SECTION A: WEATHER AND CLIMATE

PLEASE ANSWER IN A SEPARATE BOOK

Question 1:

Critically review the use of a radiosonde for the collection of meteorological data and use in weather forecasting. [10]

Question 2:

General Circulation Models (GCMs), in which the three-dimensional general circulation of the earth’s atmosphere is modeled, are not without their limitations. Briefly outline some of the key limitations and discrepancies between modeled and real climate and hence confidence in GCM’s future climate projections. [15]
Question 3:

Describe the basic wind flow pattern and synoptic progression of weather ‘System A’ off the east coast of the subcontinent (refer to Figure 1), as well as the weather that would be experienced over southern Africa with its occurrence in late winter.

Figure 1: Schematic drawing of the major wind flow associated with System A over southern Africa (Source: Carter, 2005, 101).
SECTION B: BIOGEOGRAPHY

PLEASE ANSWER IN A SEPARATE BOOK

Question 4:

The following changes in dune vegetation were recorded at a site identified from aerial photographs of the South African coast. Describe and interpret, using examples from the data set, the processes that are in operation. [10]

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<tbody>
<tr>
<td>Bare Sand</td>
<td>19.5</td>
<td>17.5</td>
<td>14.1</td>
<td>7.9</td>
<td>2.6</td>
<td>2.6</td>
<td>12.0</td>
<td>5.0</td>
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<tr>
<td>Dune Pioneer Community</td>
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<td>0.7</td>
<td>0.9</td>
<td>1.8</td>
<td>2.0</td>
<td>1.7</td>
<td>0.2</td>
<td>0.9</td>
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<tr>
<td>Secondary Dune Grassland</td>
<td>34.3</td>
<td>30.9</td>
<td>21.8</td>
<td>9.8</td>
<td>4.8</td>
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<td>8.0</td>
</tr>
<tr>
<td>Acacia karoo Woodland and Secondary Dune Scrub</td>
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<td>11.7</td>
<td>15.1</td>
<td>19.3</td>
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</tr>
<tr>
<td>Secondary Forest Dune</td>
<td>-</td>
<td>0.1</td>
<td>1.9</td>
<td>3.7</td>
<td>5.7</td>
<td>5.9</td>
<td>8.2</td>
<td>8.5</td>
</tr>
</tbody>
</table>

**Values are as percentage change.

Question 5:

Explain the need for a long-term understanding in biogeography. In your response define palaeo-dating and palaeo-reconstruction techniques and provide examples of these. [15]

Question 6:

How should southern African biodiversity be conserved outside the formal protected area network? Citing examples, discuss conservation initiatives for specific southern African biomes or habitat types. [25]
SECTION C: GEOMORPHOLOGY

PLEASE ANSWER IN A SEPARATE BOOK

Question 7:
Name at least five factors that affect slope stability and explain in detail how two of these contribute towards slope instability. (5 marks for each discussion + one mark for each name).

[15]

Question 8:
With the aid of a diagram, briefly explain in detail each of the following slope development theories
a). Slope decline (5)
b) Slope retreat (5)
c) Slope replacement (5)
d) Now discuss how a focus on landscape processes has superceded this interpretation (10)

[25]

Question 9:
Distinguish clearly between saturated overland flow and hortonian overland flow by discussing each and highlighting the differences.

[10]
SECTION A: WEATHER AND CLIMATE

Question 1:
Discuss the ocean-atmospheric circulations that occur in the Pacific basin with the occurrence of an El Nino event, and how such an event may impact on the weather and climate of southern Africa. [10]

Question 2:
Describe, with the use of a diagram, the air flow and processes involved in the progression and development of an occluded front. [15]
Question 3:

Refer to the satellite image of System A below (Figure 1). Explain the conditions required for its formation and provide an argument for whether you think Mozambique requires a well-equipped meteorological centre to monitor and track the system. [25]
SECTION B: BIOGEOGRAPHY

PLEASE ANSWER IN A SEPARATE BOOK

Question 4:
Explain the figure below. [10]

(Question text continues)

Question 5:
Describe the role of mapping and classification in understanding biogeographical processes. Provide examples from southern African to justify your response. [15]

Question 6:
‘Fire can act as an agent of destruction and renewal’. Contrast the role of fire in four South African biomes, including specific fire-adaptations, -dependencies and symbiotic relationships. Include in your discussion biome-specific fire management approaches and recommendations. [25]
SECTION C: GEOMORPHOLOGY

PLEASE ANSWER IN A SEPARATE BOOK

With reference to the diagram in Figure 1, briefly explain why the extent of weathering is different between the semi-desert & desert, and tropical forest zones.

Figure 1: Generalised weathering profiles in different climatic zones

Question 2:

With the aid of diagram describe fully different components of a nine (9) unit model.