SECONDARY SCHOOL IMPROVEMENT PROGRAMME (SSIP) 2019

GEOGRAPHY

REVISED

ANSWER BOOK

GEOMORPHOLOGY

GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

GRADE 12

GEOMORPHOLOGY
TOPIC 5: DRAINAGE BASINS IN SOUTH AFRICA

SECTION B: TYPICAL EXAM ANSWERS – DRAINAGE BASINS

QUESTION 1.1

1.1.1 Water that is found below the surface (1)
[Concept] (1 x 1) (1)

1.1.2 Infiltration – Water on the ground enters/seeps into the soil (1)
[Concept]
Run-off – Water flowing overland/ overland flow (1)
[Concept] (2 x 1) (2)

1.1.3 It will add water to the stream to allow it to continue flowing (2) (1 x 2) (2)

1.1.4 Water table will drop/lowered (2) (1 x 2) (2)

1.1.5 **Topography (relief):** Gentle slopes promotes infiltration of water and leads to a higher water table (2)
Rock type: Permeable rock promotes infiltration and will lead to high water table (2)
Soil moisture: Dry soil leads to high water table due to infiltration (2)
Saturated soil feeds the water table and lets it rise (2)
Type of rainfall: Prolonged and gentle rain leads to a higher water table (2)
Vegetation cover: Lots of/dense vegetation promotes infiltration and leads to high water table (2)
Evaporation rate: Low evaporation rates increases the rate of infiltration and leads to a rise of the water table (2)
[ANY FOUR. ACCEPT ANY OTHER REASONABLE ANSWERS] (4 x 2) (8)

QUESTION 1.2 (NOVEMBER 2014)

1.2.1 Dendritic (1)

1.2.2 Acute angles/Small angles/Mention any angle less than 90° (1)

1.2.3 Uniform (1)

1.2.4 Erosion (1)

1.2.5 Stream Order 2 (1)

1.2.6 Interfluve (1)

1.2.7 C (1) (7 x 1) (7)

QUESTION 1.3 (FEBRUARY / MARCH 2015)

1.3.1 Total area drained by a river and its tributaries (1)

[CONCEPT] (1 x 1) (1)

1.3.2 Water that moves directly on the earth's surface during rainfall/Water that flows over the land when rainfall is heavy or the soil is saturated with water (1)
[CONCEPT] (1 x 1) (1)

1.3.3 Impermeable rock (2)
Steep gradient (2)
Lack of vegetation (2)
Heavy rainfall (2)
Saturated soil (2)
Low evaporation rate (2)
[ANY TWO] (2 x 2) (4)

1.3.4 (a) Increase (2) (1 x 2) (2)
(b) Higher rainfall increase the number of tributaries to the main river(2)
More first order streams form (2)
Stream order of rivers lower down increases (2)
[ANY TWO] (2 x 2) (4)

QUESTION 1.4 (FEBRUARY/MARCH 2015)

1.4.1 C (1)

1.4.2 B (1)

1.4.3 C (1)

1.4.4 A (1)

1.4.5 C (1)

1.4.6 B (1)

1.4.7 C (1)

1.4.8 A(1)

QUESTION 1.5 (NOVEMBER 2014)

1.5.1 Laminar (1)

1.5.2 Turbulent (1)

1.5.3 Turbulent (1)

1.5.4 Turbulent (1)

1.5.5 Laminar (1)

1.5.6 Laminar (1)

1.5.7 Turbulent (1)

1.5.8 Laminar (1) (8 x 1) (8)

QUESTION 1.6 (EXEMPLAR 2014)

1.6.1 Dendritic (1)
1.6.2 Rectangular (1)
1.6.3 Rectangular (1)
1.6.4 Dendritic (1)
1.6.5 Radial (1)
1.6.6 Dendritic (1)
1.6.7 Radial (1)
1.6.8 Rectangular (1)

QUESTION 1.7(EXEMPLAR 2014)

1.7.1 The total area drained by a river and its tributaries (1)
[CONCEPT] (1 x 1) (1)

1.7.2 Total length of all the streams in relation to the size of the drainage basin it drains (1)
[CONCEPT] (1 x 1) (1)

1.7.3 **X** (2) (1 x 2) (2)

1.7.4 Many streams to cover the greater part of the drainage basin (2)
[CONCEPT] (1 x 2) (2)

1.7.4 An increase in precipitation will increase the number of streams (2)
Saturated soil increases run-off, forming more streams (2)
Low permeability results in run-off and the development of streams (2)
Sparse vegetation increases run-off and more streams form (2)
Steep gradients increase run-off and more streams develop (2)
[Any TWO] (2 x 2) (4)

1.7.5 Drainage density will increase (2)
More artificial surfaces and storm water drainage increase run-off outside urban developments (2)
More small streams develop (2)
[Any TWO] (2 x 2) (4)

QUESTION 1.8 (NOVEMBER 2015)

1.8.1 Rainfall/Precipitation (1)
Melting snow (1)
Groundwater (1)

Springs (1)
River/surface run-off (1)
[Any ONE]

1.8.2 Catchment/Source (1)
1.8.3 Third order (1)
1.8.4 Delta/fluvial island/alluvial island (1)
1.8.5 Deposition (1)
1.8.6 Infiltration/percolation/seepage(1)
1.8.7 Watershed/Drainage divide (1)
1.8.8 Permanent base level/ Ultimate base level (1) (8 x 1) (8)

QUESTION 1.9 (NOVEMBER 2015)

1.9.1 A – 3/Fold mountains (1)
B – 1/Volcanic dome (1)
C – 2/Jointed landscape (1) (3 x 1) (3)

1.9.2 The underlying rock structure (2)
The geology of the area (2)
Tectonic forces (2)
[ANY ONE] (1 x 2) (2)

1.9.3 Streams flow outwards (radiates) from a central high lying point (dome) (2)
(1 x 2) (2)

1.9.4 Igneous rocks/examples of igneous rocks (2)
Impermeable rocks (2)
Rock type with cracks/fractures/fault lines (2)
Geology consists of well-jointed rocks (2)
[ANY TWO. ACCEPT OTHERS] (2 x 2) (4)

1.9.5 Fold mountains have steep gradients/anticlines and synclines (2)
The tributaries would flow straight down steeper slopes (2)
Main streams flow on valley floors/anticlines (2)
[ANY TWO] (2 x 2) (4)

QUESTION 1. 10 (NOVEMBER 2015)

1.10.1 B (1)

1.10.2 A (1)

1.10.3 A (1)

1.10.4 B (1)

1.10.5 A (1)

1.10.6 B (1)

1.10.7 B (1) (7 x 1) (7)

QUESTION 1 .11 (NOVEMBER 2015)

1.11.1.(a) A river that only flows after heavy rainfall, short duration (1)
[Concept] (1 x 1) (1)

(b) Many rocks and boulders visible in the river course (1)
Dry river bed (1)
[ANY ONE] (1 x 1) (1)

(c) Regularity of rainfall/droughts (2)
Amount of rainfall (2)
Soil type over which the streams flow
(2) Underlying rock structure (2)
Rate of evaporation (2)
Vegetation density in catchment area (2)
The speed/velocity at which the water flows (2)
The volume of flowing water/floods (2)
The manner in which the water flows (2)
Infiltration rate (2)
Soil water content (2)
Gradient (2)
[ANY TWO] (2 x 2) (4)

