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GRADE 12
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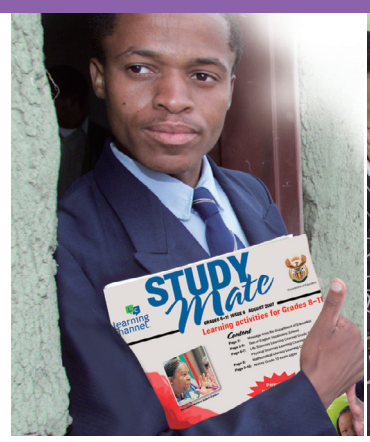
ISSUE 11 2008
Learning channel.

Geography



National Senior Certificate Grade 12
Geography
Exemplar 2008 – Paper 1

The Geography exam is 3 hours long and amounts to 300 marks.

The question paper consists of two sections, namely, Section A and Section B.

Only Section A is provided in today's Study Mate. Ask your teacher for Section B and answer all the questions in Section A and Section B.

SECTION A: PHYSICAL GEOGRAPHY

Answer at least ONE question from this section.

QUESTION 1

1.1 Choose a description from COLUMN B that matches an item in COLUMN A. Write only the letter (A – L) next to the the question number (1.1.1 – 1.1.10) in the ANSWER BOOK, for example 1.1.11 M.

COLUMN A		COLUMN B		
1.1.1	Abstraction	A	the cold front merges with the warm front and the warm sector is lifted off the ground	
1.1.2	Instability	B	the erosion of a slope at a constant angle	
1.1.3	Captured river	C	air that moves up a slope during the day	
1.1.4	Coriolis effect	D	the very slow downward movement of soil under the influence of gravity	
1.1.5	Scarp retreat	E	the lowest level a river will erode to	
1.1.6	Occlusion	F	the lengthening of a river course by the river cutting backwards towards its source	
1.1.7	Soil creep	G	the inward horizontal flow of air towards a centre	
1.1.8	Convergence	H	the tendency of air moving across the rotating surface of the earth to be deflected	
1.1.9	Base level of erosion	I	warm, dry winds that flow down the escarpment	
1.1.10	Anabatic winds	J	a river that is diverted and loses water	
		K	a watershed is cut back and lowered by highly erosive rivers	
		L	air that is warmer than its environment will continue to rise	
			(10 x 2)	(20)

1.2 Refer to the extract as well as the satellite images of tropical cyclone Favio in FIGURE 1.2 and answer the questions that follow.

1.2.1 (a) Is tropical cyclone Favio an example of a low-pressure or a high-pressure system? (1 x 2) (2)
(b) With reference to FIGURE 1.2, give ONE reason to support your answer to QUESTION 1.2.1(a). (1 x 2) (2)

1.2.2 (a) What was the general direction of movement of tropical cyclone Favio? (1 x 2) (2)
(b) Give ONE reason to support your answer to QUESTION 1.2.2(a). (1 x 2) (2)
(c) Explain why tropical cyclone Favio was moving in the direction mentioned in QUESTION 1.2.2(a). (2 x 2) (4)

1.2.3 (a) What does one call the centre of a tropical cyclone that is clearly visible on the satellite images? (1 x 2) (2)
(b) Name ONE weather condition that is typical of the centre of a tropical cyclone. (1 x 2) (2)
(c) Explain why the weather condition mentioned in QUESTION 1.2.3(b) exists in the centre of a tropical cyclone. (2 x 2) (4)

1.2.4 (a) 'Favio is now an overland depression …' What stage in the development of a tropical cyclone is being referred to here? (1 x 2) (2)
(b) Fully explain why the stage of development mentioned in QUESTION 1.2.4(a) was reached. (3 x 2) (6)

1.2.5 (a) Name TWO ways in which tropical cyclone Favio caused damage to the environment once it moved over Mozambique. (2 x 2) (4)
(b) Explain why there is a need to establish well-equipped tropical cyclone warning centres in Mozambique. (2 x 2) (4)

1.3 FIGURE 1.3A shows the longitudinal profile of a stream before rejuvenation has taken place. FIGURE 1.3B shows the longitudinal profile of the same stream after rejuvenation has taken place.

