2.1 2.1.1  The number of births ✓ per 1000 females of child bearing age. ✓

2.1.2  The fertility rate decreased ✓ in BOTH developed and developing countries. ✓
But the fertility rate decreased MORE in the developing countries ✓ compared to the developed countries.

2.1.3 - The people in both countries were becoming educated ✓
- There was more access to contraceptives ✓
- People concentrate more on their careers ✓
- Realisation: standard of living is higher in smaller families ✓
- The increase in sexually transmitted diseases led to people using more contraceptives like condoms ✓

2.1.4 Low fertility rate means fewer babies born (declining population) and this leads to:
- fewer workers ✓
- to drive the economy ✓/pay tax
- immigrants are brought in to work ✓/ outsource the work to other countries
- more money flows out of the country ✓
- aging population/many elderly to be supported ✓
- elderly don’t contribute to the economy ✓
- negative effect on the economy ✓

(Mark the first THREE only)

2.2 2.2.1 (a) Ureter ✓

(b) Kidney ✓

(c) (Urinary) Bladder ✓

2.2.2 The blood in C contains less waste products ✓ than the blood in D ✓
OR
The blood in C contains less oxygen ✓ than the blood in D ✓
OR
The blood in C contains more carbon dioxide ✓ than the blood in D ✓
(Mark the first ONE only)

(Any 1 x 2) (2)
2.2.3

Rubric for marking diagram:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct diagram and one blood vessel larger(wider) than the other</td>
<td>1</td>
</tr>
<tr>
<td>Any three correct labels</td>
<td>3</td>
</tr>
</tbody>
</table>

2.2.4

(a) Kidney stone ✓ / Renal stone 

(b) Drinking more water ✓
   Eat less food containing salt ✓
   (Mark the first ONE only) 
   (Any 1) 

2.3

2.3.1 Mark and recapture method ✓ 

2.3.2 \[ P = \frac{M \times C}{R} \]
   \[ = \frac{50 \times 96}{8} \]
   \[ = 600 \text{ locusts} \]
2.3.3 - Only a short period of time between the first and second catch ✓
- The organisms should not be harmed during the catching/marking ✓
- Marked organisms should be able to move freely between the other organisms ✓
- It should be a closed population ✓ / No immigration or emigration should take place
- Repeat the investigation to calculate the average population ✓

(Mark the first TWO only) (Any 2) (2)

2.4 2.4.1 A villus ✓

2.4.2 (a) Columnar epithelium ✓ (1)
(b) Lacteal vessel ✓ (1)

2.4.3 Small intestine ✓ (1)

2.4.4 - It is long, ✓ which means it has a very large surface area for absorption ✓
- It has many folds ✓ which enlarges the surface area for maximum absorption of nutrients ✓
- millions of villi and micro-villi ✓ which enlarge the surface area even further ✓
- circular and longitudinal muscles ✓ responsible for the movement of food by peristalsis. ✓
- Coiled tube slows down the movement of food ✓ (increases transit time) to ensure maximum absorption of nutrients. ✓
- The thin-walled ✓ villi (outer walls of villi are lined by a single layer of columnar epithelium) facilitate easy absorption. ✓
- Absorptive surface is kept moist ✓ by digestive juices and mucus to facilitate diffusion of nutrients. ✓
- Villi are well supplied with blood capillaries and lacteals ✓ to ensure that absorbed nutrients are quickly transported away. ✓

(Mark the first TWO only) (Any 2 x 2) (4)

2.4.5 C ✓ (1)

2.4.6 - The capillary flows in at D ✓
- Then absorption of nutrients will take place ✓
- From the small intestine into the capillaries in the villus ✓
- When the blood leaves at C, it will be rich with nutrients ✓

(Any 2) (2)

2.4.7 - The body will not be able to absorb nutrients ✓* (minerals or vitamins)
- They will run the risk of malnutrition ✓
- which will lead to retarded growth ✓ / Fatigue / Weight loss

* Compulsory mark + any 1 (2)

[40]
QUESTION 3

3.1 3.1.1 The population size of lady birds ✓ and green flies over time ✓
    OR
    The graph showing the predator prey interaction in an ecosystem over a period of time (from Jan ’98 to Oct ’99).
    (2)

3.1.2 Accelerated/Logarithmic/Geometric/Exponential growth phase ✓
    (1)

3.1.3 Green flies ✓
    (1)

3.1.4 - The two species control each other’s population size ✓
    - When the lady bird population increased the green flies decreased ✓ due to increased rate of predation. ✓
    - When the population of green flies decreased, the number of lady birds decreased ✓ due to a shortage of food. ✓
    - therefore, size of both populations did not exceed the carrying capacity. ✓
    (Any 3) (3)

