KWAZULU-NATAL PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

GEOGRAPHY

COMMON TEST

MARCH 2022

This question paper consists of 7 pages.

INSTRUCTIONS

1. The paper consists of **TWO** QUESTIONS:

   QUESTION 1: CLIMATE AND WEATHER

   QUESTION 2: GEOMORPHOLOGY

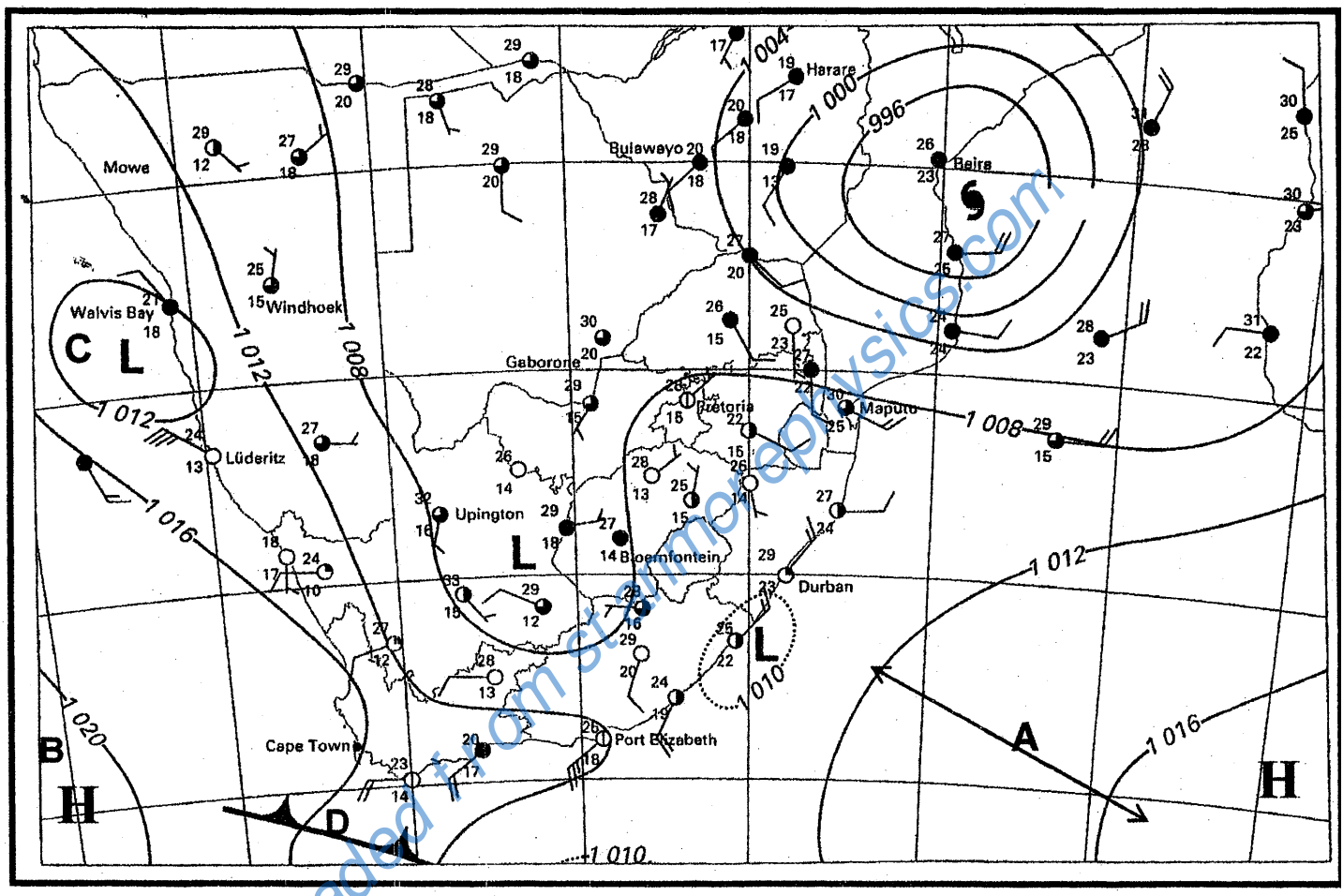
2. Write neatly and legibly.

