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NZQA

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

QUALIFY FOR THE FUTURE WORLD
KIA NOHO TAKATŪ KI TŌ ĀMUA AO!

Scholarship 2016
Earth and Space Science

2.00 p.m. Friday 25 November 2016
Time allowed: Three hours
Total marks: 24

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

Pull out Resource Booklet 93104R from the centre of this booklet.

You should answer ALL the questions in this booklet.

If you need more room for any answer, use the extra space provided at the back of this booklet.

Check that this booklet has pages 2–16 in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

Question	Mark
ONE	
TWO	
THREE	
TOTAL	/24

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QUESTION ONE: SEAFLOOR METHANE HYDRATES AND GAS SEEPS

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Use the information provided on pages 2 and 3 of your resource booklet to answer this question.

Recently, a vast amount of permafrost containing frozen methane hydrates plus numerous methane gas seeps has been discovered within the continental shelf sediments off the east coast of the North Island. Preliminary investigations have shown that methane gas is also reaching the ocean surface.

The continental shelf in this area has active, slow-moving, underwater landslides, up to 15 km long and 100 m thick. This is a phenomenon which is largely uninvestigated, and which may, at least in part, be caused by the presence of methane hydrates and methane gas seeps.

Much more research is needed to determine the extent and effects of these methane hydrates and gas seeps.

Justify the need for extra research considering the possible causes and implications of slow-moving underwater landslides, and the consequences of the release of methane gas.

Well labelled diagrams may assist your answer.

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QUESTION TWO: LIQUID WATER ON MARS

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Use the information provided on pages 4 and 5 of your resource booklet to answer this question.

There is no doubt that water exists on Mars as ice and water vapour, but recent evidence suggests that liquid water may be present just under, and occasionally on top of, the Martian surface.

Discuss in detail how and where liquid water could form on Mars, considering factors such as relevant geological features, and the axial tilt of Mars and its eccentric orbit around the Sun.

Well labelled diagrams may assist your answer.

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QUESTION THREE: THE WARMING OCEAN AND THE EFFECT ON NEW ZEALAND

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Use the information provided on pages 6 and 7 of your resource booklet to answer this question.

Over the next few decades, global warming will result in a warmer ocean and more energetic wind patterns in the South Pacific. As a result, sea temperatures around New Zealand may warm up by as much as 2°C, especially around the bottom half of the South Island.

By showing a comprehensive understanding of the factors that affect surface current flows around New Zealand, consider, in depth, the consequences of global warming on New Zealand and its surrounding ocean and ecosystems.

A well labelled diagram may assist your answer.

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Extra space if required.
Write the question number(s) if applicable.

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