

## **B14- Genetics and Evolution Exam Practice 2**

**Name:**

**Score:**

**Q1.**

A fossil was found in rocks. The rocks were formed from mud.

The fossil is of the fungus *Ourasphaira giraldae*.

(a) What is the genus of the fungus?

Tick (✓) **one** box.

Giraldae

Ourasphaira

Ourasphaira giraldae

**(1)**

(b) The mud around the fungus did **not** contain oxygen.

Which process did the mud around the fungus prevent?

Tick (✓) **one** box.

Decay

Geological activity

Photosynthesis

**(1)**

(c) The fossilised fungus is estimated to be 890 000 000 years old.

What is 890 000 000 in standard form?

Tick (✓) **one** box.

$8.9 \times 10^6$

$8.9 \times 10^7$

$8.9 \times 10^8$

$8.9 \times 10^9$

(1)

(d) Traditional classification divided organisms into kingdoms.

Who developed the traditional system of classification?

Tick (✓) **one** box.

Carl Linnaeus

Carl Woese

Charles Darwin

(1)

(e) More recent classification methods use a three-domain system.

What is the name of the domain the fungus *Ourasphaira giraldae* is classified in?

Tick (✓) **one** box.

Bacteria

Eukaryota

Plants

(1)

(f) Why has classification changed over time?

Tick (✓) **one** box.

Electron microscopes allow more detail to be seen inside cells.

Many more types of organisms have become extinct.

Some fossils are buried so deep that they may never be discovered.

(1)

(g) The fungus *Ourasphaira giraldae* is now extinct.

Give **two** possible causes of extinction.

1 \_\_\_\_\_

\_\_\_\_\_

2 \_\_\_\_\_

\_\_\_\_\_

(2)

(Total 8 marks)

## Q2.

Bacteria and viruses can reproduce quickly inside the body and make people feel ill.

(a) Use the correct answer from the box to complete the sentence.

<b>antibodies</b>	<b>antitoxins</b>	<b>toxins</b>
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Bacteria and viruses make us feel ill because they produce \_\_\_\_\_ .

(1)

(b) (i) Antibiotics can be used to treat some infections.

Use the correct answer from the box to complete the sentence.

<b>bacteria</b>	<b>bacteria and viruses</b>	<b>viruses</b>
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Antibiotics are medicines that kill \_\_\_\_\_ .

(1)

- (ii) New strains of pathogens have developed which are resistant to antibiotics.

Use the correct answer from the box to complete the sentence.

<b>are short of food</b>	<b>invade body cells</b>	<b>mutate</b>
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New strains are produced when pathogens \_\_\_\_\_ .

(1)

- (iii) What will scientists have to develop to kill these new resistant strains?

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(1)

(Total 4 marks)

### Q3.

Living things can be classified into groups.

- (a) Scientists look at structures inside cells to classify living things.

Suggest **one** structure found in cells that can be used to classify living things.

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(1)

- (b) The table below shows one system for classifying humans.

<b>X</b>	Animalia
<b>Phylum</b>	Chordata
<b>Class</b>	Mammalia
<b>Order</b>	Primates
<b>Family</b>	Hominidae
<b>Genus</b>	<i>Homo</i>
<b>Species</b>	<i>Sapiens</i>

Who devised this system of classification?

Tick **one** box.

- |          |                          |
|----------|--------------------------|
| Darwin   | <input type="checkbox"/> |
| Linnaeus | <input type="checkbox"/> |
| Wallace  | <input type="checkbox"/> |
| Woese    | <input type="checkbox"/> |

(1)

(c) Look at the table above.

**X** is the largest category in this classification.

Name category **X**.

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(1)

(d) Give the **binomial name** of humans.

Use information in the table above.

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(1)

(e) Suggest **one** way that classification systems are useful to scientists.