3. Number your questions according to the question paper.

4. Answer **ALL** questions.

QUESTION 1: CLIMATE AND WEATHER

1.1 Refer to the South African synoptic weather map. (The letters **A, B, C** and **D** have been printed on the synoptic weather map)



1.1.1 Give ONE piece of evidence from the synoptic weather map that indicates that the map represents a summer situation. (1 x 1) (1)

1.1.2 Describe the pressure gradient at **A**. (1 x 1) (1)

1.1.3 Identify the pressure cells **B** and **C** respectively. (2 x 1) (2)

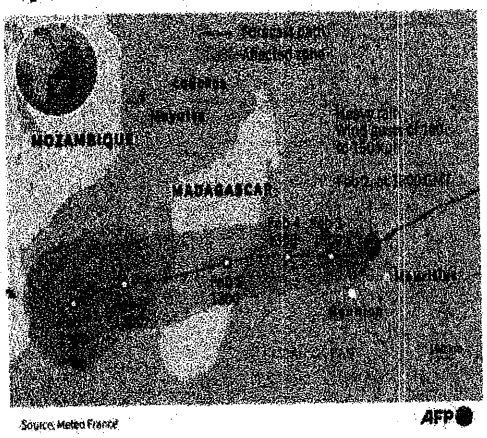
1.1.4 Name the front labelled **D**. (1 x 1) (1)

1.1.5 State the wind speed at Durban. (1 x 1) (1)

[6]

1.2 Refer to Tropical cyclone Batsirai.

Cyclone Batsirai



Intense Tropical Cyclone Batsirai was a deadly tropical cyclone which heavily impacted Madagascar in February 2022.

Tropical Cyclone Batsirai swept over the Indian Ocean and into central and southern Madagascar on February 5–6, 2022, bringing torrential rain, flooding, and high winds of about 230 km per hour, bringing heavy impacts and majorly disrupting power and communication throughout the affected areas. Batsirai originated from a tropical disturbance that was first noted on 24 January 2022. It fluctuated in intensity and became a moderate tropical storm on 27 January 2022, after which it unexpectedly rapidly intensified into an intense tropical cyclone. It then weakened and struggled to intensify through the coming days due to present wind shear and dry air. Afterward, it entered much more favorable conditions, rapidly intensified yet again to a high-end Category 4 cyclone on the Saffir–Simpson scale while moving towards Madagascar 5 February.

After the storm passed, thousands of people evacuated to temporary shelters. Batsirai has left at least 121 people dead, 112,000 displaced, and 124,000 homes affected.

