Answer all the questions

1. Explain the mechanism of monsoon winds and their influence on the climate of Rwanda.

**Characteristics of Monsoon**

- Seasonal winds that involve Africa and Asia plus Australia.
- When the Sun is overhead the tropical of Capricorn, the Northern hemisphere develops high pressure winds blow from Asia across the equatorial region to Australia with a more intense low pressure.
- While other winds blow from Punjab region towards the equator. But by crossing the equator, these winds are diverted by the rotational movement of the earth eastwards. They become humid on the Indian Ocean and give rains in Indonesia, and the Northern Parts of Australia.
- When the Sun is overhead the tropical of Cancer, the Northern hemisphere is hotter than the Southern hemisphere and the Chain of Himalayas becomes warmer more quickly than the oceans.
- The continental air rises to give place to the humid Oceanic air. Winds blow from Australia across the equator towards China, Japan and S.E Asia and releases moisture in form of rain.

2. Other winds blow from the equatorial low pressure to a more intense low pressure region of Punjab; it is the monsoon of summer.

**Consequences of Monsoon Winds to Rwandan Climate**

- In January and February, the comparatively dry and cold air masses enter the whole of eastern of Africa pushed by the winter monsoon from Himalayas and Arabia, preventing rain falls in Rwanda.
In June of August the trade winds from the south, carry Gulf of Moisture from the Indian Ocean reach the coast of Africa but it does not get inland. It is diverted northward and absorbed in a way by the Monsoon of summer which blows on India. Therefore, there is rain in Rwanda when none of the monsoon fluxes is active. 

Irregularity of rainy season is caused by a mixture of local winds with the monsoon.

2. Rainfall and watercourses are uniquely distributed in Rwanda.

a) Describe rainfall distribution in Rwanda. 
   - the distribution of rainfall largely depends on the altitude i.e. rainfall increases with altitude.
   - Eastern plain receives low rainfall i.e. less than 1000mm like Umurara, Bugesera (Bugarama East of Congo Nile).
   - The Central plateau receives moderate rainfall (1000-1250mm) e.g. Kigali, Byumba.
   - North and West of Rwanda receives high rainfall above 1250mm.
   - There are two rain seasons i.e. Ihuma (March-May) and Umulindo (Sept-Dec).

b) Give the probable causes of great changes in rainfall experienced recently in Rwanda.
   - Influence of winds (circulation of air masses).
   - Global warming
   - Air pollution
   - Deforestation
   - Bush burning
   - Swamp reclamation
   - Any 2 x 1

2) Explain the low rate of water flow in the Birunga region whereas it is the one of the best watered regions of Rwanda.
   - High permeability of rocks.
   - Deviation of rivers.
   - Steep slopes.
1. Existence of Vegetation cover. 1x1

2. From the end of the Precambrian Period, the African block was subjected to tectonic movements which shook Eastern Africa especially in the Cretaceous period and Tertiary era.

3. What were the impact of these tectonic movements on the Rwandan base rock?
   - Formation of the rift valley.
   - The uplift of the Congo Nile crest.
   - The appearance of huge staircase of fault which makes the perception uneven into two elements (the Central tray and the low Eastern lands [Lower floor]).
   - Warping
   - Volcanic effusions on the field of faults in the South West of the country.
   - The volcanic activity in the South West of the country (Birunga).

4. Explain the impact of block faulting on the structure of drainage in Rwanda:
   - Formation of fault lakes
   - Fault guided rivers e.g. Rusizi
   - River reversal e.g. R. Base, R. Akagera
   - River capture e.g. Nyabarongo captured Nyabugogo on Nyakabiga
   - Formation of waterfalls and rapids.
   - Formation of barrier lakes.

5. By referring to the notion of over-population identify the effects of over-population in Rwanda:
   - Shortage of arable land.
   - Rural exodus (Encourage migration)
   - Housing problems
   - Shortage of pasture
   - Deforestation
   - Unemployment
   - Famine
   - Pollution
- Encroachment on marginal land.
- Congestion
- Soil erosion
- High crime rate
- Poverty
- Prostitution
- Street kids
- Pressure on infrastructure like roads, schools, hospitals, water etc.
- Political instability
- Brain drain
- Over exploitation of natural resources.
- Putz stress on government expenditure.