1.3.1 (a) The longitudinal profile illustrated in FIGURE 1.3A is that of a graded stream. What is meant by a graded stream? (1 x 2) (2)
(b) With reference to FIGURE 1.3A, give ONE piece of evidence to support the statement that the longitudinal profile of a graded stream is being illustrated. (1 x 2) (2)
(c) Explain why a graded stream develops a concave longitudinal profile. (2 x 2) (4)

1.3.2 (a) What is meant by the term rejuvenation? (1 x 2) (2)
(b) What feature in FIGURE 1.3B indicates that rejuvenation has taken place? (1 x 2) (2)
(c) Give TWO reasons why a stream can rejuvenate itself. (2 x 2) (4)
(d) Is the knick-point waterfall shown in FIGURE 1.3B an example of a permanent or a temporary base level of erosion? (1 x 2) (2)
(e) Give a reason for your answer to QUESTION 1.3.2(d). 1 x 2) (2)

1.4 FIGURE 1.4A shows a landform typically found in South Africa. FIGURE 1.4B shows the process of mass movement that will take place on the slopes of the illustrated landform.

1.4.1 (a) Identify the landform (feature) illustrated in FIGURE 1.4A. (1 x 2) (2)
(b) Explain, with reference to the underlying rock structure, how the landform identified in QUESTION 1.4.1(a) developed. (3 x 2) (6)

1.4.2 (a) What type of mass movement is illustrated in FIGURE 1.4B? (1 x 2) (2)
(b) Provide evidence from FIGURE 1.4B that mass movement is taking place. (1 x 2) (2)
(c) On which slope, the dip slope or the scarp slope, is mass movement more likely to take place? (1 x 2) (2)
(d) Explain your answer to QUESTION 1.4.2(c). (2 x 2) (4)
(e) Why do you think people should be made aware of the consequences of mass movement before building on slopes? (2 x 2) (4)
(f) Name ONE way in which slopes can be stabilised (reinforced) to reduce mass movement. (1 x 2) (2)

[100]

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QUESTION 2

2.1 Indicate whether the following statements are TRUE or FALSE. Choose the answer and write only 'true' or 'false' next to the question number (2.1.1 – 2.1.10) in the ANSWER BOOK.

2.1.1 Primary circulation refers to the circulation within one hemisphere on a global scale.
2.1.2 Pressure gradient refers to the difference in pressure between two points.
2.1.3 Isotherms are lines on a map that join places of equal pressure.
2.1.4 In the southern hemisphere air movement around a high pressure (anticyclone) is clockwise.
2.1.5 The polar front is formed where warm subtropical air and cool sub-polar air meet.
2.1.6 An aquifer is a rock that is impermeable and does not allow water to move through it.
2.1.7 A flow hydrograph records how much water passes a given point in a given period of time.
2.1.8 A periodic river is a river that only flows in the rainy season when it receives ground water.
2.1.9 Rocks that are uniformly resistant and exposed to the same type of weathering will weather at different rates.
2.1.10 Core stones are rounded stones that are exposed after erosion to make up a tor. (10 x 2) (20)

2.2 Refer to FIGURE 2.2 showing the tri-cellular circulation of the atmosphere.

2.2.1 (a) Why do meteorologists refer to a tri-cellular circulation of the atmosphere? (1 x 2) (2)
(b) Identify the THREE cells of circulation labelled P, Q and R respectively. (3 x 2) (6)
2.2.2 (a) What does the abbreviation ITCZ stand for? (1 x 2) (2)
(b) Where, at X, Y or Z, would the ITCZ be found? (1 x 2) (2)
(c) Name any TWO weather conditions that one will experience at the ITCZ. (2 x 2) (4)
(d) Explain why the weather conditions mentioned in QUESTION 2.2.2(c) exist at the ITCZ. (2 x 2) (4)

2.3 Refer to FIGURE 2.3A showing the weather forecast for 15 May 2007. FIGURE 2.3B is a cross-section through the eastern half of the country explaining the sunny conditions at all the inland weather stations.

2.3.1 What is meant by the term inversion shown in FIGURE 2.3B? (1 x 2) (2)
2.3.2 Name the high-pressure cell associated with the label subsided air of continental origin. (1 x 2) (2)
2.3.3 Why does an inversion develop at the lower side of the high- pressure cell mentioned in QUESTION 2.3.2? (2 x 2) (4)
2.3.4 With reference to FIGURE 2.3B, explain why sunny conditions are indicated for all the inland weather stations. (3 x 2) (6)
2.3.5 Will the inversion shown in FIGURE 2.3B be higher or lower than its current position during the summer months? (1 x 2) (2)
2.3.6 The vertical positional change of the inversion from winter to summer is of great importance to farmers on the South African plateau. Explain this statement. (2 x 2) (4)

2.4 Refer to the extract as well as the photograph and diagram of rivers draining into the Hartbeespoort Dam in FIGURE 2.4.