1.11. (a) Exotic river (2) (1 x 2) (2)

(b) Gains water in much wetter areas - Drakensberg Mountains (2)
Stream flow volume exceeds infiltration rate (2)
Fed by tributaries in high rainfall areas (2)
Reliable ground water close to the source (2)
Construction of dams to regulate the flow of water (2)
[ANY TWO] (2 x 2) (4)

(c) Regular water supply (2)
Irrigation (2)
Stock farming (2)
[ANY ONE – ACCEPT OTHER] (1 x 2) (2)

SECTION C: HOMEWORK ANSWERS – DRAINAGE BASINS

QUESTION 1

1.1. Evaporation ✓
1.2. Confluence ✓
1.3. Source / Origin ✓
1.4. Infiltration ✓
1.5. Minor water shed / interfluve ✓
1.6. Drainage basin ✓
1.7. River system ✓
1.8. Base flow ✓
1.9. Direct runoff / overland runoff
1.10. Dendritic ✓ (10 x 1 = 10)

QUESTION 2

2.1. X: Episodic / Exotic ✓
Y: Periodic ✓
Z: Permanent / Perennial ✓ (3 x 1 = 3)
2.2. X: Arid / Low rainfall / Desert / Dry area ✓
Y: Semi-arid / half dry / seasonal rainfall region ✓
Z: High rainfall region ✓ (3 x 1 = 3)
2.3. Water table is the upper level of saturated groundwater. ✓✓ (1 x 2 = 2)
2.4. During the high rainfall region more water infiltrate the soil and the water table rises. ✓
During the dry period of the year the water table sinks as water seeps into the rivers and evaporates. ✓ (2 x 1 = 2)
2.5. a) Z / permanent river ✓ (1 x 1 = 1)
b) Continuous flow ✓✓support agriculture, mining, industries, transport and settlements. ✓✓ (2 x 2 = 4)
2.6. The permanent river gets water form base flow throughout the year ✓✓ as well as surface runoff during the rainy season. ✓✓ (2 x 2 = 4)

QUESTION 3

3.1. Dendritic drainage pattern. ✓ (1 x 1 = 1)
3.2. Uniform rock ✓ with equal resistance to erosion ✓ / gradual gradient ✓ (2 x 1 = 2)
3.3. Order 5 ✓✓ (1 x 2 = 2)
3.4. Order 1 ✓ (1 x 1 = 1)
3.5. Order 1 ✓ - youth stage / mountain stage / ✓ (2 x 1 = 2)
3.6. Order 1 ✓ (1 x 1 = 1)
3.7. Fine ✓ (1 x 1 = 1)
3.8. Gradient: ✓ steep gradient high drainage density ✓
Vegetation: ✓ sparse vegetation – high density ✓
Porosity: ✓ rock soil that is not porous will not absorb water and have a high drainage density. ✓
Permeability: ✓ rock soil that is impermeable will not absorb water and have a high drainage density. ✓
Rainfall: high and heavy rainfall will lead to high drainage density. ✓ (3 x 2 = 6)

QUESTION 4

4.1.

Sketch	Drainage Pattern Name	2 Characteristic of Drainage pattern	Underlying rock Structure
A	Dendritic ✓	Shape like a tree ✓ Tributaries join at oblique angle from upstream ✓	Uniform rock ✓ Gradual gradient ✓ Equally resistant to erosion
B	Radial / Centrifugal ✓	Rivers flow away ✓from central high point ✓	Hill / Island ✓✓
C	Rectangular ✓	Main stream and tributaries ✓have 90º angles in the streams ✓	Jointed igneous rock – ✓ river follow weaknesses in rocks ✓
	(3 x 1 = 3)	(3 x 2 = 6)	(3 x 2 = 6)

QUESTION 5

5. Use the sketches above to answer the questions below. Fit the most suitable sketch to the description below.

5.1. a / f ✓
5.2. e ✓
5.3. h ✓
5.4. c / d ✓
5.5. g / I ✓
5.6. e ✓
5.7. I ✓
5.8. b ✓
5.9. g / i ✓
5.10. h ✓
5.11. c ✓
5.12. h ✓
5.13. a / f ✓
5.14. h ✓
5.15. a / b / f ✓ (15 x 1 = 15)

QUESTION 6

6.1. Drainage basin: total area drained by a river system ✓✓
Watershed: high lying area separating one drainage basin forms another. ✓✓
River system: main stream and all its tributaries. ✓✓ (3 x 2 = 6)

6.2. 1✓ (1 x 1 = 1)

6.3. a) Trellis ✓ (1 x 1 = 1)

b) Parallel main streams / Parallel ridges ✓✓
Short tributaries ✓✓
Tributaries join main stream at right angles ✓✓ (2 x 2 = 4)

6.4. Parallel ridges / homoclinal ridges, alternative hard and soft rock. ✓✓ (1 x 2 = 2)

6.5. a) 3✓✓ (1 x 2 = 2)

b) Short tributaries joining at separate places along the main stream / longitudinal drainage basin – low stream order. ✓✓ (1 x 2 = 2)

6.6. Pass ✓ – low lying area where a river passes through a ridge. ✓ (2 x 1 = 2)

QUESTION 7

7.1. A: Laminar flow ✓ B: Turbulent flow ✓
7.2. A ✓
7.3. B ✓
7.4. A ✓
7.5. B ✓
7.6. A ✓ (7 x 1 = 7)

SESSION NO: 6 GEOMORPHOLOGY

TOPIC 6: FLUVIAL PROCESSES

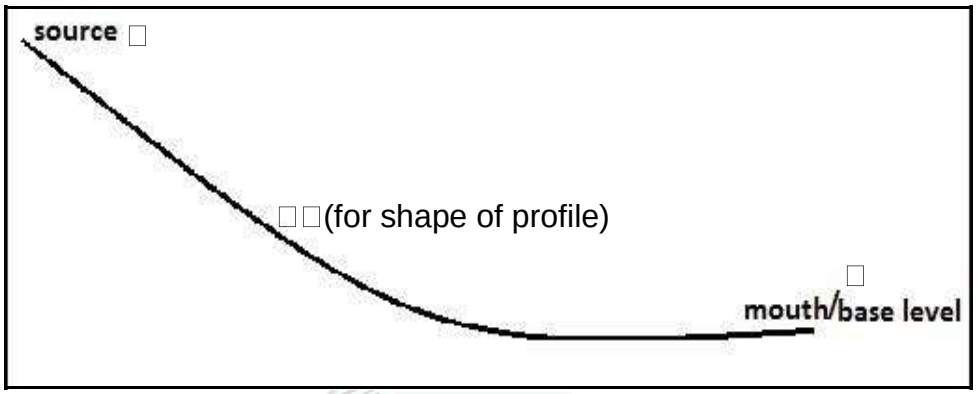
SECTION B: ANSWERS TO EXAM QUESTIONS – FLUVIAL PROCESSES

QUESTION 1.1 (NOVEMBER 2014)