Positive effects:
- Increased market due to high demand.
- Increased labour force.
- Source of security for the country.
- "Source of labour force".
- High population encourages innovations and inventions.
- Increased tax base. any 10x1

5. Study these diagrams of volcanic relief and answer the questions below.

A - Is a dyke / volcanic plug / volcanic neck, formed when magma solidifies in a vertical fissure/vent (Hence it is a vertically inclined intrusive feature). Explanation: 2

While volcanic plug and volcanic neck are formed when a dyke is exposed to the surface by erosion.

B - Batholith

It is a huge granitic rock formed when mass magma solidifies deep below the earth's crust. Exp. 2
C. LACCOLITH

It is a mushroom-like shaped feature formed when magma solidifies in a basin.

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b) Explain the importance of volcanoes for mankind:
- Formation of fertile soil
- Encourages formation of water bodies
- Climate modification
- Encourages development of fishing
- Modification of climate like volcanic mountains
- Sites for construction of communication towers.
- Provision of construction materials.
- Sites for scientific research.
- Source of geothermal energy
- Water catchment areas
- Source of therapeutic water used as medicine.
- Act as political boundaries.

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- Hinders development of infrastructure like roads.
- Hideouts for rebels
- Landslides and soil erosion
- Support aridity
- Loss of lives and property
- Discourages settlement.

6) According to the theory of continental drift, the earth is divided into several blocks. Explain the various movements of continental blocks when they collide and the consequences of the collision. Plate collision is due to convergence when continental blocks move towards each other from
When it occurs, there can be:
- Subduction: The oceanic block which is denser sinks under the continental block.
- Collision: When two blocks of the same density come into contact, there is friction of blocks on each other. None of them sinks under the other.

The consequences of these movements:
- Formation of mountains
- Occurrence of volcanism
- Occurrence of earthquakes
- Transformation of faults, caused by overriding
- Subduction

\[ \times \times \times \times \times \times \times T = 1057 \]
Section B (30 marks)

7. An earthquake occurs, its epicentre is under the sea. Several hundreds of kilometres from the coast but it causes considerable damage to the coast.

(a) Tsunami
- Underwater earthquake

| T=0.1 |

Damage it can cause:
- Damage of ships.
- Collapse of the sea floor.
- Changes in sea levels.
- Causes erosion.
- Flooding.
- Loss of life.
- Destruction of fauna and flora.
- Causes diseases.
- Cause trauma.
- Result into landslides.
- Destruction of infrastructure.
- Destruction of property.
- Displacement of people (Migration)

T=0.05

8. How would you explain the magnitude of the effects of such an earthquake?
- When the strength of the earthquake is strong, it will cause great damage.
- Nature of the rocks.
- Level of the sea.
- Level of economic activities.
- System of monitoring and reporting earthquakes.
- The strength of the earthquake.
- Distance between the epicentre and the coast.
- Size of the coast and relief.
8) Study the following diagrams showing erosion on mountain sides and answer the questions that follow:

a) Name and explain the 2 processes of erosion on mountain sides

1) Rock fall: This is a type of mass wasting which takes place when individual rocks fall along the steep slopes.

2) Mud flow/Soil flow/Slumping: Movement of massive soaked soil along the slope.

- Land slide: Its forms are rock slump, rock slide and rock fall.

b) Describe the effects of the water flow on the mountain sides.

- Erosion of soil
- Destruction of vegetation/crops
- Destruction of roads and communication lines
- Formation of gullies
- Loss of life
- Deposition of fertile soils in the valley
- Destruction of property
- Landslide
- Soil loses fertility

3) Explain the factors of high population density in some regions of Eastern Africa.
- Favourable climate which favours human economic activities
- Soil fertility
- Solid political structures in some societies that have not disintegrated
- Improved standards of living
- Migrations like ZOOLEKE BANTU, Ngoni and did
1. Discuss the part played by highly industrialised countries and that of less industrialised countries in polluting the environment.

**Industrialised Countries:**
- Smoke from industries and vehicles
- High fuel consumption such as petrol which pollutes the atmosphere with gases
- Nuclear atomic bombs
- Urbanisation
- Heat emitted by machines like heaters, lights, cookers, etc.
- Emission of radio-active materials
- Wastes from industries
- Limited forested areas
- Decomposition of waste material
- Greenhouse effect
- Use of space vehicles

**Less Industrialised Countries:**
- Deforestation
- Bush burning
- Poor farming methods
- Smoke from vehicles especially old ones
- Smoke from industries
- Wars
- Poor garbage disposal
- High consumption of firewood and charcoal

Any 5 explained 20% Max 5 marks

\[ T = 10 \]
- Murray roads 12

- 11. The origin and location of rocks vary according to their nature.

  a) What is the origin of metamorphic rocks? Metamorphic rocks result from the change of existing rocks (sedimentary or igneous) under the effect of high temperature and pressure plus chemicals.

