To be completed by candidate

NSN

School Code

1

SUPERVISOR'S USE ONLY

92046

NZQA

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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

Level 1 Physics and ESS RAS 2022

92046 Demonstrate understanding of the effects on planet Earth of interactions between the Sun and the Earth-Moon system

PILOT ASSESSMENT

Credits: Five

Achievement	Achievement with Merit	Achievement with Excellence
Examine the effects on planet Earth of interactions between the Sun and the Earth-Moon system.	Interpret the effects on planet Earth of interactions between the Sun and the Earth-Moon system.	Analyse the effects on planet Earth of interactions between the Sun and the Earth-Moon system.

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

You should attempt ALL parts of the question 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 2–6 in the correct order and that none of these pages is blank.

Do not write in any cross-hatched area (▨). This area may be cut off when the booklet is marked.

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

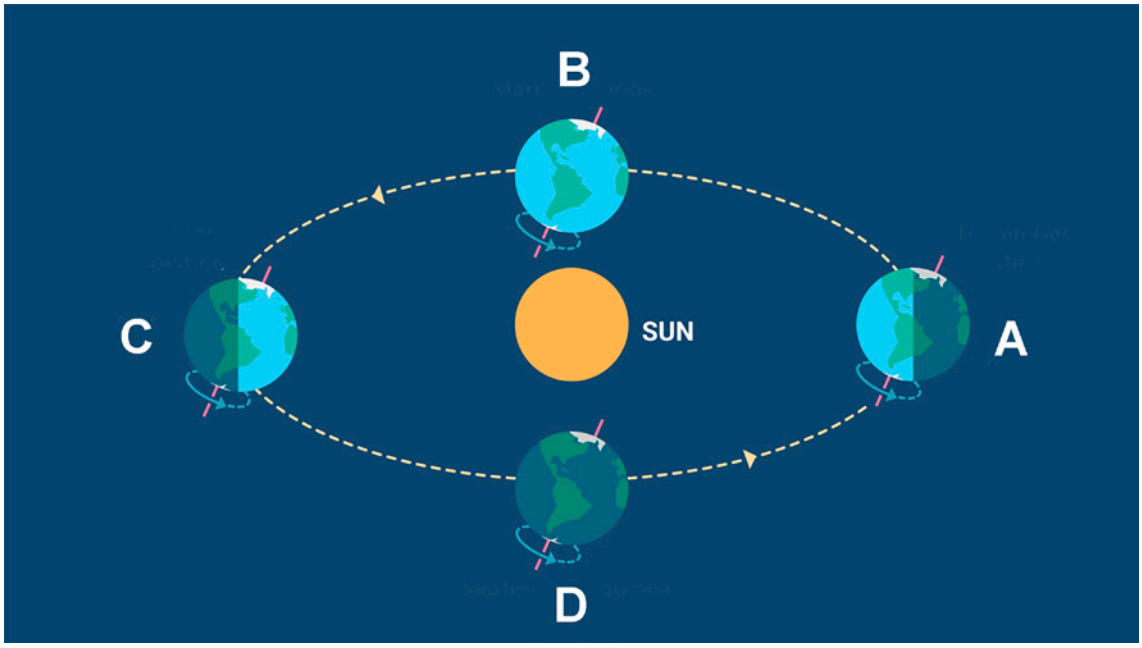
The apparent position of the Sun changes during the year. Use the information in your resource booklet to answer the following questions. You may refer to diagrams in the resource booklet to aide your explanations.

SECTION A: SEASONS

Refer to Resources A and B to answer the following questions:

(a) Aotearoa / New Zealand is in the Southern Hemisphere.

Name the four seasons that Aotearoa / New Zealand experiences in a year, as shown on the diagram below.