3.2 3.2.1 When kidneys become so damaged ✓ they no longer function properly ✓
    (2)

3.2.2 Dialysis ✓
    (1)

3.2.3 B ✓
    (1)

3.2.4 - The waste products move out from the dialysis tubing/blood ✓
    - where there is a high waste product concentration ✓
    - into the dialysis fluid ✓
    - where there is a low waste product concentration ✓
    - through the process of diffusion ✓
    - concentration gradient is maintained because dialysis fluid is being pumped ✓
    (Any 3) (3)

3.2.5 Allows selective movement of waste products ✓ into dialysis fluid ✓
    (Any 2) (2)

3.2.6 - More water will remain in the bloodstream ✓
    - Blood volume will increase ✓
    - therefore, the blood pressure will increase ✓
    (3)

3.3 3.3.1 Carbon dioxide is released during aerobic respiration. ✓✓
    (2)

3.3.2 To ensure all micro-organisms are killed. ✓ / To eliminate any other organisms. / To ensure the carbon dioxide present is only produced by the germinating seeds.
    (1)

3.3.3 - Same kind of seeds ✓
    - Constant temperature of 35 °C ✓
    - Apparatus kept in the dark ✓
    (Mark the first TWO only) (Any 2) (2)
3.3.4 - The apparatus would be set up in the exact same way ✓
- except by using no seeds ✓ / seeds that were boiled ✓
- To ensure that the changes observed in the investigation were caused by the cellular respiration/germinating seeds ✓ (3)

3.3.5 - Germinating seeds need a lot of energy for growth ✓
- and the rate of cellular respiration will be high ✓
- more carbon dioxide released ✓
- achieving better results ✓ (Any 2) (2)

3.4 3.4.1 Rate of photosynthesis ✓ (1)
3.4.2 0,14% ✓ (1)
3.4.3 - Amount of water ✓
- Temperature ✓
- Light ✓
(Mark the first TWO only) (Any 2) (2)

3.4.4 Rate of photosynthesis under different CO₂ concentrations at low light intensity

Mark allocation for the graph:
- Line graph is drawn 1
- Title of the graph (includes both variables) 1
- Correct scale for x-axis and y-axis 1
- Correct labels and units for the x-axis and the y-axis 1
- Plotting of the points
  - 0 points correct 0
  - 1–5 points correct 1
  - All points correct 2
- Only low light intensity graph is drawn 1 (7)

[40]

TOTAL SECTION B: 80
SECTION C

QUESTION 4

Inhalation
- The diaphragm contracts ✓
- It becomes less rounded ✓ / flat
- The external intercostal muscles contract ✓
- causing the ribcage to move up- and outwards ✓
- The volume of the chest cavity increases ✓
- The volume of the lungs also increases ✓
- The pressure decreases ✓
- Air flows into the lungs ✓

Gaseous exchange of oxygen in the lungs
- There is a high oxygen concentration in the alveoli ✓
- The blood has a low oxygen concentration ✓
- A concentration gradient is created ✓
- Oxygen will move from the alveoli to the bloodstream ✓
- By the process of diffusion ✓

Homeostatic control of carbon dioxide
- Because of exercise the carbon dioxide levels in the blood will increase ✓
- The medulla oblongata will be stimulated ✓
- to send messages to the heart ✓
- breathing muscles ✓
- the heart beats faster ✓
- blood with carbon dioxide is pumped to the lungs faster to be exhaled ✓
- the breathing muscles contract faster ✓
- and the rate and depth of breathing increases ✓
- more carbon dioxide is removed out of the body ✓
- The carbon dioxide levels decrease back to normal ✓
# ASSESSING THE PRESENTATION OF THE ESSAY

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Relevance(R)</th>
<th>Logical sequence(L)</th>
<th>Comprehensive(C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generally</td>
<td>All information provided is relevant to the topic</td>
<td>Facts are arranged in a logical/sequential order</td>
<td>All aspects required by the essay have been sufficiently addressed.</td>
</tr>
<tr>
<td>In this essay</td>
<td>Only information with regard to inhalation, gaseous exchange of oxygen only in the lungs and homeostatic control of carbon dioxide</td>
<td>The sequence of events in inhalation, gaseous exchange and control of carbon dioxide levels is correct</td>
<td>Inhalation (4/6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Gaseous exchange (3/4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Homeostatic control of carbon dioxide (5/7)</td>
</tr>
</tbody>
</table>

| MARK              | 1                                                                              | 1                                                                                   | 1                                                                                 |

Content: (17)    
Synthesis: (3)  

TOTAL SECTION C: 20  
GRAND TOTAL: 150