1.1.1 Shows the side view of a river from its source to its mouth (1)
It is the changing gradient of a river from its source to its mouth (1)
It is the representation of the gradient down which a river flows (1)
[CONCEPT] (1 x 1) (1)

1.1.2 Waterfall (1) rapid (1) hard rocks (1) (1 x 1) (1)

1.1.3



Must be a **graded profile** with correct labels.
(1 x 3)
Award 1 mark for shape only (3)

1.1.4 Almost smooth river bed (2)
Concave shaped profile (2)
(1 x 2)
[ANY ONE] (2)

1.1.5 **Processes that the river profile must undergo to be graded**
Downward erosion must increase in the upper and middle course (2)
The upper course must assume a steeper slope (2)
In the upper course discharge must increase and overcome friction (2)
Headward erosion must increase to remove temporary base levels of erosion (2)
Retreat of waterfalls to remove temporary base levels of erosion (2)
Flattening of rapids remove temporary base levels of erosion (2)
Filling in of lakes remove temporary base levels of erosion (2)
Stream carrying capacity must increase to carry additional stream load (eroded particles) (2)
Gradient in the lower course must decrease in order for carrying capacity to decrease (2)
In the lower course the stream discharge must be reduced (2)
Deposition occurs in the lower course lowering the gradient
(2)
The river now assumes a steep gradient in the upper course and a gentle gradient in the lower course (2)
[ANY FOUR] (4 x 2) (8)

QUESTION1.2 (FEBRUARY / MARCH 2015)

1.2.1 Meander (1) (1 x 1) (1)

1.2.2 Width (1) and depth (1) (2 x 1) (2)
(1 x 2)

1.2.3 Slip-off slope (1) (2)

1.2.4 The boys do not understand the difference between the slopes on the river bend/Where the slip off slope is, it is shallow and where the undercut slope is, it is deeper (2)
[CONCEPT] (1 x 2) (2)

1.2.5 **Difference in the formation of slopes A and B**
Slope A - Undercut slope
It is the undercut cut slope that is associated with fast flowing water (2) Lots of energy resulting in the process of lateral erosion (2)
It occurs on the outer bank of the meander (2) The slope is steep and concave (2)
Slope B - Slip-off slope
It is the slope that is associated with a slower flowing water (2) More friction and slower flowing resulting in deposition (2)
It occurs on the inner bank of the meander (2)
The slope is gentle and convex (2)
[ANY FOUR] (4 x 2) (8)

QUESTION1.3 (EXEMPLAR 2014)

1.3.1 An interfluve (1) (1 x 1) (1)

1.3.2 Separates water between two streams in the same drainage basin (2) (1 x 2) (2)

1.3.3 High rainfall leads to a higher stream discharge/Low rainfall leads
to a lower stream discharge (2)
Saturated soil leads to a higher stream discharge/Unsaturated soil leads to a lower stream discharge (2)
Low permeability leads to a higher stream discharge/High permeability leads to a lower stream discharge (2)
Sparse vegetation leads to a higher stream discharge/Dense vegetation leads to a lower stream discharge (2)
Steep slope leads to a higher stream discharge/Gradual slope leads to a lower stream discharge (2)
[Any TWO] (2 x 2) (4)

1.3.4 River flows over level ground close to coastline (2)
River loses energy and slows down (2)
Heavier material of the bed load is dumped, causing sediments to build up on the sea floor (2)
Main stream splits into small distributaries as it flows through deposited material (2)

[Any TWO] (2 x 2)(4)

1.3.5 The soils are rich in nutrients/fertile (2)
A water source is close by/river provides water (2)
Land is flat/gentle gradient (2)
[Any TWO] (2 x 2) (4)

QUESTION 1.4 (NOVEMBER 2014)

1.4.1 River rejuvenation refers to the revival of the river's erosive ability/Process whereby a river has reached base level and regains energy, beginning to erode actively downwards once again (1)
[CONCEPT]

1.4. 2 Incised meanders/entrenched meanders (1)

1.4.3 Change in ultimate base level/drop in sea level (2)
Isostatic uplift (2)
Internal forces (faulting, folding, warping, earthquakes) or onset of ice age (2)
Higher rainfall as a result of climate change, will increase the erosive potential of a river (2)
Increased volume of water in the river as a result of river capture (2)
Fast flowing tributary joins the main stream (2)
[ANY TWO] (2 x 2) (4)

1.4.4 The river has more energy (2)
Starts to erode vertically (downwards) (2)

Starts to erode vertically (downwards) (2)
A meandering river cuts a deep valley into the underlying bedrock (2)

[ANY TWO]

1.4.5 The landscape is associated with steep valley sides/deep gorge (2)
Entrenched valleys wide near the surface (2)
High costs incurred during construction of roads and railways and bridges (2)
Dangerous for people working on construction sites (2)
Costly drawing up engineering plans (2)
[ANY TWO ACCEPT OTHER REASONABLE ANSWERS] (2 x 2) (4)

QUESTION 1.5(JUNE / JULY 2015)

1.5.1 A river becomes active again and the downward erosive power is renewed (1)
[CONCEPT] (1 x 1) (1)

1.5.2 A - valley within a valley (1)
B - River terraces (1) (2 x 1) (2)

1.5.3 It indicates where the old and new erosion level occurs/the point where rejuvenation started (2) (2)
[CONCEPT] (1 x 2)

1.5.4 The depth of the river increases on the cross profile (2) (2)
It will become more narrow at the base (2) (1 x 2)

1.5.5 Downward erosion is dominant; it cuts a new deep steep sided valley (2)
Headward erosion cuts back into hard rock (2)
Increased downward erosion cuts into the landscape (2) (2 x 2) (4)

1.5.7 Rapids for white river rafting (2)
Extreme sports/adventure tourism (2)
Appreciation of natural features such as gorge, waterfall, rapids (2)
Aesthetically pleasing (2)
[ANY TWO - ACCEPT OTHER REASONABLE ANSWERS] (2 x 2) (4)

QUESTION1.6 (JUNE / JULY 2015)

1.6.1 **Superimposed drainage**
River now flows <u>on older uncovered rocks</u> which are uncovered by erosion (1) River is younger than the landscape over which it flows (1)
[CONCEPT]
Antecedent drainage
River flows <u>on a young landscape</u> which is altered by tectonic forces (1)
River is older than the landscape over which it flows (1)
[CONCEPT] (2 x 1) (2)

1.6.2 The river erodes downwards (vertical erosion) into the original surface to reach the underlying rock layers (2)
The rate of downcutting of the river is faster than the rate at which the current rock layer is exposed (2)
[Any ONE] (1 x 2) (2)

1.6.3 Both rivers maintain their original course (2) (1 x 2) (2)

1.6.4 Folding (2) (1 x 2) (2)

1.6.5 The rate of down cutting by the river is equal to the rate of upliftment/ there is a balance between the two processes (2) (1 x 2) (2)

1.6.6 High lying ridges form infrastructure obstructions (2)
Building roads and railways would be more expensive (2)
The landscape is hilly and it is difficult to use machinery (2)
The building costs of houses will be higher (2)
[ANY TWO] (2 x 2) (4)