en.wikipedia.org/wiki/Cyclone_Batsirai

1.2.1 What do you understand by the term *category 4 tropical cyclone*? (1 x 1) (1)

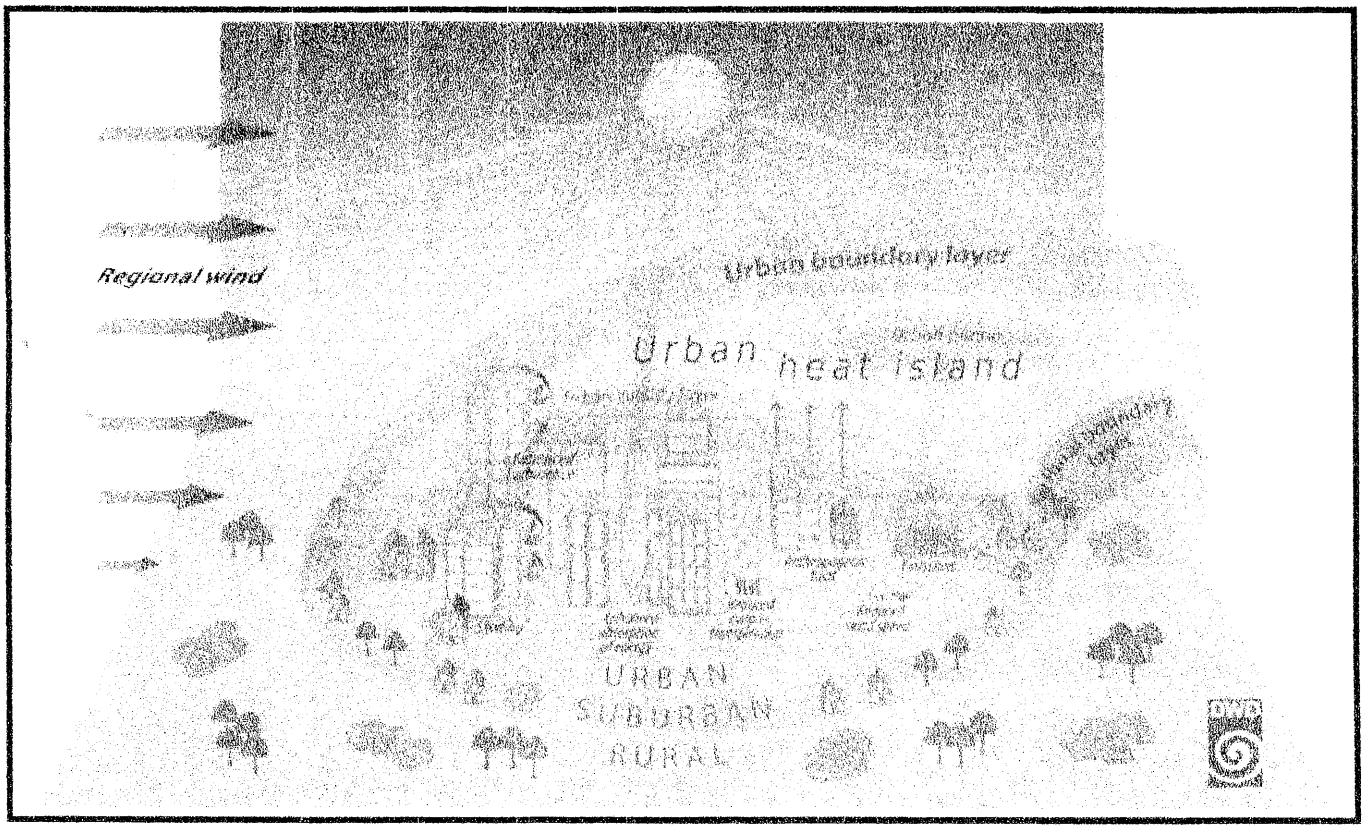
1.2.2 Explain ONE possible reason for the development of tropical cyclone Batsirai on 24 January. (1 x 2) (2)

1.2.3 Explain why cyclone Batsirai fluctuated in intensity before moving over Madagascar. (1 x 2) (2)

1.2.4 Suggest how remote sensing can assist in tracking the movement of tropical cyclones. (1 x 2) (2)

1.2.5 Write a paragraph of approximately EIGHT lines outlining the precautionary and management strategies that could be put in place to manage the effects of future tropical cyclone activity. (4 x 2) (8)

1.3 Refer to the heat island and pollution dome over an urban settlement.



1.3.1 Explain what is meant by the term heat island. (1 x 2) (2)

1.3.2 Which part of the city is experiencing the highest temperature? (1 x 1) (1)

1.3.3 Explain how building material influences the high temperatures in the city. (1 x 2) (2)

1.3.4 State the environmental problem resulting from a pollution dome that is situated closer to the earth's surface. (1 x 1) (1)

1.3.5 During night-time the pollution dome is much lower than during day-time. Provide ONE reason for this occurence. (1 x 1) (1)

1.3.6 Suggest ONE way in which we can reduce the environmental problem stated in QUESTION 1.3.4. (1 x 2) (2)

[30]