2.4.1 (a) Identify the drainage pattern of the Jukskei River as seen in FIGURE 2.4. (1 x 2) (2)
(b) Give ONE reason for your answer to QUESTION 2.4.1(a). (1 x 2) (2)
2.4.2 (a) Flooding is common in Alexandra. What is a flood? (1 x 2) (2)
(b) Why do people still build shacks on the banks of the Jukskei River if the area is threatened by constant flooding? (1 x 2) (2)
(c) Explain why there is a short lag time and a high flood peak as the Jukskei River flows through Alexandra. (3 x 2) (6)
(d) Name any TWO consequences of flooding for the inhabitants of Alexandra. (2 x 2) (4)
2.4.3 (a) Describe the locations of the sewerage works in relation to the rivers shown in FIGURE 2.4. (1 x 2) (2)
(b) What are the consequences of the above for people living on the banks of the Hartbeespoort Dam? (2 x 2) (4)
(c) State TWO measures that can be introduced by the provincial government to ensure that all rivers flowing into the Hartbeespoort Dam are free of sewerage effluents. (2 x 2) (4)

2.5 Refer to FIGURE 2.5 showing the four slope forms associated with a slope. All four slope forms are not necessarily found on a mountain or ridge.

2.5.1 Give ONE characteristic of each of the slope forms shown in FIGURE 2.5. (4 x 2) (8)
2.5.2 Explain why all four slope forms are NOT always found on a mountain or ridge. (2 x 2) (4)
[100]

Dear learners

Sources A, B and C required for the History Paper published in Study Mate Issue 10, are available at www.learn.co.za

ANNEXURE

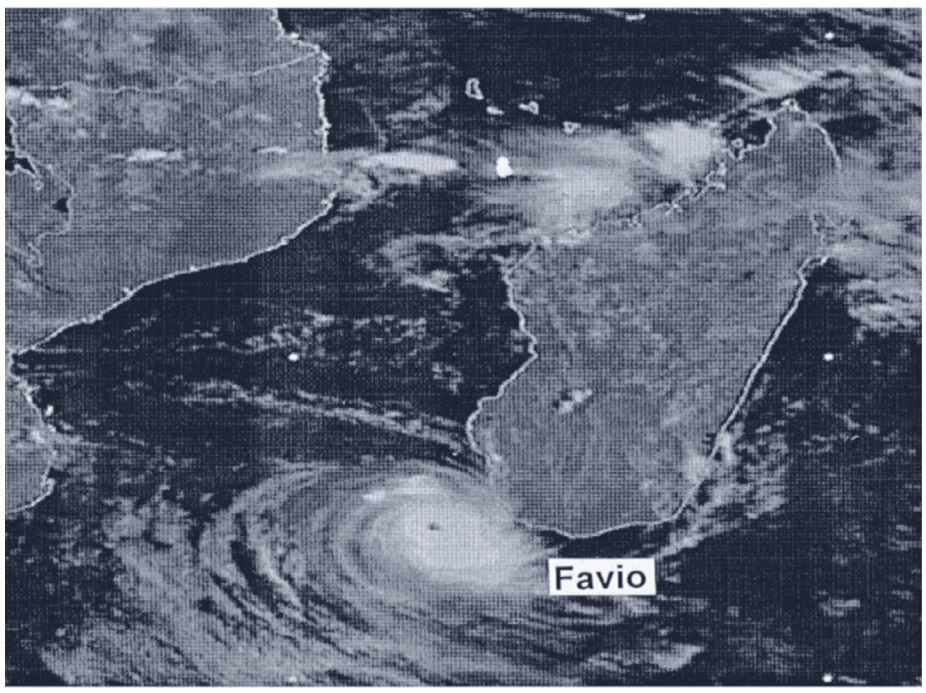
Figure 1.2

Tropical cyclone Favio causing multiple disasters in Mozambique!

Track and Impact

Tropical cyclone Favio developed in the western Indian Ocean about 1 200 km from Madagascar on 14 February 2007. It gradually moved southwest, passing well off-shore of Reunion and Mauritius. By 20 February, it was just off the southern shore of Madagascar as a well-formed, mature storm.

While the storm system had largely skirted around populated areas to that point, forecasters were concerned about its behaviour when it entered the warmer water of the Mozambique Channel.