QUESTION1.7(JUNE /JULY 2015)

1.7.1 (a) D (1)
(b) B (1)
(c) A (1) (3 x 1) (3)

1.7.2 The valley is too large for the stream flowing in it (1)
Stream volume decreases/ less water (1)
Energy reduced / less erosion (1)
Deposition increases (1)
[ANY ONE] (1 x 1) (1)

1.7.3 The Pungwe River has a higher volume of water (2)
The Pungwe River flows down a steeper slope (2)
The Pungwe River will start to erode downwards (2)
[ANY TWO] (2 x 2) (4)

1.7.4 **NEGATIVE IMPACT OF RIVER CAPTURE**
The amount of water will be reduced along the Nyakupinga River affecting livelihoods that depend on water supply (2)
People living along the Nyakupinga River will be forced to source water from other tributaries of the main river (2)
There will be a reduction in the available water for domestic purposes (2)
There will be a reduction in the available water for agricultural purposes/ farming (2)
Yields will decrease (2)
Loss of income (2)
Recreational activities associated with water sports will be affected negatively (2)
Fishing activities will be reduced due to the lack of flowing water (2)
Natural habitats (ecosystems) will be affected and result in less aesthetically pleasing environments for human recreation (2)
Polluted water will remain and can cause water borne diseases which will affect human health (2)
[ANY FOUR - ACCEPT OTHER REASONABLE ANSWERS] (4 x 2)(8)

SECTION C: ANSWERS TO HOMEWORK QUESTIONS – FLUVIAL PROCESSES

Question 1:

1.1 Drainage basin: The area drained by a river system ✓✓ (1 x 2) (2)
1.2. Explain the term longitudinal profile. (1 x 2) (2)
1.3. Concave shape of longitudinal profile ✓✓ (1 x 2) (2)
1.4. Uniform sedimentary or igneous rock ✓✓ with a gradual gradient and equal resistance to erosion ✓✓ (2 x 2) (4)
1.5. Stream order 2 ✓✓ (1 x 2) (2)
1.6. Larger volume, ✓✓ More gradual gradient ✓✓ Flow slower ✓✓ dams up and start meandering ✓✓ (1 x 2) (2)

1.7. <u>UPPER COURSE</u>:
Turbulent flow (2) ✓✓results in rough river channel (2) ✓✓ Vertical erosion dominant because of down cutting (2) ✓✓ forming steep slopes and V shaped valleys (2) ✓✓
Rapids, waterfalls and plunge pools (2) ✓✓result from uneven river bed and downward erosion (2) ✓✓
Headward erosion therefore the stream gets longer (2) ✓✓

<u>LOWER COURSE</u>:
Laminar flow (2) results in smooth river channel (2) ✓✓ Lateral erosion dominates (2) ✓✓ forming wide, open valleys (2) ✓✓ Gradual gradient (2) ✓✓ results in the formation of meanders and oxbow lakes (2) ✓✓
Deposition of eroded material (2) ✓✓forms flood plains, sand banks, braided streams and deltas (2) ✓✓
[MUST REFER TO BOTH RIVER COURSES] (4 x 2) (8)

Question 2:

2.1. Undercut slope ✓
2.2. Slip off slope ✓
2.3. Oxbow lake ✓
2.4. Silt ✓
2.5. Flood plain ✓ (5 x 1) (5)
2.6. Meanders cause lateral erosion✓✓ which widens the river valley ✓✓ and contribute to deposition ✓✓ as oxbow lakes are formed and filled up. ✓✓ (2 x 2) (4)
2.7. Meander loop develops ✓✓
Erosion cuts meander neck narrower ✓✓
Erosion cuts through meander neck ✓✓
River takes shortest straight route ✓✓
Meander cut of en entrances filled by silt due to deposition ✓✓
Oxbow lake left severed form river. ✓✓ (3 x 2) (6)

QUESTION 3:

3.1. Cross profile / cross section / side view / Transverse profile ✓✓ (1 x 2) (2)
3.2. Depth ✓✓ width ✓✓ (2 x 2) (4)
3.3. Downward erosion ✓✓ (1 x 2) (2)
3.4. The river valley shows evidence of rejuvenation.
(a) Rejuvenation means the river has renewed energy to perform more erosion again. / ✓✓
River takes on characteristics of the youth stage in the old or mature stages. ✓✓ (1 x 2) (2)
(b) River terraces ✓✓
Valley in a valley ✓✓ (2 x 2) (4)
(c) Increased rainfall due to climate change or melting ice caps ✓✓
River capture where the captor stream gains more water ✓✓
Isostatic lift of continents where the last part of the river is then higher ✓✓
Than sea level and there is an increase gradient at the river mouth ✓✓
3.5. The river has more erosive power so it will erode downward deepening the valley. ✓✓
The river will widen the valley as it has more erosive power and lateral erosion will also take place. ✓✓ (2 x 2) (4)

QUESTION 4:

4.1. A: Longitudinal river profile ✓ ✓
B: Cross / transverse (1 x 2) (2)
4.2. It has a concave slope ✓✓ (1 x 2) (2)
4.3. The sea / ocean ✓✓ (1 x 2) (2)
4.4. B: Deep narrow v-shaped valley ✓✓
C: Flat wide open valley – floodplain ✓✓ (2 x 2) (4)
4.5. B: Downward erosion deepened the valley ✓✓
C: Lateral erosion and deposition widened the valley ✓✓ (2 x 2) (2)
4.6. Upper course / Youth stage ✓ Rapids / Waterfalls ✓
Middle Course / Mature Stage ✓ Meanders, sand islands, slip-off slopes / cut banks ✓
Lower course / Old age stage ✓ Braided streams, meanders, sand banks, marches ✓ (6 x 1) (6)

QUESTION 5

5.1. Waterfall ✓✓ (1 x 2) (2)
5.2. Hard resistant rock layer covering a softer layer of rock ✓✓ (1 x 2) (2)
5.3. Tourist attraction ✓✓ / Can be used to generate hydroelectricity ✓✓ (2 x 2) (4)
5.4. River deposits sand and blocks its own path. ✓✓ River splits up to get around sand islands and braided streams develop. ✓✓ (2 x 2) (4)
5.5. A: Old age / Mature stages ✓✓
B: Youth stage ✓✓ (2 x 2) (4)
5.6. Plunge pool ✓✓
Water cuts out a deep hole as it plunges straight down the waterfall ✓✓ /
Hydraulic action cuts out a deep pool. ✓✓ (2 x 2) (4)

QUESTION 6

6.1.	Y ✓✓	(1 x 2) (2)
6.2.	X ✓✓	(1 x 2) (2)
6.3.	Y ✓✓	(1 x 2) (2)
6.4.	X ✓✓	(1 x 2) (2)
6.5.	Y ✓✓	(1 x 2) (2)

SESSION NO: 7 GEOMORPHOLOGY
TOPIC 7: CATCHMENT AND RIVER MANAGEMENT

SECTION B : ANSWERS TO EXAM QUESTIONS

QUESTION 1.1 (NOVEMBER 2014)

