Student No. _____

Barker College

# 2002
## TRIAL HIGHER SCHOOL CERTIFICATE

# Biology

## ANSWER SHEET

**Staff Involved:**

- **DGG***
- **RDF**
- **MIK**
- **RSH**
- **TKB**
- **TER**

**AM FRIDAY 16 AUGUST**

**130 copies**

**Section A – Multiple Choice**
**Choose the best response and fill in the response oval completely**

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| | | | | |
|---|---|---|---|---|
| **1.** | A | B | C | D |
| **2.** | A | B | C | D |
| **3.** | A | B | C | D |
| **4.** | A | B | C | D |
| **5.** | A | B | C | D |
| **6.** | A | B | C | D |
| **7.** | A | B | C | D |
| **8.** | A | B | C | D |
| **9.** | A | B | C | D |
| **10.** | A | B | C | D |
| **11.** | A | B | C | D |
| **12.** | A | B | C | D |
| **13.** | A | B | C | D |
| **14.** | A | B | C | D |
| **15.** | A | B | C | D |

Barker College

# 2002
## TRIAL HIGHER SCHOOL CERTIFICATE

# Biology

**PM THURSDAY 16 AUGUST**

**General Instructions**

- **Reading time – 5 minutes**
- **Working time – 3 hours**
- **Write using blue or black pen**
- **Board-approved calculators may be used**
- **Draw diagrams using pencil**
- **Write your Barker Student Number on all answer pages submitted**

**Total marks (100)**

**Section I** **Pages 2 - 15**

**Total marks (86)**

**There are two parts to this section, Part A and Part B**

**PART A**
**15 marks**
- **Attempt Questions 1 – 15**
- **Allow about 30 minutes for this part**

**PART B**
**71 marks**
- **Attempt Questions 16 – 28**
- **Allow about 1 hour and 45 minutes for this part**

**Section II** **Pages 16 - 17**

**14 marks**
- **Attempt Question 29**
- **Allow about 30 minutes for this section**

**Section I**
**Total marks (86)**

**Part A**
**15 marks**
**Attempt Questions 1 – 15**
**Allow about 30 minutes for this part**

**Use the multiple-choice answer sheet**

**Select the alternative A, B, C or D that best answers the question. Fill in the response oval completely.**

**Sample** 2 + 4 = (A) 2 (B) 6 (C) 8 (D) 9

(A) ⬭ (B) ⬬ (C) ⬭ (D) ⬭

**If you think you have made a mistake, put a cross through the incorrect answer and fill in the new answer.**

(A) ⬬ (B) ⬬ (C) ⬭ (D) ⬭

**If you change your mind and have crossed out what you consider to be the correct answer, then indicate this by writing the word *correct* and drawing an arrow as follows.**

*correct*

(A) ⬬ (B) ⬬ (C) ⬭ (D) ⬭

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**1.** Which processes are thought to be involved in the movement of materials through the xylem of plants?

(A) Circulation, cohesion, filtration.
(B) Cohesion, adhesion, root pressure.
(C) Osmosis, phagocytosis, adhesion.
(D) Diffusion, osmosis, translocation.

**2.** Which of the following describes an adaptation that Australian plants use to regulate leaf temperature?

(A) Leaves with a large surface area.
(B) Leaf surfaces with no cuticle.
(C) Silvery hairs on the leaves.
(D) Leaves facing towards the sun all day.

**3.** Which of the following options correctly relates the compound and the form in which it is carried in mammalian blood?

| | **Oxygen** | **Carbon dioxide** | **Nitrogen waste** |
|---|---|---|---|
| (A) | Oxyhaemoglobin | Plasma | Uric acid |
| (B) | Lymphocytes | Plasma | Urea |
| (C) | Oxyhaemoglobin | Hydrogen carbonate ions | Urea |
| (D) | Red blood cells | Hydrogen carbonate ions | Uric acid |

**4.** A student observed a prepared slide of human blood. The majority of cells seen were described as being circular, without a nucleus, approximately $6-8\mu$m in diameter.

