S

93104

931040

SUPERVISOR'S USE ONLY

NZQA

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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

Tick this box if there is no writing in this booklet

Scholarship 2020
Earth and Space Science

9.30 a.m. Wednesday 9 December 2020
Time allowed: Three hours
Total score: 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	Score
ONE	
TWO	
THREE	
TOTAL	/24

ASSESSOR'S USE ONLY

QUESTION ONE: UNDERSEA VOLCANISM

ASSESSOR'S USE ONLY

Explore the eruption and formation of the Havre caldera, in particular its profile and pumice production as an underwater volcano. Justify, in comparison to surface volcanoes, why underwater volcanoes merit further research. Include a discussion of the various risks that they pose to New Zealand and the Pacific islands.

ASSESSOR'S USE ONLY

ASSESSOR'S USE ONLY

ASSESSOR'S USE ONLY

(8)

QUESTION TWO: ISOTOPES AS INDICATORS

ASSESSOR'S USE ONLY

Analyse the processes in the water cycle that establish different ratios of ^{18}O to ^{16}O throughout the world. Justify how the ^{18}O to ^{16}O ratio in ice cores can determine whether past climates were glacial or interglacial periods. Also, justify the significance of preserved dead ancient marine organisms. During the current climate crisis, how can this information be utilised to show the effect of humans on future climates?

ASSESSOR'S USE ONLY

ASSESSOR'S USE ONLY

ASSESSOR'S USE ONLY

(8)

QUESTION THREE: GOLDILOCKS ZONES

ASSESSOR'S USE ONLY

The planet K2-18b orbits its star, K2-18, at a distance that places it in the 'Goldilocks' zone, where water may exist in liquid form.

Discuss the possible effects on the atmosphere, oceans, rocky surface, and the water cycle if the planet K2-18b was tidally locked or not tidally locked. Justify whether this planet could sustain basic life, considering the implications of K2-18b's distance from its own star, and the possibility of tidal locking.

ASSESSOR'S USE ONLY

ASSESSOR'S USE ONLY

ASSESSOR'S USE ONLY

(8)

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

QUESTION NUMBER

ASSESSOR'S USE ONLY

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

QUESTION NUMBER

ASSESSOR'S USE ONLY

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

QUESTION NUMBER

ASSESSOR'S USE ONLY

93104