1.1.1 Water Resource Management: the sustainable and responsible use of water
[CONCEPT] (1 x 1) (1)

1.1.2 Mangaung (1)
Bloemfontein (1)
Botshabelo (1)
Thaba Nchu (1)
[ANY ONE] (1 x 1) (1)

1.1.3 Building dams (1)
Water transfer (1)
Water regulations (1)
Water pollution (1)
Water purification (1)
(2 x 1)
[ANY TWO] (2)

1.1.4 Clay soil (2)
Settlement development (2)
Sparse vegetation (2)
[ANY TWO] (2 x 2) (4)

1.1.5 **Human interference along a river**

Reduces the amount of clean water available for domestic use in rural area (2)
The possibility of water pollution increases/water quality decreases (2)
An increase in the amount of water borne diseases e.g. cholera (2)
Reduces amount of water available for crop cultivation in the lower reaches/ Food insecurity (2)
Disturbance of aquatic life (2)
Increase the costs of water due to higher demand (2) More controlled flooding (2)
Impact negatively on their income (2)
More costly to buy clean water in the informal settlement (2) Natural flow of river is reduced (2)
More costly to irrigate downstream (2)
Less water for recreational activities (2) Less water for industrial purposes (2)
Greater reliance on groundwater (2)
[ANY FOUR ACCEPT OTHER REASONABLE ANSWERS] (4 x 2) (8)

QUESTION1.2 (EXEMPLAR 2014

1.2.1	Inadequate municipal sewage treatment (1)	(1 x 1)	(1)
1.2.2	Studies show the presence of harmful viruses in river (2)	(1 x 2)	(2)
1.2.3	An outbreak of diarrhoea in Durban (2) Two children died (2) People are hospitalised (2) It could cause an outbreak in cholera (2) People cannot go to work (2) Loss of income (2) People cannot afford high cost of health care (2) [Any TWO]	(2 x 2)	(4)
1,2,4	Stricter control and enforcement of legislation which monitors effluents from factories (2) More hefty fines to punish polluters (2) Improved waste treatment facilities (2) Have a buffer so that people cannot live close to rivers (2) Provide running water in or close to homes (2) Regular testing of water quality (2) Increased awareness of and education on the problems which people cause by living so close to rivers (2) [Any FOUR. Accept other reasonable solutions]	(4 x 2)	(8)

QUESTION 1.3 (JUNE / JULY2015)

1.3.1 Pipeline depositing untreated sewage water into the river (1)
Sign warning against untreated sewage (1) The waste disposal/litter along the river (1)
There is a human settlement that suggests pollution (1)
Human habitation suggests disposal of domestic waste (1)
Use of river for bathing, washing clothes etc (1)
[ANY THREE] (3 x 1) (3)

1.3.2 People will be more susceptible to water borne diseases e.g. cholera/ contaminated water increases risk of diseases for people living along this section of the river (2)
People living along this section of the river system are low income earners who generally cannot afford health care (2)
Less clean/pure water can reduce crop growth (2)
Polluted water contaminates soil and reduces soil fertility (2)
Polluted water can make animals sick (2)
ANY TWO - ACCEPT OTHER] (2 x 2)

1.3.3 Provide basic services like piped/tapped water for people living along a river
(2)
Supply bins and provide regular waste collection services (2) Recycling bins and containers (2)
Have a buffer zone for human activities along the river (2)
Purify sewage before dumping into the river (2)
Fines for dumping waste into rivers (2) Constant monitoring water quality (2)
Increased education/awareness campaigns (2)
[ANY FOUR - ACCEPT OTHER REASONABLE ANSWERS] (4 x 2) (8)

QUESTION 1.4 (NOVEMBER 2015)

1.4.1 Gauteng (1)/North West (1)/Free State (1)/Northern Cape (1)
[ANY TWO] (2 x 1) (2)

1.4.2 Mining waste dumped in the river (1)
Industries pollute the river (1)
Chemicals used for farming flows into the river (1) Untreated sewage entering the river (1)
Domestic waste from settlements along the river (1)
[ANY TWO] (2 x 1) (2)

1.4.3 Water that should be used as drinking water is wasted (2)
Pollution continues on daily basis (2)
The problem will not be solved, only lessened/temporary solution (2)
It is a costly process (2)
[ANY TWO] (2 x 2) (4)

1.4.4 **FOOD (AGRICULTURE)**

Costly to buy purified water (2)
Farmers will have to buy more chemicals to purify water (2)
Chemicals costly to purchase (2)
Production costs increase (2)
Cost of chemicals will be included in food prices (2) Polluted water will reduce productivity for the farmers (2) Food more costly to maintain profit margins (2)
Polluted water reduces soil fertility (2)
Reduction in crop yields creating a greater demand for food (2) Costly to purchase fertilisers to maintain soil fertility (2)
Less food produced (2)
Food prices increase (2)

ELECTRICITY (ESKOM)

Costly to purify water for use in electricity generation (2)
Cost will be included in electricity prices (2)
Costs will increase the price of electricity during production (2) Less clean water to generate hydro electricity (2)
Electricity shortage will inflate the price (2)
[ANY FOUR - ACCEPT OTHER REASONABLE ANSWERS. MUST REFER TO BOTH ESKOM AND AGRICULTURE] (4 x 2) (8)

SECTION C : ANSWERS TO HOMEWORK QUESTIONS

QUESTION 1

1.1. River capture occurs when one river steals the headwaters of another river (2) ✓✓
Abstraction: Watershed is being eroded backwards due to headward erosion along streams and sheet erosion on slopes (2)
[Concepts] ✓✓ (2 x 2) (4)

1.2. (a) Headward erosion means backward erosion/eroding from the source backwards/lengthening from the source backwards (2) ✓✓cutting through the watershed into the catchment area of another stream. (2) ✓✓ (1 x 2) (2)
(b) River flows down a steeper gradient thus the velocity is high/more energy (2) ✓✓
Flowing over softer rock thus the rate of erosion is higher (2) ✓✓
Increase in rainfall (2) ✓✓ (1 x 2) (2)

1.3.	F / Captor / Pirate	G / Misfit / Beheaded (2 x 2) (4)
Discharge	More discharge (2) ✓✓	Less discharge (2) ✓✓

1.4. D - elbow of capture (2) ✓✓
E - wind gap/river gravel/dry valley/dry gap (2) ✓✓
G – Misfit / Beheaded stream (2) ✓✓ (2 x 3) (6)

1.3. **Changes in rivers F and G after river capture**
Captor/pirate River
Drainage basin increases (2) ✓✓
More water/increase in stream discharge/volume (2) ✓✓
Flows faster (2) ✓✓
More erosive power (2) ✓✓
Less deposition (2) ✓✓
Flood peak will be higher (2) ✓✓
Increase in tributaries (2) ✓✓
Rejuvenation occurs (2) ✓✓
Change in the ecosystem (2) ✓✓

Captured River
It is now a misfit stream below the point of capture (2) ✓✓
Valley too large for the trickle of water flowing in it below the point of capture (2) ✓✓
Size of the drainage basin decreases (2) ✓✓
Less water below the point of capture (2) ✓✓
Flows slowly below the point of capture (2) ✓✓
Less erosive power below the point of capture (2) ✓✓
More deposition below the point of capture (2) ✓✓
Presence of river gravel where capture took place (2) ✓✓
No changes above the point of capture (2) ✓✓
Change in the ecosystem (2) ✓✓
[Any 4 from both captor and captured river. Accept other] (4 x 2) (8)