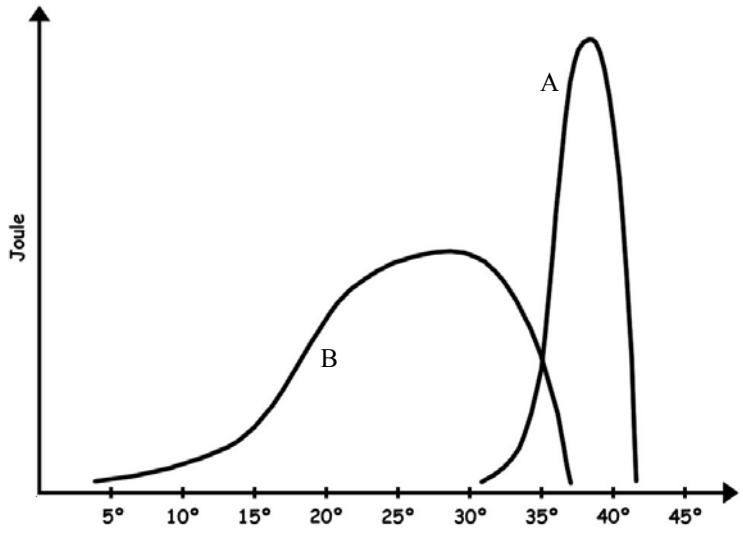
What type of cell was the student looking at?

(A) Antibodies.
(B) White blood cells.
(C) Platelets.
(D) Red blood cells.

**5.** Which of the following provides the strongest evidence for the Theory of Evolution?

(A) Many of the native animals in Australia are related to those in South America.
(B) A gene that controls eye growth in mice is different to the same gene in fruit flies.
(C) Fossil evidence shows that many animals were larger than they are now.
(D) Dinosaurs became extinct 65 million years ago.

**6.**




Which statement represents a correct inference from the graph above?

(A) Organism A is an ectotherm.
(B) Organism A is an endotherm.
(C) Organism B is nocturnal.
(D) Organism A is aquatic.

**7.** Which statement best describes the effect of mutations in natural selection?

(A) Mutations cannot result in new characteristics.
(B) Sometimes new mutations occur, and these increase a species' chance of survival.
(C) Mutations are harmful and cannot improve the 'fitness' of a species.
(D) Mutations that interfere with the smooth operation of an organism are eliminated.

**8.** Which of the following is true of recessive alleles?

(A) They have a low frequency in a population.
(B) They can only survive in a heterozygous individual.
(C) They can influence the phenotype in a homozygous genotype.
(D) They are less likely to be inherited by the next generation.

**9.** For which of the following is Rosalind Franklin remembered?

(A) The discovery of genes on the sex-chromosomes.
(B) The chromosomal theory of inheritance.
(C) The 'rediscovery' of Mendel's work.
(D) The X-ray diffraction pattern of DNA.

**10.** Red green colourblindness in humans is a recessive condition inherited on the X chromosome. A non-colourblind woman, whose father is colourblind, marries a colourblind man.

What is the probability that **any** child they have will be colourblind?

(A) 100%
(B) 50%
(C) 25%
(D) 0%

**11.** Which of the following is part of the body's third line of defence against disease?

(A) Antibody production.
(B) Phagocytosis by macrophages.
(C) Profuse nasal hair.
(D) Oil secreted by the skin.

**12.** Which of the following options is the best definition of a pathogen?

(A) An organism that causes disease in a host.
(B) An organism that lives in or on its host.
(C) An organism that transfers a disease to another organism.
(D) A cell that engulfs bacteria from its surroundings.

**13.** The work of which of the following scientists led to an understanding of the role of microbes in decay?

(A) Ronald Ross.
(B) MacFarlane Burnett.
(C) Robert Koch.
(D) Louis Pasteur.

**14.** Some diseases can be caused by an imbalance in the microflora present in humans.

Which of the following diseases is caused by an imbalance of microflora?

(A) Melanoma.
(B) Small pox.
(C) Thrush (candidiasis).
(D) Malaria.

**15.** What is a possible consequence of overuse and misuse of antibiotics?

(A) Parasites may become stronger.
(B) New disease-causing bacteria may be produced.
(C) Resistant strains of pathogens may develop.
(D) People may become immune to the antibiotics.