Adapted from: www.timeanddate.com/calendar/aboutseasons.html

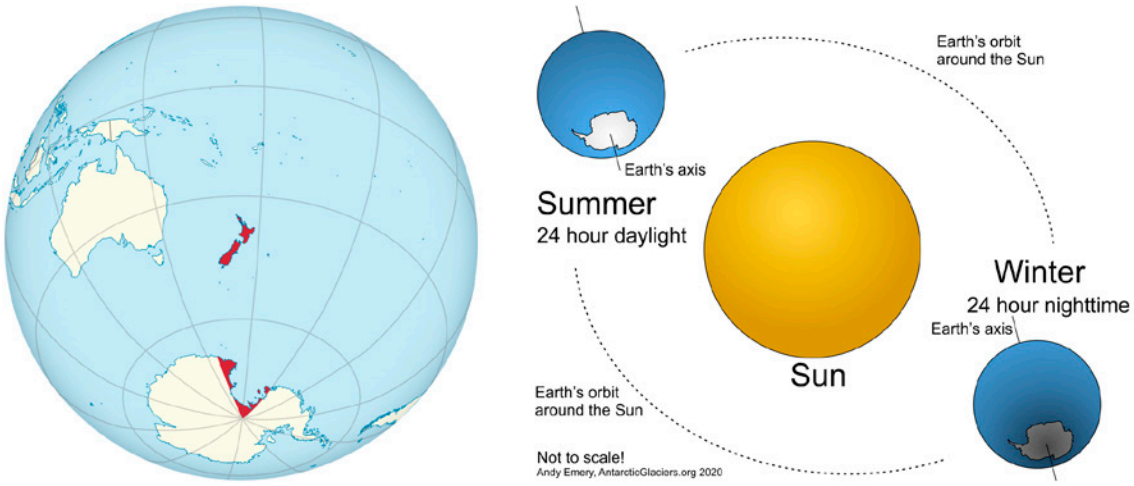
A: _____

B: _____

C: _____

D: _____

(b) Antarctica is further away from the Equator than Aotearoa / New Zealand (as shown below), which means it doesn't experience the same amount of heating or the same number of seasons.



Source: www.antarcticglaciers.org/antarctica-2/introductory-antarctic-resources/seasons-of-antarctica/earth_orbit-1/

Aotearoa / New Zealand experiences four seasons in a year, while Antarctica only experiences two.

Explain why Aotearoa / New Zealand and Antarctica differ, by referring to the Earth's orbit of the Sun, the tilt of the Earth, and the amount of solar radiation the Earth receives.

SECTION B: NAVIGATING TO AOTEAROA

(a) Refer to Resource C to explain why the direction of the Sun in our sky is from east to west.

(b) In order to navigate their way to Aotearoa / New Zealand from an area of Polynesia between Tropic of Capricorn and the Equator, Māori had to use the Sun and stars as their navigational tools.

Using Resources C and D, explain how Māori navigators would know what time of the year it was by referring to the Sun's position on the horizon, the height of the Sun's path in our sky, and the change in the length of their shadows on the waka.

SECTION C: SUMMER AND WINTER SOLSTICE IN AOTEAROA

Refer to Resource E and F to answer the following questions:

(a) Explain how the position of the Sun and Earth during the December solstice in Aotearoa / New Zealand affects the length of daylight.

(b) Referring to the map in Resource F, Auckland and Dunedin are 1430 km apart, and this causes the length of day to be different on both the summer and winter solstices. Below is a table of the amount of daylight that both of these places receive on these solstices.

2021 Sunrise and sunset times for Auckland and Dunedin on the Summer solstice (22 December)

Location	Sunrise	Sunset	Hours of daylight
Auckland	5.58 am	8.40 pm	14 hours 42 mins
Dunedin	5.44 am	9.28 pm	15 hours 44 mins

2021 Sunrise and sunset times for Auckland and Dunedin on the Winter solstice (21 June)

Location	Sunrise	Sunset	Hours of daylight
Auckland	7.33 am	5.11 pm	9 hours 38 mins
Dunedin	8.20 am	4.59 pm	8 hours 39 mins

Using the information above, explain why Auckland and Dunedin have varying amounts of daylight on both the winter and summer solstices.

Refer to the path of the Sun during the year and the latitudes of Auckland and Dunedin.

There is more space for your answer to this question on the following page.

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