QUESTION 2:

2.1. Drainage basin: Area drained by a river system ✓✓ (1 x 2) (2)

2.2. Direct runoff, indirect runoff, precipitation, groundwater / base flow. ✓✓ (1 x 2) (2)

2.3. High rainfall in the area will cause fine / high drainage density✓✓
High evaporation rates may reduce drainage density. ✓✓
Convection rain reduces infiltration and increaser runoff – higher density ✓✓ (2 x 2) (4)

2.4. Provide water domestic use (2) ✓✓
Provide water for agricultural use/irrigation (2) ✓✓
Rivers can be used for recreational use e.g. fishing/boating (2) ✓✓
Water transport (2) ✓✓
Generation of hydroelectric power (2) ✓✓
Source of food when commercial fishing takes place (2) ✓✓
Make industrial activities possible (2) ✓✓
[Any THREE] (3 x 2) (6)

2.5. Deforestation: reduces infiltration and leads to silting – negative impact on sustainable water access. ✓✓
Industries: water over use and pollution✓✓
Houses / Settlement: Flooding due to vegetation removal and less infiltration
Over use of water – desertification✓✓
Cultivation: erosion silts up rivers, reduces fertility of soils, algae growth stimulated by fertilisers cause aquatic life to perish. Water pollution by fertilizers and insecticides. ✓✓ (4 x 2) (8)

2.6. Monitor and manage rivers and their catchment areas (2) ✓✓
<u>Industry:</u>
Legislation necessary to control what is discharged into the rivers (2) ✓✓
Fines to be imposed for dumping into rivers (2) ✓✓
Create buffer zone to prevent industrial development close to the river (2) ✓✓
<u>Cultivation:</u>
Farmers to be educated on environmental sustainable farming practices (2) ✓✓
Control floods through enlarging the river channels (2) ✓✓
<u>Deforestation:</u>
Planting trees to trap surface run-off and decrease erosion (2) ✓✓ (4 x 2) (8)

QUESTION 3:

3.1. Landfills (2) ✓✓
Leaking septic tanks (2) ✓✓
City wastes (2) ✓✓
Pesticides and inorganic fertilizers used in gardens (2) ✓✓
Polluted industrial run off (2) ✓✓
[Any TWO. Accept other reasonable answers (2 x 2) (4)

3.2. Strict municipal laws/bylaws (2) ✓✓
Fines/legislation/waste management policies (2) ✓✓

Recycling/grey water systems (2) ✓✓
Maintenance/upgrade of storm water drainage systems (2) ✓✓
Awareness campaigns (2) ✓✓
Buffer zones to prevent industrial wastes (2) ✓✓
Frequent testing of water quality (2) v
Treating industrial waste before dumping into the rivers (2) ✓✓
Reducing the use of pesticides in the gardens (2) ✓✓
[Any TWO. Accept other reasonable answers] (2 x 2) (4)

3.3. Water for households (cleaning, cooking) (2) ✓✓
Water for industrial development (2) ✓✓
Transport routes (2) ✓✓
Sewerage systems (2) ✓✓
Recreational facilities e.g. dams, lakes, rivers (2) ✓✓ (2 x 2) (4)

3.4. **Negative impact of human activities on rivers**
Afforestation reduces stream discharge (2)
Deforestation causes floods (2)
Waste disposal causes pollution in rivers (2)
Waste disposal changes the equilibrium of the river (2)
Waste disposal kills organisms in rivers (2)
Food chains destroyed (2)
Food sources for people destroyed (2)
Irrigation reduces stream flow in the lower reaches (2)
Dams reduce silt from flowing down stream, thus affecting the fertility of the soil (2)
Artificial surface in urban areas results in greater run-off and less ground water supply (2)
Eutrophication of water supply (2)
Urban development changes/controls the course of the river (2)
Informal settlements along the banks of the river will cause pollution (2)
Spread of diseases in polluted rivers (2)
[Any 4. Should refer to the negative impact. Accept other reasonable answers]
(4 x 2) (8)

QUESTION 4:

4.1. a) Crocodile river ✓ (1 x 1) (1)
b) Sesmylspruit ✓ (1 x 1) (1)
c) Northwards ✓ (1 x 1) (1)
d) A river that was cut into a lower landscape as it was eroded. (2) ✓✓
The drainage pattern does not fit the newly opened landscape. (2) ✓✓
The drainage pattern is newer than the landscape. (2) ✓✓ (3 x 2) (6)
e) dendritic pattern (2) ✓✓ (1 x 2) (2)
f) The pattern take on the shape of a tree with its branches. (2) ✓✓
(1 x 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)

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)

Question 5

5.1.1. pirated / captured / beheaded stream (1) ✓
5.1.2. Misfit / beheaded (1) ✓
5.1.3. elbow of capture (1) ✓
5.1.4. wind gap / dry gap (1) ✓
5.1.5. Captor / Pirate stream (1) ✓ (5 x 2) (5)

5.2. Headward erosion (2) ✓✓
River capture / River piracy (2) ✓✓ (2 x 2) (4)

5.3. Headward erosion due to a large volume, (2) ✓✓steep gradient (2) ✓✓ or soft rock(2) ✓✓ caused the pirate stream to lengthen its course(2) ✓✓ and cut through the watershed (2) ✓✓ into the drainage basin of the pirated stream. (2) ✓✓ The water flowed into the pirate stream as it has a lower altitude. (2) ✓✓ (4 x 2) (8)

5.4. Must refer to both discharge and erosion of both streams (4 x 2) (8)
Must have information in a paragraph form.

	Misfit streams	Pirate stream
Erosion	Less erosion (2) ✓✓ Mostly deposition (2) ✓✓	More erosion (2) ✓✓ Downward erosion cuts valley deeper – rejuvenation (2) ✓✓
Discharge	Lower discharge as it now has a smaller drainage basin (2) ✓✓	Larger discharge as it has a larger drainage basin. (2) ✓✓

Question 6

6.1 Flowing through a steeper gradient (2) ✓✓
River has a higher velocity therefore rate of erosion is high (2) ✓✓
River could be flowing on softer rock (2) ✓✓
Higher rainfall (2) ✓✓
River could have had a lower flow level (2) ✓✓[Any ONE] (1 x 2) (2)

6.2 River gravels (2) ✓✓
Windgap/dry gap (2) ✓✓
Waterfall (2) ✓✓
Knickpoint (2) ✓✓
Elbow of capture (2)✓✓ [Any TWO] (2 x 2) (4)

6.3 Very little water in a large valley (2) ✓✓
Stream seems too small for the valley it occupies (2) ✓✓
River deprived of headwater (2) ✓✓ [Any ONE. Concept] (1 x 2) (2)

6.4 It has an increased volume of water (2) ✓✓
The drainage basin increases (2) ✓✓
More erosive power/energy (2) ✓✓
The river could be rejuvenated (2) ✓✓
Downward erosion at a faster rate (2) ✓✓ [Any TWO] (2 x 2) (4)

