Circle the letter indicating the best answer.

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TEACHER NAME:  

DATE:  

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TIME ALLOWED FOR THIS PAPER:
Reading time before commencing work: 10 minutes
Working time for this paper: 1 hour 50 minutes

MATERIAL REQUIRED / RECOMMENDED FOR THIS PAPER:
To be provided by the supervisor:
- This question and answer booklets

To be provided by the candidate:
- Pens, pencils, ruler, eraser

IMPORTANT NOTE TO CANDIDATES
No other items may be taken into the examination room.
It is your responsibility to ensure that you do not have any unauthorised notes or other items of a non-personal nature in the examination room. If you have any unauthorised material with you, hand it to the supervisor BEFORE reading any further. All iPads and mobile phones must be turned off and in your bag along with any other devices and notes. Bags are to be closed and placed under the desk.
Instructions to candidates

1. Sitting this examination implies that you agree to abide by the examination rules set down by Kinross College.
2. Answer the questions in the space provided.
3. You must be careful to confine your responses to the specific questions asked and to follow any instructions that are specific to a particular question.
4. A spare page is included at the end of this booklet. It can be used for planning your responses and/or as additional space if required to continue an answer.
   (a) Planning: If you use the spare page for planning, indicate this clearly at the top of the page. If you choose to use lined paper for planning, ensure your name and the title is clearly printed.
   (b) Continuing an answer: If you need to use the space to continue an answer give the page number. Fill in the number of the question (s) that you are continuing to answer at the top of the page.
5. This examination contributes towards your report. If you have any questions, please ask them during the ten-minute reading time.
   Manage your time wisely. Always provide substantiation (evidence). Make sure that what you have written makes sense.

Note: Do not turn the page until you are asked to do so.
**Biological Science Multiple Choice Questions**

1. The respiratory and circulatory system work together to
   a. Fight disease
   b. Exchange gases
   c. Deliver nutrients to cells
   d. Respond to stimuli

2. The order of decreasing complexity is
   a. Cells → tissues → organs → systems
   b. Tissues → organs → cells → systems
   c. Cells → systems → tissues → organs
   d. Systems → organs → tissues → cells

3. Pathogens are microbes that
   a. Aid digestion
   b. Cure disease
   c. Cause disease
   d. Photosynthesize

4. Nerves impulses are:
   a. fast
   b. direct
   c. electrical
   d. all of the above

5. The glands found next to the kidneys are the
   a. pituitary
   b. thyroid
   c. testes
   d. adrenal

6. The circulatory system consists of the:
   a. Heart, lungs and muscles
   b. Kidneys, blood and urine
   c. Heart, blood and blood vessels
   d. Brain, blood vessels and nerves

7. The job of the excretory system is to remove waste and:
   a. Control blood sugar levels
   b. Control body water levels
   c. Control body temperature
   d. Control muscular actions

8. Food chains always start with a
   a. Primary consumer
   b. producer
   c. secondary consumer
   d. decomposer

9. A tapeworm living in your gut is an example of
   a. parasitism
   b. mutualism
   c. commensalism
   d. predation

10. Which of the following is an abiotic factor?
    a. Amount of food
    b. Number of predators
    c. Amount of water
    d. Available breeding partners

11. The energy for life on Earth all comes from
    a. Water
    b. Coal
    c. Food
    d. The Sun

12. Respiration is
    a. breathing
    b. a chemical reaction that traps energy
    c. a chemical reaction that releases energy
    d. not necessary for life
13. An example of an introduced species to Australia is
   a. Kangaroo
   b. Echidna
   c. Salt water crocodile
   d. Rabbit

14. Organisms like bacteria and fungi that break down dead matter into simple compounds are called:
   a. Herbivores
   b. Producers
   c. Decomposers
   d. Secondary consumers

15. Photosynthesis is a reaction that:
   a. Releases carbon dioxide
   b. Turns carbon dioxide into sugar
   c. Gives out energy
   d. Takes in oxygen

16. Which of these concepts is part of the theory of plate tectonics?
   a. Continents are fixed and don’t move
   b. A great flood shaped The Earth’s surface
   c. Continents are in slow constant motion
   d. None of the above

17. Which of The Earth’s layers is broken into several tectonic plates?
   a. Crust
   b. Mantle
   c. Outer core
   d. Inner core

18. Which scientist is credited with proposing the theory of plate tectonics?
   a. Charles Darwin
   b. Albert Einstein
   c. Isaac Newton
   d. Alfred Wegener

