**Task 2: Extended Response**

Mark: \_\_\_\_\_\_\_\_\_\_/25

**Year 11 Human Biology 2016**

Answer the two questions below on the lined paper provided. You can choose how to structure you answer, and may include labelled diagrams or tables if appropriate.

**Questions 1)**

1. Discuss the structural and chemical properties of enzymes. (6 marks)

Structural properties:

• Enzymes are proteins

• Have an active site that is specific to a particular substrate/s

• After the reaction the enzyme is unchanged

Chemical properties:

• Are biological catalysts

• Increase the rate of reaction

• Lower the activation energy required for a reaction to occur

• Can become denatured at high temperatures or pHs above or below the optimum range.

• Denatured enzymes have had the their active site changed and cannot participate in reactions

**Must have at least 6 points (from either category above)**

1. Compare and contrast the ‘lock and key hypothesis’ to the ‘induced fit model’ of enzyme action. (5 marks)

Similarities: **Must have 3 points**

• Both incorporate a lowering of activation energy

• Both explain how the enzyme can be recycled

• Both propose a need for an active site

• Both propose that the enzyme remains unchanged after the reaction

Differences: **Must have 2 points**

• Lock and key – enzyme’s shape is rigid (doesn’t change)

• Induce fit – shape of the enzyme changes to accommodate the substrate/s

**Question 2)**

Respiration is a process common to all living cells.

1. Describe in detail the nature and location of the chemical processes involved in muscle cell respiring aerobically. (10 marks)

**Max 10 marks**

• Correct chemical equation 2 marks

(or similar worded answer stating products and reactants including energy)

• Glycolysis: 1 mark

* Location: cytoplasm 1 mark
* Description:
  + Glucose 🡪 pyruvate 1 mark
  + 2 ATP formed 1 mark
  + No oxygen required 1 mark

• Kreb’s cycle and electron transport chain 2 marks

* Location: mitochondria 1 mark
* Description:
  + Pyruvate 🡪 CO2 and H2O 1 mark
  + 34 – 36 ATP formed 1 mark

(either number is acceptable)

* + Oxygen is required 1 mark

1. Explain why cellular respiration is essential for maintenance of life. (4 marks)

Why is it essential?

* ATP is an energy source essential for cellular activities **1 mark**

Such as: **Max 3 marks**

* Active transport
* Protein synthesis
* Anabolic reactions
* DNA replication / cell division
* Maintaining cell organisation
* Transporting substances within the cell
* Movement of whole cell
* Transmitting nerve impulses