6.5 Shortage of water downstream in the captured river (Kort River) (2) ✓✓
Could affect farming activities along captured river (Kort River) (2) ✓✓
Could affect fishing activities along captured river (Kort River) (2) ✓✓

Less water for the generation of electricity (2) ✓✓

Affect recreational activities because of less water in captured river (Kort River) (2) ✓✓

Possibility of flooding along the captor stream/Berg River (2) ✓✓

Excess water will wash away settlements and make it unsafe (2) ✓✓

Cultivated land washed away (Berg River) (2) ✓✓

Negative economic impact on farming (Kort River) (2) ✓✓

After flooding fertile sediments deposited on flood plain(Berg River) (2) ✓✓

Farming activities increase along the Berg River (2) ✓✓

Positive impact on farming economy (2) ✓✓

[Any SIX – Accept other reasonable answers. Must refer at least ONCE to the Kort River ment or the Berg River]

[If listed and only words/phrases used **ONE** mark, If full sentences used **TWO** marks] (4 x 2) (8)

SESSION 9 – TOPIC 9: GEOMORPHOLOGY CONSOLIDATION

SECTION B: ANSWERS TO PRACTICE QUESTIONS

QUESTION 1

1.1. X: Episodic River ✓✓
Y: Periodic River ✓✓
Z: Permanent / Perennial river ✓✓ (3 x 2) (6)

1.2. X: Direct runoff ✓ during occasional ✓ rain storms
Y: Direct runoff and base flow ✓ in the rainy season ✓, none in dry season
Z: Direct runoff and base flow ✓ throughout the year ✓ (3 x 2) (6)

1.3. Water table is the top level of saturated ground water. ✓✓ (1 x 2) (2)

1.4. During the dry season it is not replenished by infiltration and it loses water through base flow. In the wet season the water table rise as infiltration fills up the pores in the soil.

1.5. X: Dry / Arid regions ✓✓
Y: Semi-arid areas and areas with seasonal rain. ✓✓
Z: high rainfall areas ✓✓

1.6. X and Y dries up and will then not be navigable ✓✓

QUESTION 2:

2.1. a) Drainage basin: area drained by a river system. ✓✓ (1 x 2) (2)
b) River system: main stream and all its tributaries. ✓✓ (1 x 2) (2)

2.2. A: Circular / Round ✓✓ B: Long \ longitudinal ✓✓ (2 x 2) (4)

2.3. Rainfall ✓ – continuous rain causes flooding ✓
Porosity and permeability of soils and rock ✓ – low p & P will lead to higher runoff and possible flooding ✓
Gradient ✓ - steep sloped lead to higher runoff and possible flooding
Lack of vegetation ✓ - Sparse vegetation lead to higher runoff and flooding
Deforestation✓ – higher runoff and flooding ✓
Urbanisation ✓ – Artificial surface and drainage system cause larger runoff and bigger chance of flooding. ✓ (4 x 2) (8)

2.4. A - E✓✓ B – F ✓✓ (2 x 2) (4)

QUESTION 3:

3.1 Catchment ✓
3.2 Drainage basin ✓
3.3 Confluence ✓
3.4 Stream channel ✓
3.5 Drainage basin ✓ (5 x 1) (5)
3.6. Dendritic ✓ (1 x 1) (1)
3.7. Cross profile –side view through the river valley ✓✓
Longitudinal profile – side view form source to mouth ✓✓ (2 x 2) (4)

QUESTION 4:

4.1 (a) Few streams in relation to the size of the drainage basin (2) ✓✓
(1x2) (2)

(b) Low rainfall (2) ✓✓
Soft soaking rain (2) ✓✓
Dry soils (2) ✓✓
Dense vegetation (2) ✓✓
Permeable rock (2) ✓✓
High infiltration rate (2) ✓✓
Gentle gradient (2) ✓✓
Resistant rock (2) ✓✓
High evaporation rate (2) ✓✓ [Any TWO] (2x2) (4)

(c) Low rainfall: little surface water to form run-off (2) ✓✓

Soft soaking rain: water infiltrates thus little surface water (2) ✓✓
Dry soils: absorbs water thus little surface water (2) ✓✓
Dense vegetation: retards flow of water resulting in infiltration thus little surface water (2) ✓✓
Permeable rock: allows infiltration thus little surface water (2) ✓✓
High infiltration rate: reduces surface run-off (2) ✓✓

Gentle gradient: slows down flow resulting in infiltration thus little surface water (2) ✓✓
Rock resistance: the more resistant the rock the fewer streams will be carved (2) ✓✓
High evaporation: less water available to form run-off (2) ✓✓
[Any TWO. Must refer to answer in QUESTION 4.1(b)] (2 x 2) (4)

d) Total length of all streams / by the area of the drainage basin (2) ✓✓
(1 x 2) (2)

4.2 (a) R - Upper/torrent/youthful course (2) ✓✓
S - Middle/valley/mature course (2) ✓✓
T - Lower/plain/old age course (2) ✓✓ (3 x 2) (6)

(b) T/lower or plain course (2) ✓✓ (1 x 2) (2)

(c) Gentle gradient slows down velocity and water spills over banks (2) ✓✓
Wide, gentle flood plain allows water to spread easily (2) ✓✓
Large volume of water from tributaries upstream (2) ✓✓
Deposition of sediments make river shallower (2) ✓✓
Meander necks are breached to cause floods (2) ✓✓
[Any TWO] (2 x 2) (4)

(d) Flooding can cause damage (2) ✓✓
Flooding provides fertile silt that is deposited on the flood plain (2) ✓✓
[Any ONE positive and any ONE negative effect] (2 x 2) (4)

(e) Small catchment dams in upper course to release water at intervals into the main stream (2) ✓✓
Large flood control dams in lower reaches (2) ✓✓
Raise river banks (levees) artificially (2) ✓✓
Line rivers with cement to reduce friction and increase velocity (2) ✓✓
Increase gradient by cutting through meander necks to increase velocity (2) ✓✓
Increase vegetation/prevent deforestation (2) ✓✓
[Any ONE] 1x2 = (2)

QUESTION 5:

5.1 A Watershed ✓
5.2. Centripetal ✓
5.3. River capture / stream piracy ✓
5.4 Ungraded ✓
5.5. Confluence ✓
5.6. Trellis ✓
5.7. Elbow of capture
5.8. Permanent base level of erosion ✓
5.9. Rectangular / Angular ✓
5.10. Drainage basis ✓ (10 x 1) (10)

QUESTION 6

6.1 (a) The total area drained by the river system (2) ✓✓
[CONCEPT] (1 x 2) (2)
(b) The main river and all its tributaries (2) ✓✓ [CONCEPT] (2 x 1) (2)

