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GCE AS / A LEVEL – BIOLOGY UNIT 2 QUESTION PACK

1072-01 (Legacy BY2) · New spec Unit 2 Topic 3 · AS unit, first sat 2016, 80 marks, 1h 30min paper

REVISE

.wales

BIOLOGY – UNIT 2 · AUTOTROPHS, HETEROTROPHS & PARASITES

BY2.2.3 Adaptations for nutrition – modes of nutrition and parasitic specialisation

*Autotrophic vs heterotrophic nutrition (holozoic, saprotrophic, parasitic, mutualistic), with detailed adaptations of the pork tapeworm *Taenia solium*, *Echinococcus* and the parasitic plant mistletoe.*

LEGACY 2008 SPECIFICATION

Estimated time for entire question pack: ~1 h 18 min

Derived from the legacy BY2 paper's pace of ~1.1 min/mark, padded for long-prose answers (49 marks over 6 questions).

*You are advised to **not** attempt to complete all of this in one sitting.*

ABOUT THIS QUESTION PACK

This is a **comprehensive practice question pack**, not a single mock paper. It contains every question from the legacy WJEC BY2 papers (2008 modular spec, 2011–2017) that maps onto new-spec AS Unit 2 Topic 3 (2.3).

Questions are ordered by source paper date.

INSTRUCTIONS

Use black ink or black ball-point pen. Show all working – quality of written communication will affect marks. A calculator is allowed. Diagrams included in answers must be fully annotated.

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Q	Source	Max	Mark
1	Jun 11 Q3	8	
2	Jun 12 Q3	6	
3	Jun 13 Q5	5	
Total		49	

Q	Source	Max	Mark
4	Jan 13 Q6	10	
5	Jan 14 Q4	11	
6	Jun 16 Q1	9	
Total		49	

Autotrophs, Heterotrophs & Parasites – what the new spec asks

WJEC GCE AS / A Level Biology (from 2015) · Unit 2: Biodiversity & Physiology of Body Systems · Topic 2.3.

Modes of nutrition

- Autotrophic: synthesise own organic compounds (photo- or chemoautotrophic).
- Heterotrophic: depend on organic compounds from other organisms.
- Holozoic, saprotrophic, parasitic, mutualistic.

Saprotrophs & mutualism

- Saprotrophs (fungi, bacteria) secrete enzymes, absorb digested products.
- Mutualism: both organisms benefit (e.g. *Rhizobium* in legume nodules).
- Decomposers recycle nutrients in the ecosystem.

Parasites – general adaptations

- Live on / in a host, gaining nutrients at host's expense.
- Specialised attachment, suppression of host defences, high fecundity.
- Complex life cycles often involve secondary hosts.

Taenia solium & mistletoe

- Pork tapeworm: scolex with hooks & suckers, no gut (absorbs across tegument), hermaphroditic proglottids.
- *Echinococcus granulosus*: dog tapeworm; humans accidental host.
- Mistletoe (*Viscum album*): hemiparasite; haustoria tap host xylem.

Autotrophs, Heterotrophs & Parasites in one page

Quick-reference notes – revisit before each question.

Autotrophic vs heterotrophic

Auto: make own organic from inorganic + energy.

Photo (light) vs chemo (oxidising chemicals).

Hetero: feed on others' organic compounds.

Holozoic / saprotrophic / parasitic

Holozoic: ingest, digest internally (most animals).

Saprotrophic: external digestion of dead matter (fungi).

Parasitic: live on/in host, harm host.

Mutualism

Both partners benefit.

e.g. *Rhizobium* in legume root nodules – fix N₂, get sugars.

Lichens (alga + fungus); gut bacteria in herbivores.

Taenia solium

Pork tapeworm; lives in human gut.

Scolex with hooks + suckers; no gut (absorbs through tegument).

Proglottids each contain reproductive organs; hermaphroditic.

Parasite life cycles

Eggs in faeces → secondary host (pig) eats → cysts in muscle.

Human eats undercooked pork ⇒ new tapeworm.

Echinococcus: dog <> sheep; humans are accidental hosts.

