3

SUPERVISOR'S USE ONLY

91426

914260

NZQA

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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

Level 3 Geography, 2018

91426 Demonstrate understanding of how interacting natural processes shape a New Zealand geographic environment

9.30 a.m. Friday 23 November 2018
Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of how interacting natural processes shape a New Zealand geographic environment.	Demonstrate in-depth understanding of how interacting natural processes shape a New Zealand geographic environment.	Demonstrate comprehensive understanding of how interacting natural processes shape a New Zealand geographic environment.

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 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 2–10 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.

Excellence

TOTAL 8

ASSESSOR'S USE ONLY

INSTRUCTIONS

Answer the question below. Your answer must relate to a **New Zealand geographic environment** that you have studied, and the key **interacting natural processes** that shape it.

Use page 3 to identify a **New Zealand geographic environment** you have studied, and two **interacting natural processes** that shape it, and to plan your response.

Integrate comprehensive supporting case study evidence into your written response to part (b). This may include diagram(s) and/or map(s), and you should also refer, where relevant, to your response to part (a).

QUESTION

(a) Draw a diagram(s) and/or map(s) to explain how two named natural processes interact in your chosen New Zealand geographic environment (see page 4).

(b) Comprehensively analyse how interacting natural processes create spatial variations within your chosen New Zealand geographic environment (see page 5).

ASSESSOR'S USE ONLY

New Zealand geographic environment: Franz Josef Valley //

Interacting natural processes that shape this environment:

Natural process (1): Tectonic Processes //

Natural process (2): Biological processes //

PLANNING (OPTIONAL)

SPAT (RAINFALL) (Plants) (Size & Shape Sed)

Intro - Tec, Geo, Glac, fluvial, Climate, Bio. 32km.

RAIN

Orographic diagram
- Tec (Plates etc) creating elevation 3000masl
- adiabatic lapse rate (0.6°c every 100m) Clim → tec
- orographic rainfall
- 3000mm 5000mm 11,000mm here

Plants

Succession
- Tec causing altitude.
- adiabatic
- Alpine zone = bad soil, low water, tussock lichen moss, roots
- foot hills = Rata, soil, roots
- Coastal = Podscarp, podzol soil, roots, kahikatea.

(Speel about Tec → sourcing, climate & bio = right conditions.

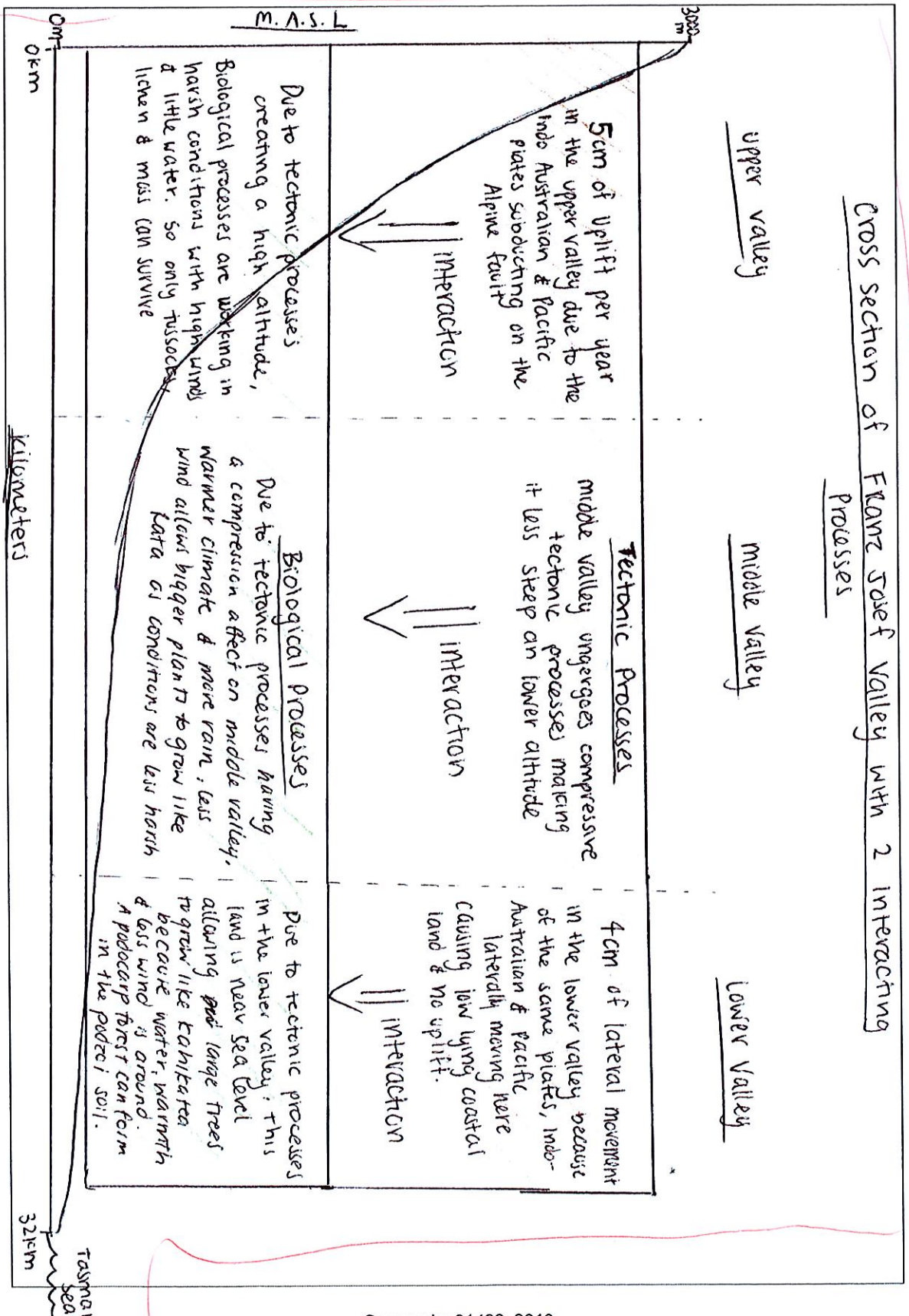
T&E Size Pattern
- Tec
- UV = climate = avalanches & tec = e.g = geologic (Schist & greywacke)
- MV = Erosion, abra, attri, hydr, corro / Trans, Tract, salt, solu, susp
- LV = depo