  1x1x1 T = 0.3

  b) In what areas are conditions favourable to the formation of metamorphic rocks?

  - Areas of sedimentation like beds of sea, river mouth
  - Areas of subduction boundary of converging plates
  - Areas that experience vulcanism
  - Areas that experience overdressing
  - Regions of high economic activities
  - Glaciated areas i.e. high poles

    any 2x1

  - Below the earth's surface

  1x1 T = 0.2

  c) Give the main volcanic regions of the world and the characteristics common in these zones:

    - The edge of the Pacific Ocean (the Pacific Ocean fire) i.e. Ring of fire
    - The Mid-Atlantic Ridge
    - Eastern Africa
    - Western America
    - Mediterranean-Himalaya

    any 4x1

    1x1x1x1 T = 0.4

  Characteristics:

  - Existence of mountain ranges
  - Earth quakes are common
  - Faulting
  - Existence of hot springs
  - They are located along plate boundaries
  - Volcanic soils are common

  T = 0.2
Section C (15 marks) (ii)

12) Study the extract from the topographical map of ZAZA and answer the following questions:

a) Name the different types of drainage networks on the map:
- Convergent in the west (centripetal)
- Trellised
- Radial or divergent in the centre and South west.
- Dendritic.
- Parallel.

b) What is the man-made feature found at coordinates 855607?
- Mis-leading coordinate.
- Does not exist

1 + 1 + 1  \( T = 3 \)

(c) Give the main type of settlement on the map.
- Nucleated

1 + 1 + 1  \( T = 3 \)

(d) Make a diagram outlining the general profile of the topographical area on the map between point A and point B.

A cross-profile from point A to B.

- V.S.
- 1cm rep 100m
- H.S.
- 1:50,000

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The diagram includes various topographical features and annotations.
e) Using features on the map, suggest 3 major problems hampering economic development of the region:
- Diseases due to the presence of rivers, swamps, and lakes.
- Difficulties of cultivating in swamps.
- Lack of tarmac roads.
- Lack of electricity.
- Lack of enough hospitals.
- Flooding.
- Shortage of land because of nucleated settlement.

Any 3 x 1

1 - 1 - 1

T = /037/
13. Study the photograph 2/4 and answer the following questions:

a) Name the crop grown in the foreground of the photograph.
   - Rice.  

b) Give the importance of this crop in our Country.
   - Food
   - Source of income
   - Mulching
   - Source of animal feeds (green leaves)
   - Source of energy
   - Making of animal feeds
   - Making fertilizers (decomposing remains)
   - Employment
   - Research
   - Animal beddings
   - Medicine (Rice water)  

   Any 3 x 1 1-1-1  
   T= 03  

C) What is the method of soil protection shown on the photograph?
   - Terracing
   - Tree planting
   - Grass planting  

   Any 1 x 2 1-2  
   T= 02  

d) Describe the relief of the region.
   - Hills with flat peaks and Convex slopes
   - Large valleys
   - Valley between hills  

   Any 3 x 1 1-1-1  
   T= 03  

e) Identify the man-made features shown on the photograph.
   - Trees planted by man
   - Crops
   - Terraces  

   Any 3 x 1 1-4-1  
   T= 07
- Read
- Trenches/ditches

Explain the problems facing agriculture in this country.
- Crop diseases
- Flooding
- Stealing of crops because there are no settlements
- Existence of predators
- Water shortage during the dry season
- Shortage of labour
- They move long distances
- Mechanisation is difficult to carry out.
Vulcanism / Volcanism:

1. Melted magma is exposed to the surface  1. Volcanic mountain (composite)
   ↓ Complete process  Crater
   Exposed  2. Crater
   Intrusive  3. Caldera (e.g., Kilimanjaro)
   Extrusive landforms:
   Intermontane  4. Volcanic neck / volcanic plug

2. Batholith
3. Laccolith
4. Bluff
5. Shield Volcano

6. Cumulo-dome

Features:
- Crater lakes
- Greyser
- Mud volcanoes