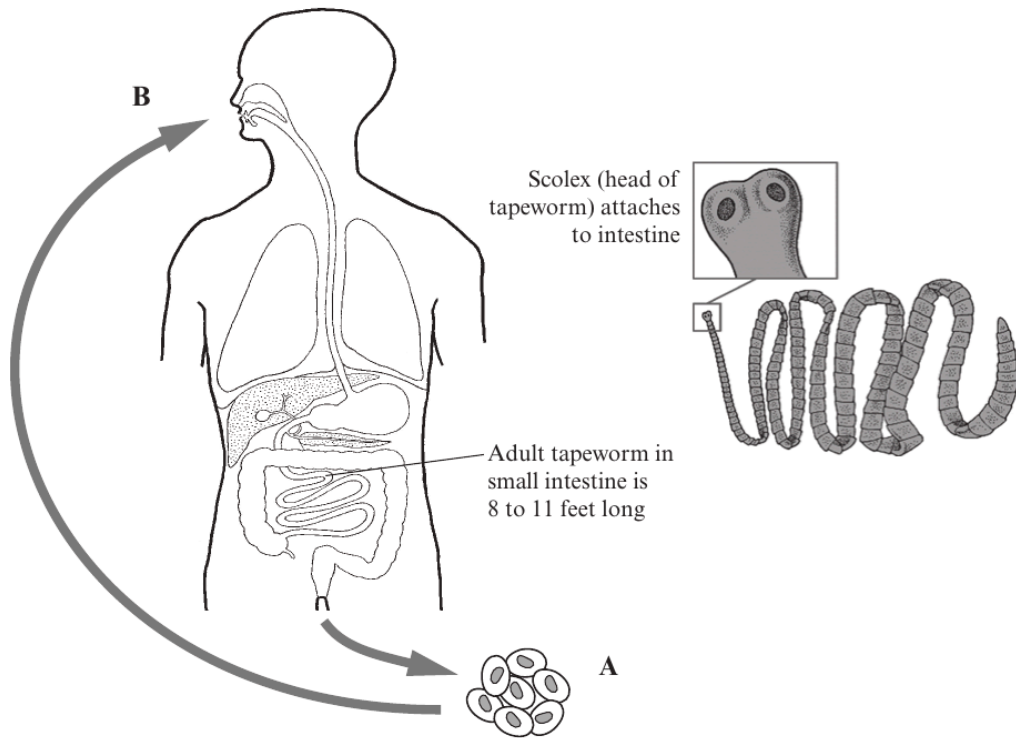
Mistletoe

Hemiparasite – has chlorophyll but no roots.

Haustoria penetrate host's xylem to take water & minerals.

Viscum album on tree branches.

3. The diagram below shows the life cycle of the pork tapeworm *Taenia solium*.



(a) Describe the sequence of events which occur between A and B, from passing of the tapeworm eggs in human faeces to the infection of another human host. [2]

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(b) Give **three** features of the tapeworm which show how the parasite is adapted to its way of life. [3]

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(c) What **two** simple precautions can be taken to avoid infection by the pork tapeworm? [2]

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- (d) The drug used to treat infections is Praziquantel which works by inducing severe spasms and paralysis of the worm's muscles. Suggest how this may cause the removal of the tapeworm. [1]

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(Total 8 marks)

3. Define the following terms and give an example of a different organism for each. [6]

Parasite

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Example

Autotroph

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Example

Saprophyte or saprobiont

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Example

(Total 6 marks)



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5. The tapeworm, *Taenia solium*, is a parasite of humans.

(a) State what is meant by the term *parasite*. [2]

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The tapeworm consists of a head with no mouth, followed by a large number of thin flat segments called proglottids.

(b) Describe how the tapeworm is adapted to obtain its nutrients. [3]

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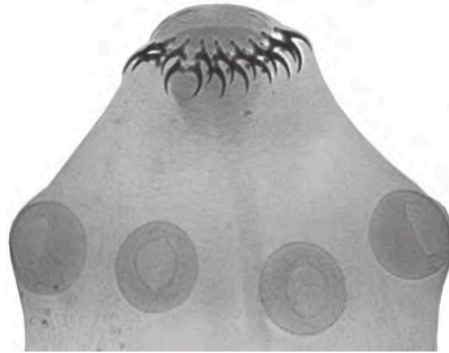
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6. The photograph below shows the scolex (head region) of an adult tapeworm (*Taenia solium*).

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[www.k-state.edu, original photograph by S.J. Upton]

(a) Define the term *parasite*. [2]

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(b) (i) Identify **two** structures shown in the photograph above which are adaptations to allow the tapeworm to survive in the gut of a human. [1]

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(ii) Explain how the **two** structures you have identified in part (b)(i) help the adult tapeworm to survive. [2]

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(c) Tapeworms have no mouth or digestive system.

State why the adult tape worm does not need a digestive system and explain how the tape-like shape of the worm's body enables it to feed without a mouth or gut. [3]

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(d) Describe how the tapeworm's reproductive strategy helps to ensure its survival. [2]