**Section I (continued)**

**Part B – 71 marks**
**Attempt Questions 16-28**
**Allow about 1 hour and 45 minutes for this part**

Answer the questions in the spaces provided.

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**Marks**

**Question 16** (4 marks)

(a) Identify one role of the kidney in the excretory system. **1**

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(b) Compare the process of renal dialysis with the function of the kidney. **3**

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**Question 17** (4 marks)

Homeostasis is a process that occurs within an organism.

(a) Outline the two stages involved in homeostasis. **2**

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(b) Explain, using a specific example, how homeostasis consists of two stages. **2**

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**Student No.** _____

**Marks**

**Question 18** (8 marks)

In your Biology course you performed a first hand investigation to identify microbes in food and water.

(a) Outline the procedure you followed in order to identify the different **types** of microbes present in a sample of water. **4**

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(b) Outline **ONE** safe work practice required during the procedure described in part (a) above. **2**

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(c) Describe a difference that you could see between a bacterial colony and a fungal colony on an agar plate. **2**

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**Student No.** _____

**Marks**

**Question 19** (6 marks)

The Proteaceae are a diverse plant family, including rainforest species such as the Tree Waratah (*Alloxylon*), as well as species like the Waratah (*Telopea*) and *Banksia*, which are adapted to dry sandstone ridges around Sydney.

(a) Identify **THREE** adaptations that assist in minimizing water loss, which you might reasonably expect to find in *Telopea* and *Banksia*. **3**

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(b) Describe a technology that you could use to demonstrate the evolutionary relationship between *Alloxylon*, *Telopea* and *Banksia*. **3**

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**Question 20** (3 marks)

Outline the reasons why the importance of Mendel's work was not recognised until some time after it was published. **3**

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**Student No.** _____

**Marks**

**Question 21** (3 marks)

Explain why it is important to maintain biodiversity. **3**

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**Question 22** (8 marks)

(a) State what you understand by the one-gene-one-polypeptide hypothesis? **2**

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(b) Outline the evidence produced by Beadle and Tatum that supports the one-gene-one-polypeptide hypothesis. **6**

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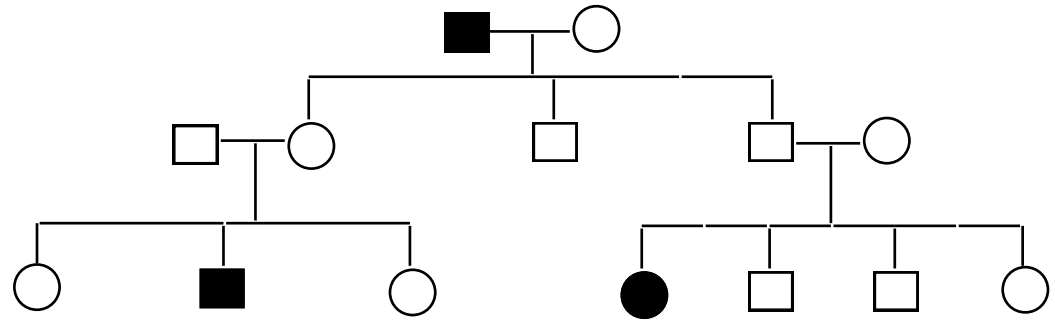
**Student No.** _____

**Marks**

**Question 23** (7 marks)

The family tree below shows the inheritance of albinism, a non sex-linked (autosomal) condition in a human family.



KEY

Normal female

Normal male

Affected female

Affected male

(a) Is albinism caused by a dominant or recessive gene? **1**

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(b) Explain your answer to part (a). **2**

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**Question 23 continues on page 11**

**Student No.** _____

**Marks**

(c) If the albino female in the third generation married a non-albino male, what would be the expected genotypes and phenotypes of their offspring?