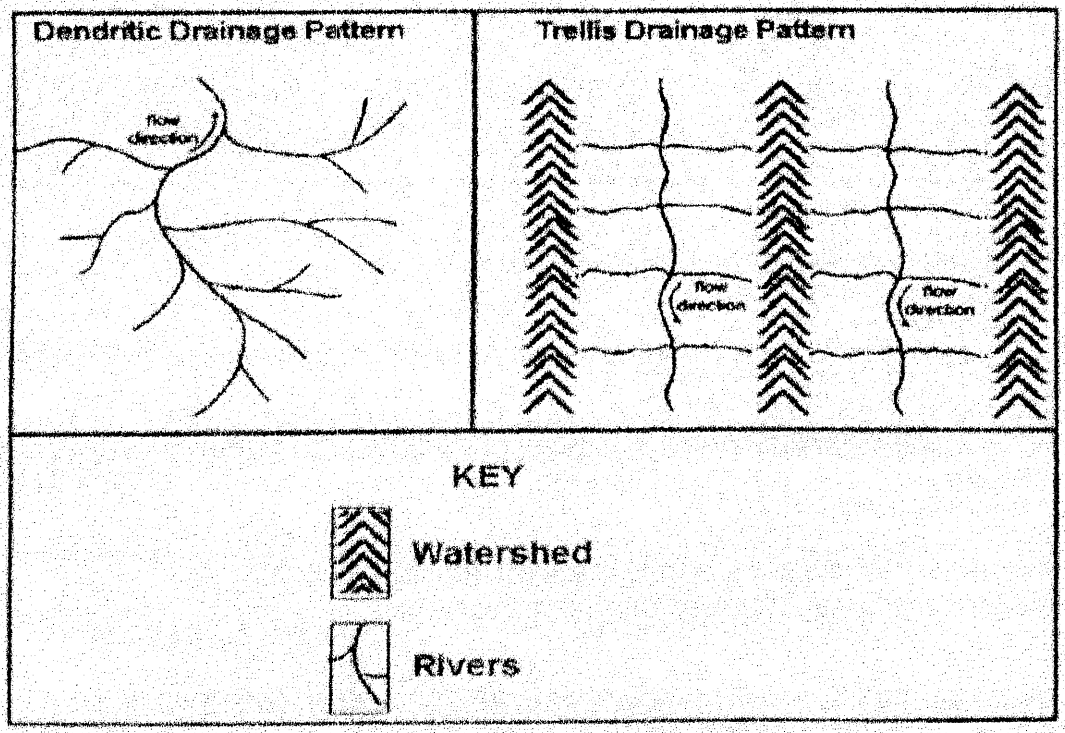
QUESTION 2: GEOMORPHOLOGY

2.1 Choose a term from COLUMN B that matches the geomorphological description in COLUMN A. Write only the letter (A – G) next to the question number (2.1.1 – 2.1.6) in the ANSWER BOOK, for example 2.1.7 H.

COLUMN A		COLUMN B	
2.1.1	High ground separating one drainage basin from another.	A.	Watertable
2.1.2	Point where two or more streams join.	B.	Watershed
2.1.3	Upper level of ground water.	C.	Ground water
2.1.4	Area from where a river gets it source of water.	D.	Surface run off
2.1.5	High ground separating streams in the same drainage basin.	E.	Confluence
2.1.6	Water found within the earth's surface.	F.	Interfluve
		G.	Catchment area

(6 x 1) **(6)**

2.2 Refer to the drainage patterns.



[Source: Examiner's own sketch]

2.2.1 Define the concept drainage pattern. (1 x 2) (2)

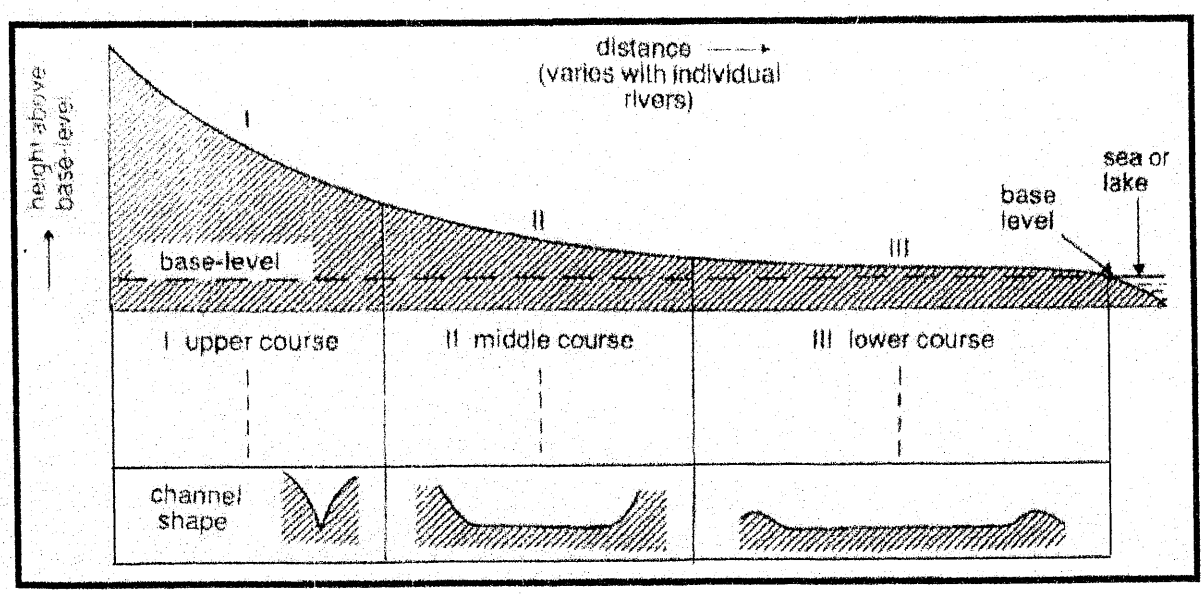
2.2.2 Describe the trellis drainage pattern. (1 x 2) (2)

