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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!

Level 3 Earth and Space Science, 2016

91414 Demonstrate understanding of processes in the atmosphere system

2.00 p.m. Wednesday 30 November 2016
Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of processes in the atmosphere system.	Demonstrate in-depth understanding of processes in the atmosphere system.	Demonstrate comprehensive understanding of processes in the atmosphere 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 the questions in this booklet.

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

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.

TOTAL

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QUESTION ONE: NEW ZEALAND CLIMATE AND WEATHER

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As shown in the maps below, different regions of New Zealand experience quite different climates.

Adapted from: www.mfe.govt.nz/sites/default/files/publications/climate/nz-fifth-national-communication/images/figure2-3.jpg

Explain the reasons for such different climate conditions in New Zealand.

In your answer you should explain:

- the difference between climate and weather
- the factors that determine climate
- the role of landforms such as mountain ranges, coastal areas, etc
- the reasons for the climate in TWO named locations in New Zealand.

You may include annotated diagrams to help your answer.

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

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QUESTION TWO: THE LAYERS OF THE ATMOSPHERE

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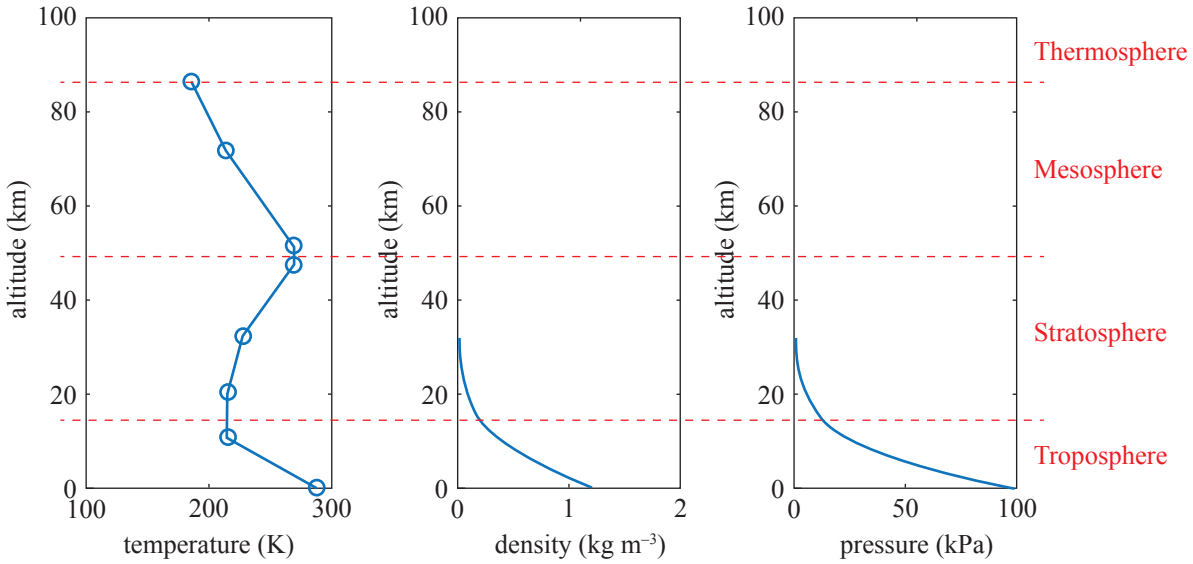
The atmosphere is a layer of gases surrounding the Earth which is held in place due to gravity. The Earth's atmosphere is made up of different layers, as shown in red on the diagram below. Atmospheric temperature, density, and pressure vary between these layers, as shown in the graphs.

The 1976 U.S. Standard Atmosphere



Adapted from: https://upload.wikimedia.org/wikipedia/commons/2/21/Us_standard_atmosphere_model.png

With reference to the graphs above, explain the reasons for differences in temperature, density, and pressure within AND between the FOUR layers of the atmosphere.

In your answer you should explain what is meant by atmospheric density and pressure.

You may include annotated diagrams to help your answer.

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

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QUESTION THREE: CLOUDS

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Clouds are predominantly found in the troposphere. Clouds play an important role in the energy balance of the Earth.

http://www.metsoc.org.nz/news/2012/08/2012-conference

Explain how clouds form, why they are predominantly found in the troposphere, AND their role in the energy balance of the Earth.

In your answer you should consider:

- the role of water vapour and aerosols in cloud formation
- how temperature and air pressure relate to cloud formation
- the role of clouds in heat exchange in the atmosphere
- the effect of low and high level clouds on the Earth's radiation.

You may include annotated diagrams to help your answer.

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

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

QUESTION NUMBER

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