19. What type of crust is found on the sea floor?
   a. Sea floor crust
   b. Oceanic crust
   c. Continental crust
   d. Geological crust

20. Which of these statements is correct?
   a. There is no difference between oceanic and geological crust
   b. Continental crust lies under the oceans
   c. Oceanic crust is denser than continental crust
   d. Sea floor crust and continental crust have the same thickness

21. The Earth’s land was once joined up in one supercontinent called:
   a. Europa
   b. Jurassica
   c. Pangaea
   d. Americana

22. What is happening at a subduction zone?
   a. Plates are sliding past each other
   b. Plates are spreading apart
   c. One plate is sliding underneath another
   d. None of the above

23. Which of the following can happen at a transform boundary?
   a. Earthquake
   b. Mountain formation
   c. Volcanic eruption
   d. Rift valley formation
24. What is the border between two tectonic plates called?
   a. Boundary
   b. Collision zone
   c. Rift
   d. Trench

25. At mid-ocean ridges plates are:
   a. Colliding
   b. Sliding past each other
   c. Spreading apart
   d. None of the above

26. The three types of plate boundary are:
   a. Convergent, divergent, transverse
   b. Convergent, digressive, transform
   c. Concave, divergent, transform
   d. Convergent, divergent, transform

27. The slipping, sliding and colliding of tectonic plates cause
   a. Volcanoes
   b. Earthquakes
   c. Tsunamis
   d. All of the above

28. The movement of the Earth’s tectonic plates is driven by
   a. Conduction zones
   b. Convection currents
   c. Convergence plates
   d. Collision boundaries

29. Harry Hess discovered some evidence for continental drift. He called it:
   a. Seafloor spreading
   b. Plate tectonics
   c. Ocean drift
   d. Subduction

30. Which of the following events can occur at a divergent boundary?
   a. Earthquake
   b. Mountain formation
   c. Volcanic eruption
   d. Rift formation

End of Multiple choice questions
Biological Science Short Answer Questions

1. The immune system needs to work with the circulatory system in order to do its job.
   
   a. What is the job of the immune system?

   ______________________________________________________________________ (1 mark)

   b. How many lines of defence does the immune system have?

   ______________________________________________________________________ (1 mark)

   c. What is the job of the circulatory system?

   ______________________________________________________________________ (1 mark)

   d. Describe how the circulatory system helps the immune system to do its job

   ______________________________________________________________________
   ______________________________________________________________________
   ______________________________________________________________________
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   ______________________________________________________________________ (4 marks)

2. Ecosystems contain biotic and abiotic factors.
   
   a. Provide a definition for:

   i) Biotic

   ______________________________________________________________________

   ii) Abiotic

   ______________________________________________________________________ (2 marks)

   b. Name 3 biotic and 3 abiotic factors you might find in an ocean ecosystem

   i) Biotic

   ______________________________________________________________________
   ______________________________________________________________________
   ______________________________________________________________________
   ______________________________________________________________________ (3 marks)

   iii) Abiotic

   ______________________________________________________________________
   ______________________________________________________________________
   ______________________________________________________________________ (3 marks)
3. A middle distance runner is standing still waiting for their race to start. When the starting gun goes, they start running. **Describe** and **explain** the responses of their **circulatory system** and their **respiratory system** to the change from standing still to running.

a. Response of circulatory system:

______________________________________________________________

______________________________________________________________

(2 marks)

b. Reasons for response:

______________________________________________________________

______________________________________________________________

______________________________________________________________

______________________________________________________________

(3 marks)

c. Response of respiratory system:

______________________________________________________________

______________________________________________________________

(2 marks)

d. Reasons for response:

______________________________________________________________

______________________________________________________________

______________________________________________________________

(3 marks)
4. Scientists studied the following ecosystem over a number of years:

The scientists used the capture/recapture technique – where \( \frac{N_1 \times N_2}{M_2} \) estimates the number of individuals in a population - to estimate the number of frill-necked lizards living in the area. Their results for Year 1 and Year 5 of their study are shown in the table below:

<table>
<thead>
<tr>
<th>Year</th>
<th>Lizards captured on night 1 (N₁)</th>
<th>Lizards captured on night 2 (N₂)</th>
<th>Number of marked lizards on night 2 (M₂)</th>
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a. Calculate the estimated population of lizards for years 1 and 5
   
   Year 1: _________________________________ (2 marks)
   
   Year 5: _________________________________ (2 marks)

b. Predict and explain what would happen to the numbers of grasshoppers, kookaburras and wombats over the same period of time:
   
   Grasshoppers: numbers would - _________________________________
   Because - _________________________________ (3 marks)

   Kookaburras: numbers would - _________________________________
   Because - _________________________________ (3 marks)

   Wombats: numbers would - _________________________________
   Because - _________________________________ (3 marks)
5. Many top level athletes spend time training at high altitudes. Describe and explain the body’s response to high altitude training and explain why it improves athletic performance.