2.2.3 Explain ONE visible difference between the tributaries of a dendritic and a trellis drainage pattern. (2 x 2) (4)

2.2.4 Suggest why a dendritic drainage pattern is more suitable for farming. (2 x 2) (4)

[12]

2.3 Refer to river valleys from source to mouth.



2.3.1 In which course is the mouth of the river. (1 x 1) (1)

2.3.2 State the lowest level to which a river can erode. (1 x 1) (1)

2.3.3 Identify TWO elements of the cross-profile that changed from the upper to the lower course. (2 x 1) (2)

2.3.4 Differentiate between the fluvial processes that shaped the cross-profile of the upper course and lower course of the river. (2 x 2) (4)

2.3.5 Suggest why the shape of the cross-profile in the upper course of the river will make it the most suitable place to build a dam. (2 x 2) (4)

[12]

TOTAL: 30

GRAND TOTAL: 60

FINAL

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GEOGRAPHY

MARKING GUIDELINE

COMMON TEST

MARCH 2022

MARKS: 60

N.B. This marking guideline consists of 5 pages.

QUESTION 1

1.1

1.1.1 high land temperatures ✓
presence of tropical cyclone ✓
presence of heat/thermal low ✓
South Atlantic High and South Indian High have moved further south ✓
(ANY ONE)

1.1.2 gentle ✓

1.1.3 South Atlantic high ✓ and Coastal low ✓

1.1.4 cold front ✓

1.1.5 15 knots ✓ (no units, no marks) (6 x 1)(6)

1.2

1.2.1 Wind speeds in excess of 230 km/h, uprooting trees, breaking windows, snapping power lines and causing extensive flooding✓ (1 x 1)(1)
[**Concept**]

1.2.2 Cyclone tracked for a long period of time in the warm waters/Sea surface temperature above 26,5 ^{0}C of the Indian Ocean that was ideal for promoting high rate of evaporation✓✓
Friction over the large sea track was minimal/less friction over the ocean, assisting rising air (convection) ✓✓
The water vapour content over the ocean is greater, containing latent heat and this formed the trigger for the full development of the cyclone ✓✓
(ANY TWO) (1 x 2)(2)

1.2.3 Due to present wind shear and dry air ✓✓
Due to friction over the land ✓✓ (1 x 2)(2)
(ANY ONE)

1.2.4 Information is received immediately and can be used to warn people ✓✓
Information can be monitored and evacuation plans can be devised, especially for people in low in low lying areas. ✓✓
Can take images of large inaccessible areas. ✓✓
The intensity of the storm can be monitored ✓✓
Information can be used to determine wind speed, temperature, wind direction ✓✓
Can be used to predict the path ✓✓ (1 x 2)(2)
(ANY ONE)

NB Question 1.2.4 has been cancelled due to technical reasons.