6.2 A = round (2) ✓✓
B = elongated/long (2) ✓✓ (2 x 2) (4)

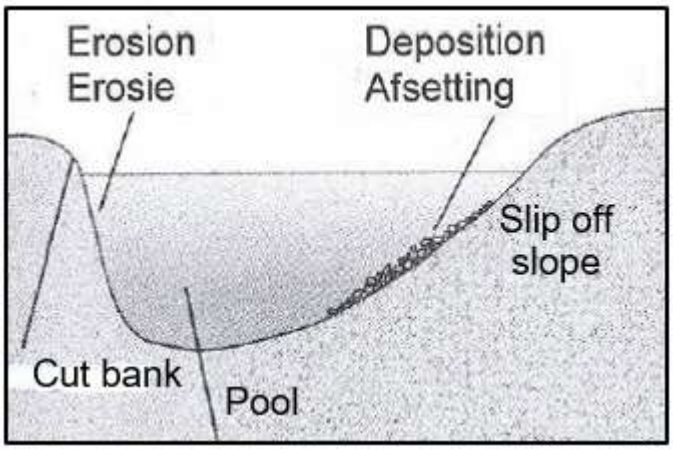
6.3 Nature of rainfall (2) ✓✓ – Soft rain less run-off; storms more run-off (2) ✓✓
Vegetation (2) ✓✓ – More vegetation less run-off; less vegetation more run-off(2) ✓✓
Relief of the land (2) ✓✓ – Where land is steep more run-off; where land is gentle less run-off(2) ✓✓
Rock type (2) ✓✓ – porous and permeable rock will have less run-off; impermeable rock will have more run-off (2) ✓✓
Soil type (2) ✓✓ – coarse sandy soil promotes infiltration; compact soils promote run-off (2) ✓✓
Soil moisture content (2) ✓✓ – Saturated soils promote run-off; dry soils promote infiltration (2) ✓✓

Evaporation (2) ✓✓ – high evaporation reduces run-off and infiltration; low evaporation increases run-off and infiltration (2) ✓✓
[Any TWO. Must give factor (2) and explain (2)] (4 x 2) (8)

6.4 A = E (2) ✓✓
B = F (2) ✓✓ (2 x 2) (4)

QUESTION 7

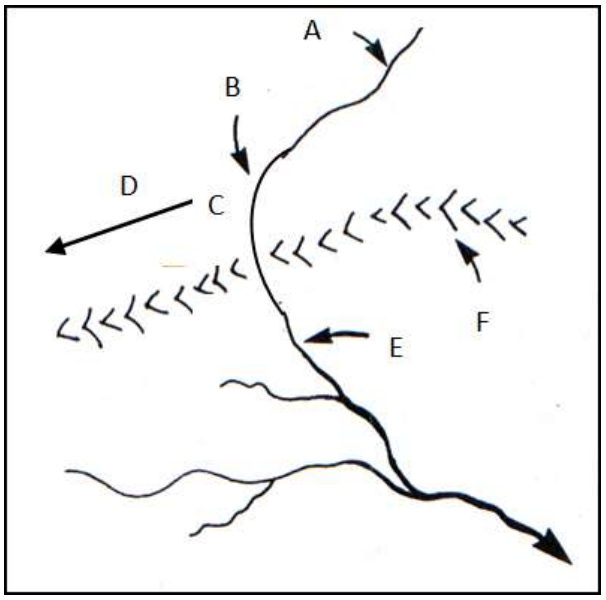
7.1 B (2) ✓
7.2 C (2) ✓
7.3 B (2) ✓
7.4 B (2) ✓
7.5 D (2) ✓ (5 x 1) (5)
7.6.1. (3 x 1) (3)



7.6.2. The meander neck will be cut through by erosion ✓✓
and the river will take the shortest route. ✓✓
The river will not run through the meander at Y. ✓✓
Deposition will take place at the entrances to the meander ✓✓
until it is cut off from the river. ✓✓
An oxbow lake develops ✓✓
and when this is filled with alluvium deposited during floods, ✓✓
a meander scar will be left. ✓✓ (4 x 2) (4)

QUESTION 8

8.1. a) (5)



A: Captive / Captured
B: Elbow of capture
C: Wind gap
D: Misfit / Beheaded stream
E: Captor stream
F: Watershed

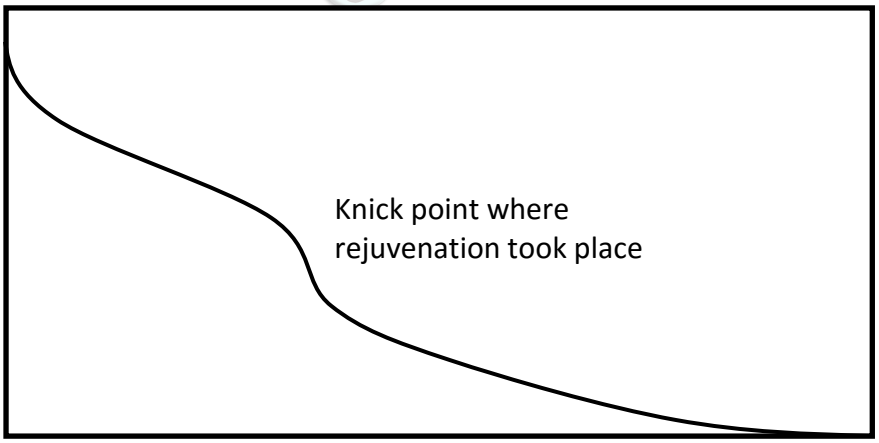
b) Headward erosion (1 x 2 = 2)

c) It will move towards Mooi river / plateau / backward (1 x 2 = 2)

8.2. a) Diep river (1 x 2 = 2)

b) The discharge will increase and thus the river will have more erosive capacity to deepen its course. (2 x 2 = 4)

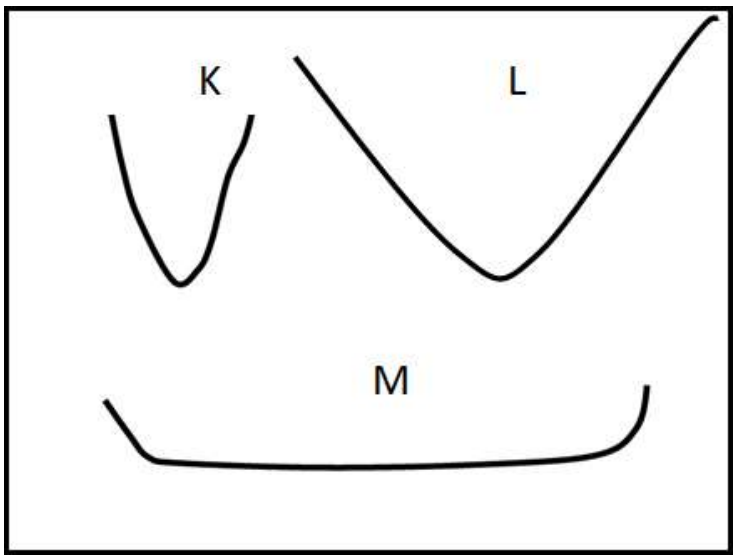
c)



(2 x 2 = 4)

8.3. a) K: Youth
L: Mature
M: Old age (3)

b) (3)



c) K: Deep and narrow – downward erosion but smaller volume, but very steep gradient
L: Wider large valley – larger volume, meandering, lateral erosion
M: Open flat plain – deposition on very gradual gradient (3 x 2 = 6)