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(1)

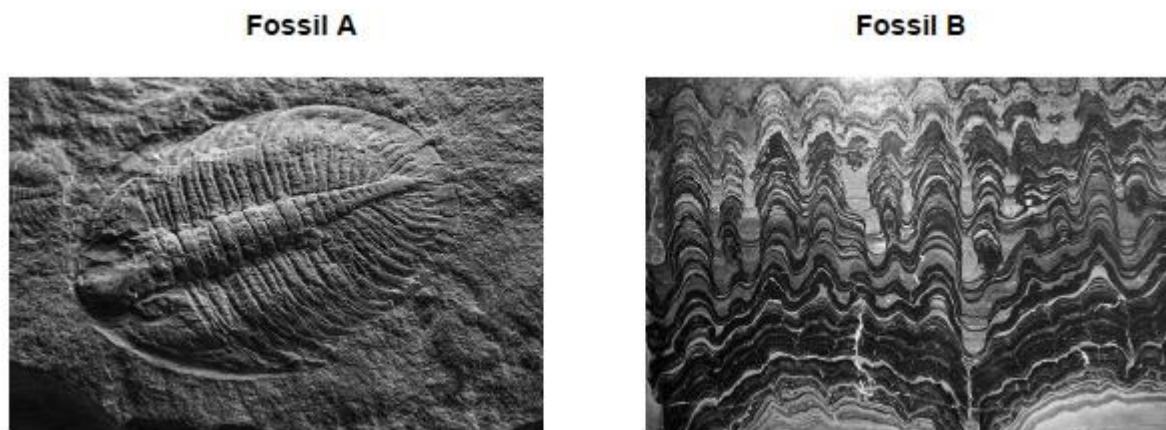
(Total 5 marks)

## Higher Tier Questions

**Q4.**

**Figure 1** shows photographs of fossils of extinct organisms.

**Figure 1**



(a) What is a fossil?

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(2)

(b) What does extinct mean?

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(1)

(c) **Fossil A** is a trilobite which had a shell, eyes and limbs.

**Fossil B** is a stromatolite formed by layers of microorganisms.

Which **two** statements suggest that the microorganisms lived at an earlier time than the trilobites?

Tick **two** boxes.

Microorganisms have a more simple structure than a trilobite.

Stromatolites are found in older rock than trilobites.

Stromatolites are layers of minerals left behind by millions of microorganisms.

Stromatolites structures are larger than trilobite fossils.

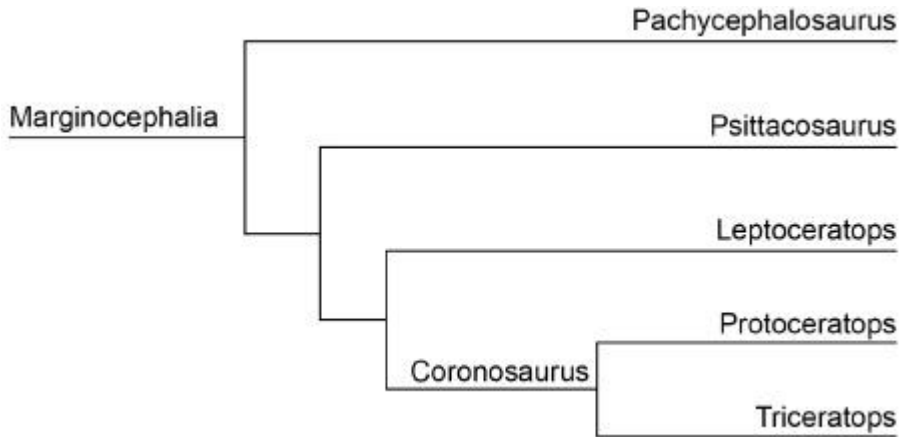
Trilobites lived in the sediment on the sea floor.

(2)

**Figure 2** shows an evolutionary tree drawn from the fossil record in the 1970s.

The evolutionary tree is for a group of dinosaurs.

**Figure 2**



(d) Scientists in the 1970s did radiocarbon dating on all the fossils.

Which fossil gave the earliest radiocarbon date?

\_\_\_\_\_ (1)

(e) Suggest which **two** types of dinosaur fossils showed the most similar features.

\_\_\_\_\_ (1)

(f) Give **one** reason why this evolutionary tree might **not** be correct.

\_\_\_\_\_  
\_\_\_\_\_ (1)

(1)  
**(Total 8 marks)**

**Q5.**

A fossil was found in rocks. The rocks were formed from mud.

The fossil is of the fungus *Ourasphaira giraldae*.

(a) What is the genus of the fungus?

\_\_\_\_\_

(1)

(b) Why was the mud important during the formation of the fossil?

Tick (✓) **one** box.

The fungus completely decayed in the mud.

The mud stopped oxygen reaching the fungus.

There was water in the mud around the fungus.

(1)

The estimated age of the fossil is in the range from  $8.9 \times 10^8$  years old to  $1.1 \times 10^9$  years old.

(c) Calculate the size of the range of the estimated age of the fossil.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Size of range = \_\_\_\_\_ years

(1)

(d) Humans did **not** exist when the fungus was alive.