(a) Draw a diagram(s) and/or map(s) to explain how two natural processes interact in your chosen New Zealand geographic environment.

ASSESSOR'S USE ONLY

Natural process (1): Tectonic Processes 4

Natural process (2): Biological Processes 4



(b) Comprehensively analyse how interacting natural processes create spatial variations within your chosen New Zealand geographic environment.

ASSESSOR'S USE ONLY

Begin your written answer here, integrating comprehensive supporting case study evidence about your geographic environment and the interacting natural processes that shape it.

Refer to any diagram(s) and/or map(s) included within your written answer, as well as those in part (a) if they are relevant.

The Franz Josef Valley (FJV) has many natural processes that interact together to create spatial variations. The natural processes include tectonic, geologic, fluvial, glacial, climatic & biological. ~~Spatial variations throughout the valley~~ 3 things that show spatial variation throughout the valley due to these interacting natural processes are rainfall, plants & size & shape of sediment. //

Beginning with rain, tectonic processes in FJV have caused different altitudes throughout the valley. The Indo-Australian & Pacific plates that make the Alpine fault were subducting 5cm per year & laterally moving 7cm per year as stated in previous diagram. Because of this movement, pressure built up and the energy was released as an earthquake. This changed the FJV environment creating different (hills) elevations↑ interacted with climate processes creating an adiabatic lapse rate throughout the valley. This rate meant that every 100m of elevation, the temperature would drop by 0.6°c. This newly formed adiabatic lapse rate interacted with the (amount of) rainfall that fell in places across FJV. //

Due to FJV primarily experiencing orographic rainfall, the new rate ~~changed the~~ & and elevations created variations in //

ASSESSOR'S USE ONLY

rainfall spatially. Orographic rainfall in FJV is when warm air is blown from Australia across the Tasman sea to the West Coast of NZ. As it crosses the sea, water evaporates creating clouds filled with water. When it comes to NZ, due to the changed terrian & adiabatic lapse rate whenever the clouds are forced to go upwards the water inside condenses & becomes rain. So because of the tectonic processes interacting with geological material creating new terrain, the clouds were forced up more in the upper valley & less in the lower valley. And due to the adiabatic lapse rate, the clouds when forced up in the upper valley condensed the most due to the cold climate conditions that instead of rain, the water became snow. The Franz Josef Glacier (FJG) experiences about 11,000mm of snowfall due to the interaction between the climate processes & tectonic processes. This is varied throughout the valley creating spatial variation in rainfall because the middle valley experiences more tectonic compression causing altitude to be less, in turn the climate is warmer due to the adiabatic lapse rate causing around 5000mm of rainfall. And finally in the lower valley, the lateral movement as stated in previous diagram doesnt cause uplift, so little change in altitude causing temp. to be warmer so the clouds water condenses very little; so only 3000mm of rainfall occurs here.