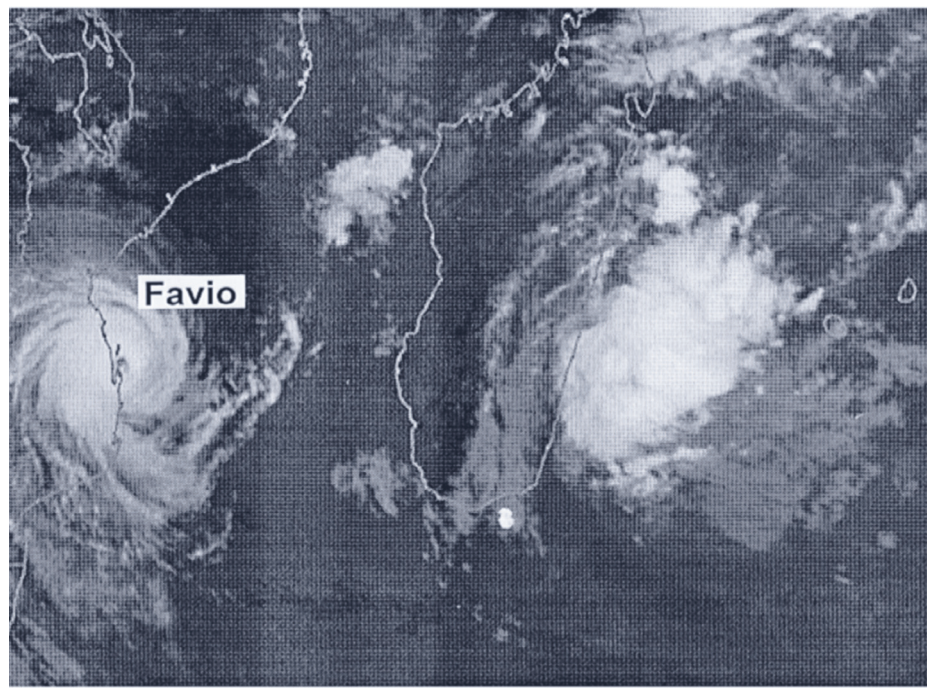
Satellite image – 20 February 2007

The storm was turning around the southern end of Madagascar, heading for the Mozambique Channel. Favio had a recognisable shape with spiral arms showing its clockwise rotation. The spiral arms were well-defined and tightly wound. The distinct centre of the storm was only partially filled with clouds. These were all signs of a well-developed tropical cyclone.

Tropical cyclone Favio struck the southern part of Mozambique on Thursday 22 February 2007 bringing in large-scale devastation and suffering to tens of thousands of residents.

Current Conditions and Expected Developments – 23 February 2007

Favio has now transformed from being a tropical cyclone to a tropical depression. This is always the case when a tropical cylcone moves over the land. Favio is now an overland depression. The maximum wind speed is about 60 km/h and is being disorganised gradually.