You will need to show all your working. **4**

**Student No.** _____

**Marks**

**Question 24** (6 marks)

(a) Identify **ONE** named infectious disease. **1**

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(b) Outline how **this** disease is transmitted. **2**

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(c) Describe the host's response to the organism that causes the disease. **1**

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(d) Describe an effective treatment for the disease. **1**

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(e) Describe **ONE** method used to control the disease. **1**

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**Student No.** _____

**Marks**

**Question 25** (3 marks)

Outline, using an example, how cell differentiation and specialisation assist in the maintenance of health. **3**

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**Question 26** (8 marks)

Assess the impact and implications of the changing methods of dealing with plant and animal diseases, including the shift in emphasis from treatment and control to the management and prevention of disease. **8**

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**Student No.** _____

Extra Writing Space for Question 26

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**Marks**

**Question 27** (5 marks)

Mr Binet is pruning his prize-winning roses. He is momentarily distracted by his pet budgie and he accidentally pricks his finger on a large and dirty thorn. The thorn breaks off and stays stuck in his skin, causing a generous flow of blood.

(a) Describe how this affects his first line of defence. **1**

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(b) Describe **TWO** adaptations in Mr Binet's second line of defence that help cope with the invasion of the thorn. **4**

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**Student No.** _____

**Marks**

**Question 28** (6 marks)

Describe how the third line of defence may be called into action after a puncture wound such as the one described in Question 27. In your answer, refer to antibodies, T cells and B cells. **6**

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Student No. _____

**Section II**
**14 marks**
**Attempt Question 29**
**Allow about 30 minutes for this section**
Answer the questions in the spaces provided.

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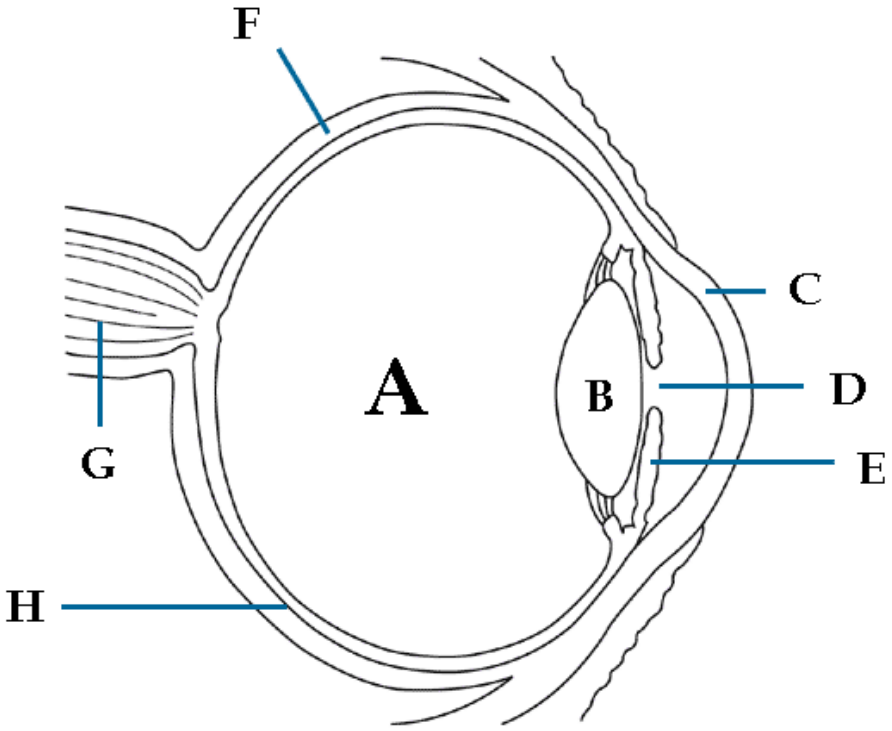
**Marks**

**Question 29 — Communication** (14 marks)

Below is a cross-section of the human eye.




| | Name | Function |
|---|---|---|
| A | | |
| B | | |
| C | | |
| D | | |
| E | | |
| F | | |
| G | | |
| H | | |

(a) Complete the table with the names of each structure and its function. **5**

**Question 29 continues on page 17**

Question 29 (continued)

**Marks**

(b) (i) How would you process information gathered from secondary sources to compare visual acuity of humans with other mammals and animals such as insects? **2**

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(ii) How does the visual acuity of humans compare with another mammal and one other animal that is not a mammal? **4**

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(c) Explain, using an example, what a response to a stimulus involves. **3**

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**End of Paper**