Suggest **one** other reason why an accurate estimation of when this species of fungus existed is not known.

\_\_\_\_\_  
\_\_\_\_\_

(1)

Carl Woese developed the three-domain system of classification.

(e) Fungi are **not** in the domain Archaea.

Which domain are fungi classified in?

\_\_\_\_\_



(1)

(f) Which **two** characteristics are features of organisms in the domain Archaea?

Tick (✓) **two** boxes.

Can only survive in light

Can survive in extreme environments

Cells contain chloroplasts

Cells do not have a cell wall

Cytoplasm contains DNA

(2)

(g) Carl Linnaeus lived in the 1700s.

Carl Linnaeus classified living things into groups depending on their appearance.

Give **three** types of evidence that are used **now** to classify living things.

Do **not** refer to appearance in your answer.

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

(3)

(Total 10 marks)

## Mark schemes

### Q1.

- (a) Ourasphaira 1
- (b) decay 1
- (c)  $8.9 \times 10^8$  years old 1
- (d) Carl Linnaeus 1
- (e) eukaryota 1
- (f) electron microscopes allow more detail to be seen inside cells 1
- (g) any **two** from:
- drought
  - ice age
  - global warming  
*if none of these, allow climate change for 1 mark  
ignore weather*
  - volcanic activity
  - asteroid collision  
*if neither of these, allow catastrophic event or  
natural disaster for 1 mark*
  - (new) predators  
*allow named example  
allow hunters*
  - (new) disease / pathogen  
*allow named example*
  - competition for food  
*allow lack of food*
  - competition for mates  
*allow lack of mates  
ignore competition unqualified*
  - lack of habitat **or** habitat change  
*ignore environment change  
ignore isolation  
ignore pollution*

2

[8]

**Q2.**

- (a) toxins 1
- (b) (i) bacteria 1
- (ii) mutate 1
- (iii) new / different antibiotic  
*allow new / different drug*  
*do **not** allow vaccine* 1

[4]

**Q3.**

- (a) Relevant organelle found in cells such as nucleus, mitochondria 1
- (b) Linnaeus 1
- (c) Kingdom 1
- (d) *Homo Sapiens*  
*ignore underlining, italics or not, capitals or not* 1
- (e) Any **one** from:  
  - to know which species are closely related
  - or**
  - study evolution
  - to monitor biodiversity
  - to identify different organisms such as two different species 1

[5]

**Higher Tier Mark Scheme**

**Q4.**

- (a) remains / traces of organisms 1
- from millions of years ago 1
- (b) no individuals of a species still alive 1
- (c) microorganisms have a simpler structure than a trilobite 1

- stromatolites are found in older rock than trilobites 1
- (d) Marginocephalia 1
- (e) Protoceratops **and** Triceratops  
(in either order)  
*allow*  
*Coronosaurus and Triceratops*  
**or**  
*Coronosaurus and Protoceratops*  
**or**  
*Marginocephalia and Pachycephalosaurus* 1
- (f) any **one** from:  
  - the fossil record is not complete
  - new fossils may have been found since 1970s
  - DNA / chemical analysis may have given new information 1

[8]

**Q5.**

- (a) *Ourasphaira*  
*ignore italics*  
*ignore capitalisation*  
*do not accept Ourasphaira giraldae* 1
- (b) the mud stopped oxygen reaching the fungus 1
- (c) any **one** from:  
  - $2.1 \times 10^8$  (years)
  - 210 000 000 (years) 1
- (d) any **one** from:  
  - fossil(s) of the fungus may have been destroyed (by geological activity)  
*ignore some destroyed*
  - fossil(s) of the fungus may not have been found (yet)  
*ignore some not found (yet)*
  - dating methods are not precise / accurate
  - the time at which an organism / fungus evolves from ancestors is difficult to pinpoint  
*allow point of speciation is not known* 1
- (e) eukaryota  
*allow eukaryote(s)* 1
- (f) can survive in extreme environments

1

cytoplasm contains DNA

1

(g) any **three** from:

- studies of internal / cell structures with light microscopes
- studies of internal / cell structures with electron microscopes  
*allow organelles for internal / cell structures*  
*if neither mark awarded allow studies of internal / cell structures (with microscopes) for 1 mark*
- chemical analysis
- comparison of biochemical processes
- DNA / genetic analysis
- studies of evolution(ary relationships)

3

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