Overall, due to tectonic processes interacting to change

ASSESSOR'S USE ONLY

geological materail into new terrian, with the added climate processes being interacted with by this change to form an adiabatic lapse rate, the spatial variation of rainfall can come about

Secondly plants, which come about with the interaction between biological processes and climate processes. In FJV, plants are spatially varied due to ~~the~~ tectonic processes stated in the diagram causing uplift in the upper valley, compression in the middle valley & lateral movement in the lower valley, these different environments interact with climate processes creating warmer & harsher places throughout the valley, interacting with biological processes which help the plants grow. The harsher the environment that the interaction between climate & tectonic processes make, the less likely biological processes will have the right conditions needed to grow certain plants like kahikatea & Rimu. The interaction between the climate & tectonic processes creating the adiabatic lapse rate spoken about earlier is still relevant because certain plants need certain conditions to grow, this would include the type of temperature avaliable in the area. So if the area ~~is really hi~~ has a high altitude due to the adiabatic lapse rate of temperature decreasing by 0.6°c every 100m of elevation plants that require a warm climate wont survive. In FJV, the upper valley is around 3000m.a.s.l (meters above sea level), this is a very high altitude. ~~What~~ From the diagram we can

ASSESSOR'S USE ONLY

see this is a very steep environment too. because of the tectonic processes occuring. The interaction this has on the biological processes is that this area has alot of light exposure, fast run off of water taking any soil with it, Climate processes interact to bring high winds making it hard for tall trees to ~~stay~~ stand and little soil to dig roots into. This is a very harsh environment for plants and we call this the alpine zone, ~~only~~ plants like tussocks, lichens, moss are biologically supported here. In the middle valley the compressive tectonic processes means altitude is less so warmer climate in the environment allowing more soil to stabalise roots, less wind & sun exposure, and water stays as relief is less steep as seen on diagram. This allows plants like brakenfern & Rata to establish themselves. finally, the lower valley ~~is the~~ has the lowest altitude ~~due~~ to only lateral movement from tectonic processes so here lies podzol soil which is nutrient rich & can support many plants like kahikatea & RIMU. This soil allows Podocarp forests to grow well which can be seen in the FJV environment. Overall this spatial pattern throughout the upper, middle & lower valley of plants can be called succession. & has been created by interacting processes such as tectonic, biological & climatic which can be seen in diagram.

Lastly, the size & shape of sediment in FJV is ~~very~~ changed to create a pattern throughout the upper, middle & lower valley due to the types of interacting processes in each environment. Starting in the upper valley, ~~there~~ tectonic processes have interacted with geological materail to create 3000m high mountains & steep relief. ~~extreme climatic~~ Tectonic processes, interacted with geological further

E8

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

ASSESSOR'S USE ONLY

QUESTION NUMBER

~~processes to~~ material around it to create rock avalanches via earthquakes, and even climatic processes created avalanches. ~~At~~ There 2 processes allowed large, angular sediment to fall onto the FSG below, insulating the glacier, creating an avalanche induced advance~~d~~ to allow the glacier to advance & deposit this supraglacial moraine. Once deposited it was exposed to climate processes which were warm making the glacier melt & retreat. This melt water came off the terminus & into the waiho river where all the large, angular sediment had been deposited. This interaction between the glacial process of retreating & fluvial processes allowed erosion of ~~these~~ this sediment to begin in the newly increased water velocity due to the more melt water from the glacier. Erosional processes seen in the diagram occured making the sediment more small & round.

o = rocks
A = Hydraulic action
B = Abrasion
C = attrition
D = corrosion.

Once the ~~rocks~~ sediment are smaller they can be better transported which is the main fluvial process in the middle valley. The sediment in this section undergoing transportational processes is shown in the diagram below.

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

ASSESSOR'S USE ONLY

QUESTION NUMBER

Cross section of river

● = Traction
• = saltation
* = Solution
.... = suspension.

After being transported, they get to the lower valley in a where the water is more calm ~~and~~ meandering river allowing the sediment to be deposited which is the third fluvial process. Here the sediment is even smaller & more rounded due to the previous processes.

Overall, the pattern of sediment shape becoming rounder & size becoming smaller over the course of FJV shows a spatial variation and has happened because of interacting processes of tectonic, fluvial, climatic & geologic.

In conclusion the FJV has had many natural processes occuring in it that have interacted to create spatial variation in rainfall, shape & size of sediment & plant life. Some of these variations even show patterns throughout the valley due to the processes interacting.

Excellence Exemplar 2018

Subject	Geography	Standard	91426	Total score	8

Q	Grade score	Annotation
	E8	Diagram is simple to interpret and shows detailed understanding of how different processes interact. There is detailed supporting case study evidence throughout the written answer. The analysis is made comprehensive by covering the links between 3 processes (climate, tectonic and biological) in order to explain the spatial variations within the chosen geographical environment. Insight is evident in the explanation of adiabatic processes creating variations in precipitation up the valley due to variations caused by tectonic processes and this ultimately creates variations of soil quality and vegetation within the chosen geographical environment. All this is supported with relevant data and specific evidence for the case study.