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(9 marks)

6. Shorehaven is a coastal area just north of Kinross. Wildlife in the area includes kangaroos, snakes, parrots, mice and rats living in the bushland behind the sand dunes, while on the beach and in the shallow water live crabs, shrimps and small fish. Offshore whales and dolphins swim. There are plans for a housing estate to be built in the bushland between the sand dunes and Marmion Avenue.

Identify, either from the examples above, or from your own knowledge, one species whose population is likely to decrease, one species whose population is likely to stay the same, and one species whose population is likely to increase. Give 2 reasons to explain each choice.

Decrease:

Reasons:

___________________________________________________________________________
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Stay the Same:

Reasons:

___________________________________________________________________________
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Increase:

Reasons:

___________________________________________________________________________
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(6 marks)
Earth and Space Science Short Answer Questions

1. Below is a map showing the Earth’s plates. Beneath the map is a list of names.
   a. Match the number on the map with the correct plate name:

   ![Tectonic Plates Diagram]

   - Pacific Plate
   - African Plate
   - Arabian Plate
   - Australian Plate
   - Eurasian Plate
   - Caribbean Plate
   - North American Plate
   - South American Plate
   - Indian Plate
   - Antarctic Plate
   - Nazca Plate
   - Cocos Plate
   - Scotia Plate

   (5 marks)

   b. The map in Question 1 shows the arrangement of the continents as they appear today. Describe how a map of the world from 400 million years ago would have looked and explain why it has changed.

   ________________________________________________________________
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   (5 marks)
2. The Venn diagram below compares and contrasts the typical features of Oceanic crust and Continental crust:

![Venn Diagram](Image)

At a plate boundary between oceanic and continental crust, the continental crust always moves up on top of the oceanic crust, with the oceanic crust being pushed back down into the mantle.

a. Which of the characteristics in the diagram – density, colour, thickness or age – is the reason for oceanic crust always being pushed underneath continental crust?

____________________________________________________________________ (1 mark)

b. Explain your answer to part a.

__________________________________________________________________________

__________________________________________________________________________ (2 marks)

c. This type of collision boundary produces a feature known as a subduction zone. Identify 1 typical feature of a subduction zone and explain how that feature is formed:

**Feature:**

(1 mark)

**Formed because:**

__________________________________________________________________________

__________________________________________________________________________ (1 mark)
Below are listed 4 pieces of evidence that could support Wegener’s Theory of Continental Drift:

1. Fossils found in Africa match fossils found in South America
2. Rocks found in Scotland match rocks found in North America
3. Many people around the globe speak the same language eg The UK and Australia both speak English
4. The shapes of different continents appear to fit together eg Africa and South America, and India and Western Australia

Assess each piece of evidence and explain how or why it either does or doesn’t support The Theory of Continental Drift:

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<th>Piece of evidence</th>
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<th>Explanation</th>
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(6 marks)
4. Below is a diagram of the Mid-Atlantic Ridge:
   a. Mark on the diagram 2 arrows showing the direction of movement of the plates – label them “a” (1 mark)
   b. Mark on the diagram arrows showing the movement of magma in the mantle due to convection currents – label them “b” (1 mark)
   c. The Mid-Atlantic Ridge provides an example of seafloor spreading. With reference to the direction of plate movement and convection currents, describe, in detail, what is happening during seafloor spreading and what type of plate boundary this is. (5 marks)
   d. Describe magnetic striping and how it supports the theory of seafloor spreading (2 marks)
5. The summit of Mount Everest is the highest point on Earth. It has been formed at a plate boundary. Describe, in detail, the processes involved in the formation of Mount Everest and explain why, excluding other factors such as weather and equipment, it should get harder to climb as time goes on. Give some indication of the speed at which these processes are happening.

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(10 marks)

6. If we could heat the mantle, just below the crust, to the same temperature as the mantle just above the core, we could possibly prevent earthquakes. Explain why:

_______________________________________________________________________________
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(5 marks)

...END OF EXAM...