1.2.5 Stock up on canned food and water supplies ✓✓
Organize a first aid kit ✓✓
Have batteries for portable radios lamps and torches ✓✓
Move cattle and other stock to higher ground ✓✓
Place sandbags along rivers and coastal areas to reduce the impact of flooding ✓✓
Put wooden shutters on windows and advise people to stay away from doors and windows✓✓
Devise evacuation plans especially for people in low lying areas ✓✓
There must be rescue teams to rescue in low lying areas ✓✓
A good forecasting system to predict the path of the tropical cyclone and Issue warnings✓✓ (4 x 2) (8)

(ANY FOUR)
(Must include at least one on both precautionary and management) **[15]**

1.3

1.3.1 An area of higher temperatures in an urban area compared to lower temperatures in the suburban and rural surrounding ✓✓ (1 x 2) (2)
[Concept]

1.3.2 CBD ✓ (1 x 1) (1)

1.3.3 Concrete in urban areas is able to store three times more heat than the same volume of soil or vegetation ✓✓
Concrete absorbs heat slowly during the day and releases it slowly at night thus raising temperatures considerably ✓✓
Cities contain a large number of tarred streets which absorbs heat, giving rise to high temperatures ✓✓
Buildings are made up of glass and will reflect and deflect heat between buildings thus increasing temperature. ✓✓ (1 x 2) (2)
(ANY ONE)

1.3.4 Global warming/greenhouse effect/acid rain ✓ (1 x 1) (1)

1.3.5 During the night the air is cooler ✓
Cooler air heavier and denser thus more subsidence ✓
Pollution dome pushed lower down ✓
During the day the air is warmer ✓
Warmer air lighter and less dense and rises ✓
Pollution dome lifts higher up ✓ (1 x 1) (1)
(ANY ONE)

1.3.6 Taller chimneys/stacks to release pollutants✓✓
Limit industrial activities at night time ✓✓
Use cleaner fuels in engines ✓✓
Legislation and fines to reduce pollution ✓✓
Greenbelt development ✓✓ (1 x 2) (2)
(ANY ONE)

[9]

TOTAL: 28

QUESTION 2

2.1

2.1.1 B – Watershed ✓

2.1.2 E – Confluence ✓

2.1.3 A – Water table ✓

2.1.4 G – Catchment area ✓

2.1.5 F – interfluve ✓

2.1.6 C – ground water ✓ (6 x 1) **(6)**

2.2

2.2.1 Surface pattern formed by a river and its tributaries ✓✓
(CONCEPT) (1 x 2) (2)

2.2.2 The main streams are parallel to each other ✓✓
Short tributaries join the main river at right angles/90^0 ✓✓
(ANY ONE) (1 x 2) (2)

2.2.3 Dendritic – tributaries join the main stream at acute angles✓✓
(due to underlying rock structure is uniform/homogeneous resistant to erosion)✓✓
Trellis – tributaries join the main stream at right angles✓✓
(due to alternating layers of hard and soft rocks/layers are often inclined or folded)✓✓ (2 x 2) (4)

2.2.4 In the dendritic pattern water is widely distributed in the drainage basin and water is accessible ✓✓
Longer tributaries therefore water is more accessible ✓✓
Occurs over flat/gentle land thus more suitable for farming ✓✓
Larger floodplain with access to fertile soils ✓✓
Underlying rock structure has uniform resistance to erosion ✓✓
(ANY TWO) (2 x 2) (4)
[12]

2.3

2.3.1 Lower course ✓ (1 x 1)(1)

2.3.2 Base level ✓ (1 x 1)(1)

2.3.3 Width ✓
Depth/height ✓
Shape ✓ (2 x 1)(2)

(ANY TWO)

2.3.4 In the upper course vertical/downward erosion take place ✓✓
In the lower course deposition/lateral erosion takes place ✓✓ (2 x 2)(4)

2.3.5 In the upper course of the river the valley is narrow ✓✓
Cost of construction of the dam wall will be cheaper ✓✓
The rocky banks will make the structure stronger ✓✓
The dam will be deeper because of the deep valley ✓✓
Cooler temperatures of higher attitude, therefore less evaporation ✓✓
Smaller water surface area reduces evaporation rates ✓✓
A deeper dam will have an increased capacity ✓✓
Less silt in the dam as there are fewer tributaries that enter the dam ✓✓
Steepness of slope allows easy flow of the water into a dam ✓✓
With less deposition/sediments in the upper course the dam capacity will be higher ✓✓ (2 x 2)(4)
(ANY TWO)

[12]

TOTAL: 30

GRAND TOTAL: 58

NB: The learner mark must be divided by 58 and be multiplied by 60
e.g. (learner mark X 60)
58