Satellite image – 22 February 2007

Figure 1.3

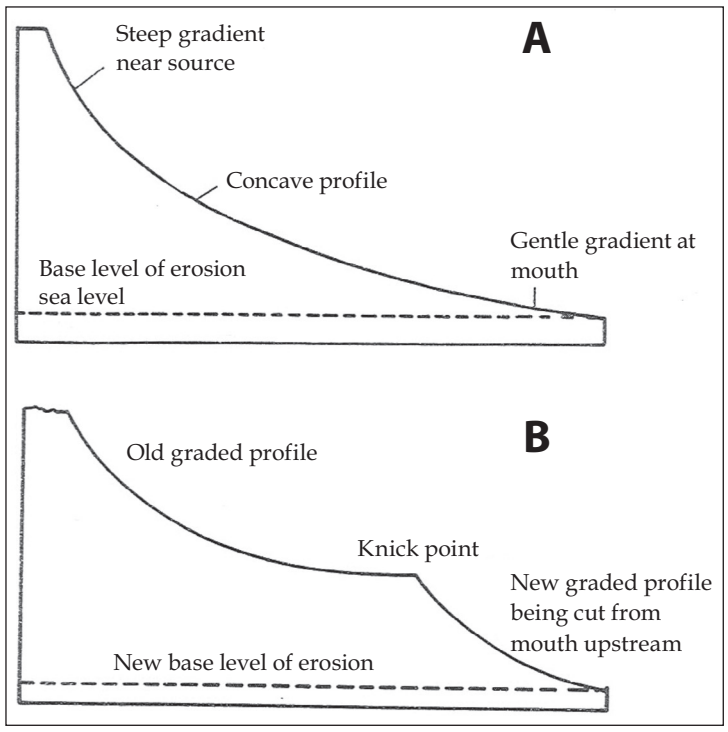


Figure 1.4

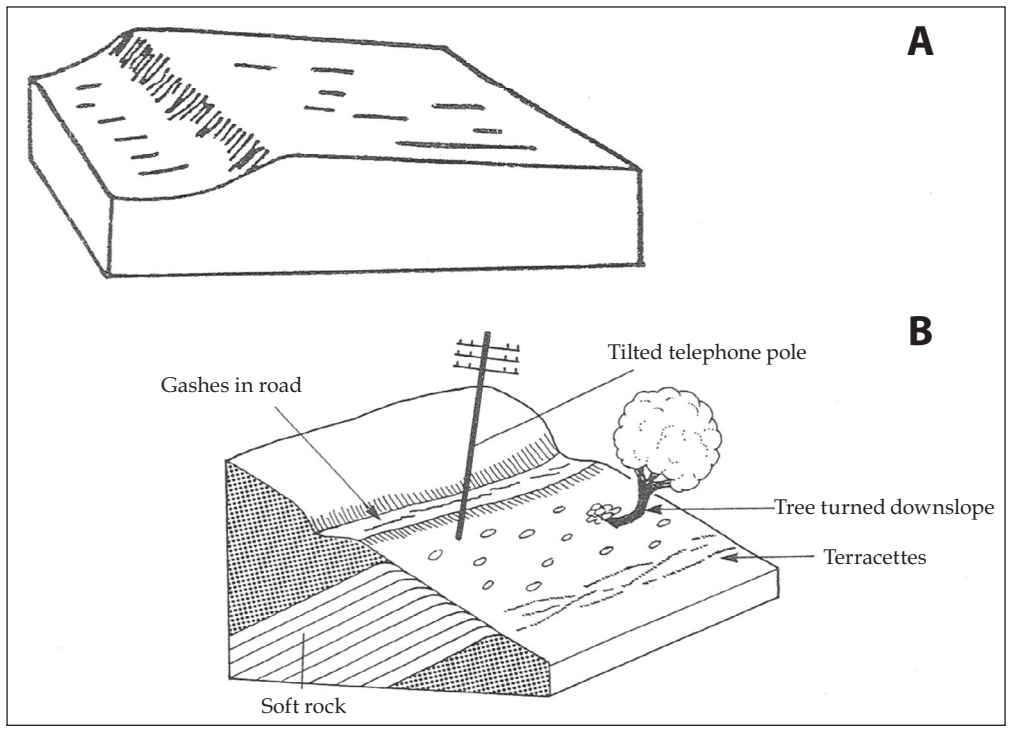


Figure 2.2

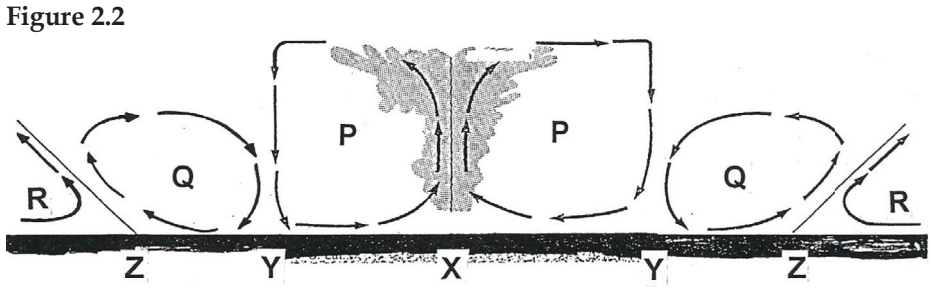


Figure 2.3

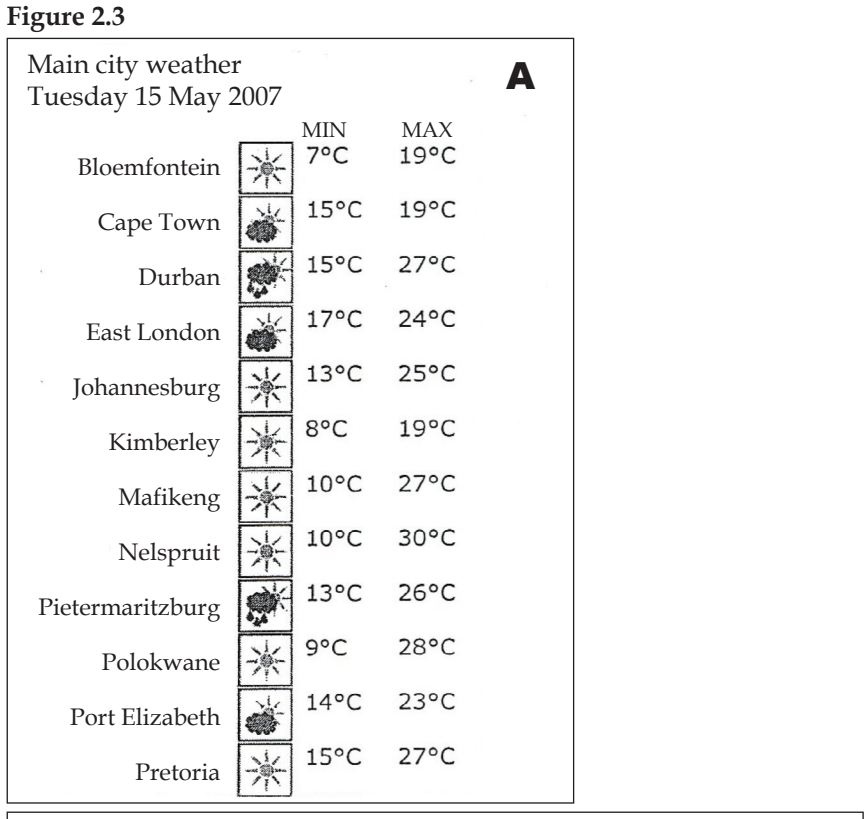


Figure 2.5

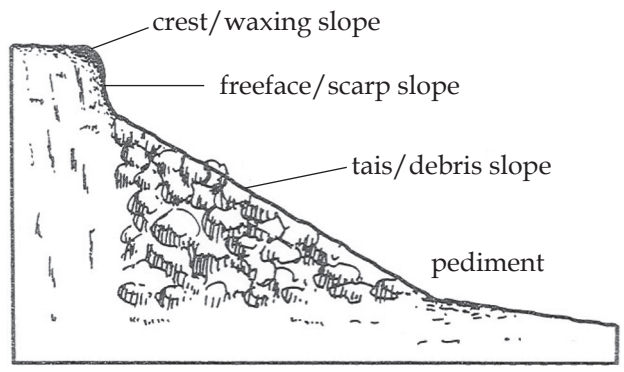


Figure 2.4

100 000 lives at risk

Living on the edge – Alexandra residents exist dangerously on the banks of the Jukskei River

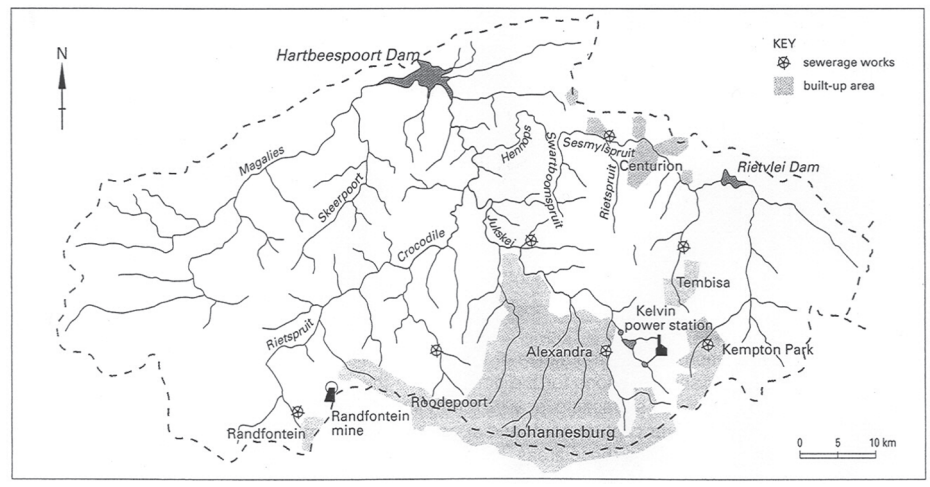
In the summer rainfall regions the lives of some 100 000 people are at risk. They are in danger because they live in flood-prone areas. One of these areas, with 6 000 residents, is an informal settlement below the banks of the Jukskei River within Alexandra Township, north of Johannesburg.

Residents have been warned many times about the dangers of building along the banks of the Jukskei, but they stay because there is nowhere else for them to go. Hundreds of shacks on the river banks have been washed away in the past yet residents remain undaunted and return to build.

This FIGURE shows the Jukskei River and other rivers that drain into the Hartbeespoort Dam.

The Jukskei River carries heavily polluted water into the dam. The sources of this pollution are from sewerage, domestic waste and detergents reaching the river from Alexandra Township, as well as effluent from mining areas and idustrial waste from the Kelvin power station and the industrial areas of Johannesburg. There are also many sewerage works along the rivers that flow into the dam.