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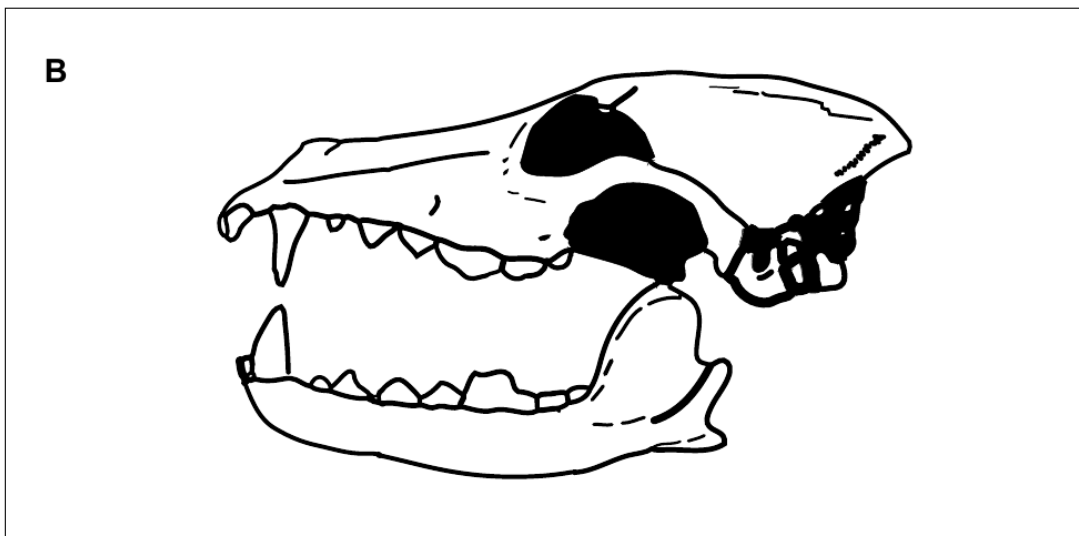
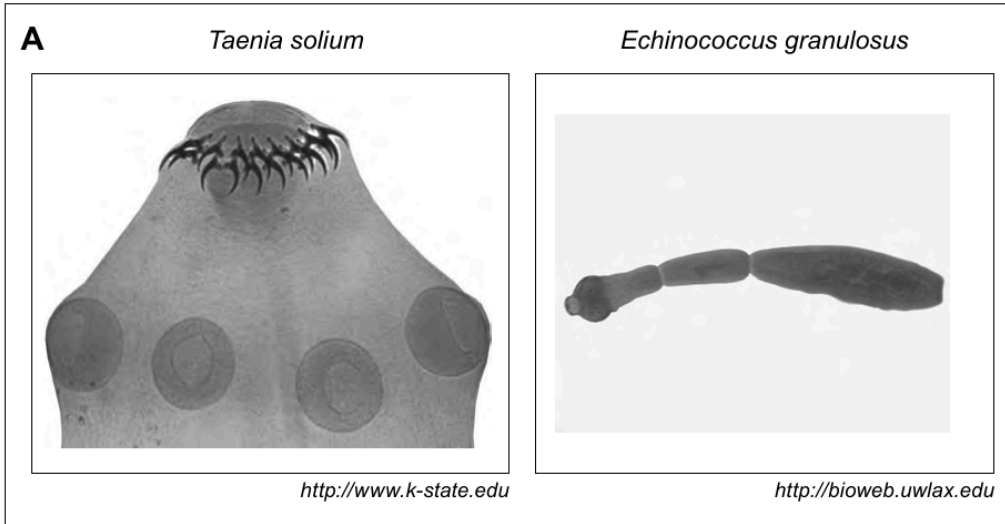
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4. The diagrams below show the gut parasites *Taenia solium* and *Echinococcus granulosus* (A) and the skull of a mammal (B).



- (a) (i) State what is meant by the term *parasite*. [2]

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- (ii) Using the photographs in **A** opposite, and your own knowledge, state **three** features of the gut parasites that are adaptations to their parasitic way of life. [3]

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- (iii) State the type of diet eaten by the animal shown in diagram **B** opposite. Give reasons for your answer. [3]

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(b) Explain how a parasitic mode of nutrition is

- (i) similar to the mode of nutrition used by the mammal in diagram **B** opposite, [1]

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- (ii) different from the mode of nutrition used by the mammal in diagram **B** opposite. [2]

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Answer **all** questions.

1. (a) Photograph **A** below is of a mistletoe plant, *Viscum album*, attached to the branch of a tree. Photograph **B** shows an enlarged image of the mistletoe plant. Mistletoe plants attach to and penetrate the branches of a tree in order to obtain water and nutrients from the tree. This commonly reduces the growth of the host tree and can kill the portion of branch it grows on.



Photograph **A**



Photograph **B**

- (i) Explain why mistletoe is referred to as being a parasite. [1]

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- (ii) Mistletoe however is only partially parasitic. Use the information provided to explain this statement. [2]

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(b) The diagrams below show the skulls of two different animals. For each of the animals, state their **mode of nutrition** and explain how their **dentition** is adapted to their mode of nutrition.



Animal X



Animal Y

Animal X

[3]

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Animal Y

[3]

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END OF QUESTION PACK

6 questions · 49 marks · ~1 h 18 min

Source: WJEC BY2 (2008 modular spec, 2011–2017)

Curated for WJEC Biology 2015 spec AS Unit 2 – Topic 3 (2.3)

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