AQA, OCR, Edexcel

A Level

A Level Biology

Energy and Ecosystems Questions

Name:

M M E

Mathsmadeeasy.co.uk

Total Marks: /28

Energy and Ecosystems

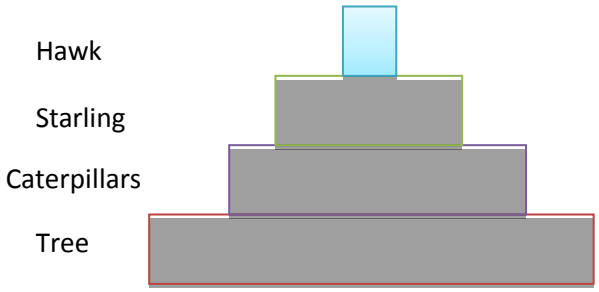
1. Energy is required to keep all organisms within an ecosystem alive. Energy originates from the sun and is transformed via photosynthesis to a useable biological product that can be transferred across organisms

   a) i) What is the definition of an ecosystem? (2 marks)

   ii) How is energy transferred to from organism to organism in an ecosystem?
   (1 mark)

   b) Food chains can be represented in different types of pyramid.

   i) The diagram below shows a pyramid of biomass. Identify one advantage and one disadvantage of representing a food chain in this way. (2 marks)



   ii) Using the organisms in the diagram above, draw:
   - Pyramid of Numbers
   - Pyramid of Energy (2 marks)

2. Energy transfer between organisms is not 100% efficient. Energy is lost at each trophic level.

   a) i) Give one reason why plants do not take in 100% of the available energy from sunlight that reaches their leaves? (1 mark)

ii)Approximately 90% of energy at each trophic level is wasted. Identify two ways in which energy is wasted at each level. (2 marks)

b) The productivity of energy transfer can be calculated in terms of Gross Primary Productivity and Net Primary Productivity.

i) Explain what is meant between these two terms and include an equation to show the relationship between the GPP and NPP. (3 marks)

ii) A fox receives 30 000 $kJm^{-2}yr^{-1}$ of energy. It doesn't take in 16 000 $kJm^{-2}yr^{-1}$ of this. It uses 7 000 $kJm^{-2}yr^{-1}$ respiration. Use this information to complete the table below. (3 marks)

GPP	
NPP	
% Efficiency of energy transfer	

3. There are many different way of investigating organisms within an ecosystem.

a) Ecosystems are made up of living organisms and abiotic factors.
i) Identify three examples of abiotic factors. (3 marks)

ii) Match the three scenarios below to the best method of investigation. (2 marks)

Estimating the size of the beetle population in an area of woodland	Line transect
Frequency of two daisy populations in a field	Mark-recapture release technique
How the distribution of species changes over a section of land	Quadrat frames

iii) For the mark-release-recapture technique to be accurate, there are certain assumptions that are applied. Identify three of these assumptions. (3 marks)

iv) What is the difference between a line transect and a belt transect? (2 marks)

v) Describe how to complete a random sample of any given area using quadrats? (2 marks)