Heavy rains in 1999, 2000 and 2001 have caused loss of life and homes along the Jukskei River in Alexandra. Building on a flood plain, so close to the river, is hazardous. As the Jukskei River rises north of Alexandra, rainwater does not infiltrate due to the impermeable artificial surfaces of the built-up area. Overland flow occurs and as a result there is a short lag time and high flood peak in the rivers as it flows through the township, which contributes to the heavy flooding experienced.



Rivers flowing into the Hartbeestpoort Dam

MEMORANDUM

QUESTION 1

1.1.1 K 1.1.2 L 1.1.3 J 1.1.4 H 1.1.5 B
1.1.6 A 1.1.7 D 1.1.8 G 1.1.9 E 1.1.10 C (10x2) (20)

1.2.1 (a) Low pressure (2) (1x2) (2)
(b) Reference to clockwise rotation of air (2)
Satellite image shows clockwise spiralling cloud band (2)
Reference made to a depression (2) [Any ONE] (1x2) (2)

1.2.2 (a) East to west / westwards (2) (1x2) (2)
(b) On 20/02/2007 it was south of Madagascar and on 22/02/2007 it was just off the east coast of Africa/Mozambique. (1x2) (2)
(c) It is located in the easterly wind belt (2)
Driven westwards by easterly winds (2) (2x2) (4)

1.2.3 (a) The eye (2) (1x2) (2)
(b) Cloudless (2)
Wind-still (2)
No rain (2)
Low pressure (2) [Any ONE] (1x2) (2)
(c) Descending column of air in centre heats up (2)
No condensation therefore cloudless (2)
No rain because there is no condensation (2)
Wind-still as air rotates clockwise to isobars around the eye (2)
Convergence and rising air results in low pressure (2) [Any TWO] (2x2) (4)

1.2.4 (a) Dissipating/Decaying stage (1x2) (2)
(b) It has reached the land (2)
Cut off from source of moisture (2)
Evaporation reduced (2)
Less condensation and release of latent heat (2)
Friction over land slows system down (2) [Any THREE] (3x2) (6)

1.2.5 (a) Destruction of buildings and infrastructure (2)
Soil washed away (2)
Natural vegetation destroyed (2)
Destruction of farmland (2)
Destruction of life/people will be killed (2) [Any TWO] (2x2) (4)
(b) To detect the development of a tropical cyclone in its early stages of development (2)
To warn people in time of the approaching tropical cyclone (2)
Evacuation procedures can be put into place (2)
Limit loss of life (2)
To put in place measures that will minimise the impact of a tropical cyclone e.g. rescue operations can be planned (2) [Any TWO – Accept other] (2x2) (4)

1.3.1 (a) When an equilibrium/balance has been reached between erosion and deposition in the stream (2) (1x2) (2)
(b) Smooth, concave longitudinal profile (2)
Longitudinal profile steep in upper reaches and gradual in lower reaches (2) [Any ONE] (1x2) (2)
(c) Needs more energy to overcome high friction index in upper reaches and to transport large stream load particles (2)
Needs less energy to overcome low friction index in lower reaches and to transport small stream load particles (2) (2x2) (4)

1.3.2 (a) Stream gains energy and starts to erode downwards into the landscape (2)
[Concept] (1x2) (2)
(b) Knick-point waterfall (2) (1 x 2) (2)
(c) Increased precipitation (2)
Increase in volume of water (2)
Stream capture (2)
Reduction in vegetation increases run-off (2)
Drop in sea-level (2)
Isostatic uplift of land (2) [Any TWO] (2x2) (4)
(d) Temporary (2) (1x2) (2)
(e) In time the waterfall will be eroded away (2) (1x2) (2)

1.4.1 (a) Cuesta/Homoclinal ridge (1x2) (2)
(b) Sedimentary rock layers tilted (2)
Rock layers vary in resistance (2)
Rock layers exposed to the Earth's surface (2)
Soft rock erodes away to form valleys (2)
Hard rock protrudes above surface to form ridges (2) [Any THREE] (3x2) (6)

1.4.2 (a) Soil creep (2) (1x2) (2)
(b) Tilted telephone pole (2)
Gashes in the road (2)
Tree turned down slope (2)
Terracettes formed on slope (2) [Any ONE] (1x2) (2)
(c) Scarp slope (1x2) (2)
(d) Steeper slope (2)
Stronger influence of gravity (2)
Material more easily moved down the slope (2) [Any TWO] (2x2) (4)
(e) Buildings can be destroyed (2)
Roads can be destroyed (2)
Damage to buildings and roads could be costly (2)
To take proper precautions before building (2) [Any TWO – Accept other] (2x2) (4)
(f) Cover slopes with dense vegetation to stabilise the soil (2)
Safety nets to catch falling materials (2)
Lay down mesh wire to stabilise the soil (2)
Create rock embankments to prevent movement down the slopes (2)
Build "undercover" roads (tunnels) to protect vehicles (2)
Do proper environmental impact assessment (2) [Any ONE] (1x2) (2)

[100]

QUESTION 2

2.1.1 True 2.1.2 True 2.1.3 False 2.1.4 False 2.1.5 True
2.1.6 False 2.1.7 True 2.1.8 True 2.1.9 False 2.1.10 True (10x2) (20)

2.2.1 (a) Because circulation occurs in three cells in each hemisphere (2) (1x2) (2)
(b) P – Ferrel (2)
Q – Hadley (2)
R – Polar (2) (3x2) (6)

2.2.2 (a) Inter-Tropical Convergence Zone (2) (1x2) (2)
(b) X (2) (1x2) (2)
(c) High temperatures/Hot (2)
Cumulonimbus cloud/Heavy cloud cover (2)
Thundershowers/Heavy downpours (2)
[Any TWO] (2x2) (4)
d) Along the equator where it is warm (2)
Rapidly rising air condenses and form clouds (2)
Large scale condensation results in heavy rain (2)
[Any TWO. Must refer to weather conditions mentioned above] (2x2) (4)

2.3.1 Temperature rises with altitude (2)
[Concept] (1x2) (2)

2.3.2 Kalahari High Pressure (2) (1x2) (2)

2.3.3 Descending air heats up (2)
Warm layer of air at bottom of Kalahari High Pressure cell (2)
Warm air meets cooling air that rises from Earth's surface (2)
[Any TWO] (2x2) (4)

2.3.4 Inversion lower than the escarpment (2)
Warm moist air cannot reach the interior (2)
Little moisture over interior will reduce condensation (2)
No cloud formation to block out the sun (2)
[Any THREE] (3x2) (6)

2.3.5 Higher (2) (1x2) (2)

2.3.6 During summer moist air reaches the interior (2)
Precipitation over the interior (2)
Rivers filled with water (2)
Farming can take place (2)
[Any TWO] (2x2) (4)

2.4.1 (a) Dendritic (2) (1x2) (2)
(b) It looks like the branches of a tree (2)
Tributaries join the main stream at acute/small angles (2)
[Any ONE] (1x2) (2)

2.4.2 (a) Situation that develops when a river overflows its banks and covers areas with water that is usually not covered by water (2)
[Concept] (1x2) (2)
(b) Shortage of space for development (2)
Attachment that they have developed with the area over time (2)
[Any ONE] (1x2) (2)
(c) The land is covered by artificial surfaces (2)
Water does not infiltrate the surface (2)
More water reaches the stream therefore flood peak is higher (2)
Water flows faster on artificial surfaces thus lag time shortened (2)
[Any THREE] (3x2) (6)
(d) Destruction of infrastructure (2)
Loss of life (2)
Houses washed away/damaged (2)
Personal belongings washed away/damaged (2)
Costs involved to rebuild (2)
[Any TWO] (2x2) (4)

2.4.3 (a) Sewerage works are located on river banks (2) (1x2) (2)
(b) Contamination of water (2)
Eutrophication (2)
Permanent stench (2)
Diseases (2)
Dam becomes unsightly (2)
Drop in land value next to the dam (2)
[Any TWO] (2x2) (4)
(c) Building purification dams (2)
Relocate the sewerage works (2)
Legislation preventing raw sewerage being dumped into rivers (2)
[Any TWO] (2x2) (4)

2.5.1 Crest: Convex slope
Top of slope (2)
Free face: Perpendicular/vertical (2)
No material can collect here (2)
Retreats parallel to itself (2)
Talus: Deposition of eroded material (2)
Remain at a constant angle (2)
Pediment: Low angle (2)
Slightly concave (2)
Consists of evenly eroded surface of rock (2)
Covered by thin layer of soil (2)
Area increases as slope is driven back (2)
[Any ONE characteristic for each of the slopes] (4x2) (8)

2.2.2 In high rainfall areas sheet flow occurs (2)
Sheet flow results in rounded slopes (2)
Where temperature extremes occur, exfoliation occurs (2)
Outer layers of exposed rock will flake off (2)
This process results in rounded slopes (2)
[Any TWO] (2x2) (4)

[100]