UNIVERSITY OF SWAZILAND
DEPARTMENT OF GEOGRAPHY, ENVIRONMENTAL SCIENCE AND PLANNING
SUPPLEMENTARY EXAMNATION, JULY 2007
B.A., B.Ed., B.Sc., B.A.S.S

TITLE OF PAPER: INTRODUCTION TO THE NATURAL ENVIRONMENT

COURSE CODE: GEP 111

TIME ALLOWED: THREE HOURS

INSTRUCTIONS: THIS PAPER IS DIVEDED INTO THREE SECTIONS

SECTION A: MULTIPLE CHOICE

(i) ANSWER ALL QUESTIONS ON THE ANSWER SHEET PROVIDED

(ii) THIS SECTION CARRIES 20 MARKS

SECTION B: SHORT ESSAY

(i) ANSWER ANY TWO (2) QUESTIONS FROM THIS SECTION

(ii) EACH QUESTION CARRIES 20 MARKS

SECTION C: TECHNIQUES AND SKILLS

ANSWER ALL QUESTIONS

DO NOT OPEN THIS PAPER UNTIL PERMISSION HAS BEEN GRANTED BY THE INVIGILATOR

SECTION A: MULTIPLE CHOICE

ANSWER ALL QUESTIONS

1. Which of these best defines isostatic uplift?
    a. broad gentle up warping that allows plates to remain in a state of isostatic equilibrium
    b. movement of the earths' crust
    c. the movement of plates
    d. Where mid-ocean ridges are ripped apart in two

2. Nitrogen gas is converted into forms that can be used by plants through which two processes?
    a. Fossil fuels and energy
    b. Animal waste and ammonia
    c. Decomposition and weathering
    d. Biological and atmospheric nitrogen fixation

3. Which of these is an extrusive igneous rock?
    a. Basalt
    b. Gabbro
    c. Granite
    d. Granadorite

4. The division of soil particles into different groups is based on___
    a. Their chemical properties
    b. Their physical properties
    c. Their diameter
    d. Their composition

5. The following species have a role to play in the utilization and transfer of energy. Which ones would be described as primary producers?
    a. All grass species
    b. Only the trees
    c. All the green plants
    d. Cattle used for ploughing

6. The arrangement of soil primary particles into aggregates is referred to as ___
    a. Soil texture
    b. Soil structure
    c. Soil density
    d. Soil formation

7. Reduction in river channels could be caused by _____
    a. Soil erosion
    b. Eutrophication
    c. Both a and b
    d. Neither a nor b

8. Earthquakes and volcanoes occur along _____
    a. The Pacific Plate
    b. Certain lines or belts on the Earth's surface
    c. Plates caused by terrible catastrophes
    d. The Chinese province of Hebei in 1976

9. Divergent boundaries are areas where_____
    a. crust is neither produced nor destroyed as plates slide horizontally past each other
    b. broad belts in which boundaries are not well defined
    c. The effects of plate interactions are unclear
    d. New crust is generated as the plates pull away from each other

10. The term diastrophism refers to_____
    a. Upliftment of the earth's crust
    b. Deformation of the earth's crust
    c. Kinds of movements of the crustal material
    d. Molten rock rising from below either intrusively or extrusively

11. Which of these statements is true for rock decomposition?
    a. Results in the breaking of rocks and boulders into smaller sizes
    b. Is more prevalent in humid climates
    c. Dominates in the surface of the earth
    d. Affects mostly sedimentary rocks

12. Which one of the following mass wasting process is slowest
    a. Earthflow
    b. Landslides
    c. soilcreep
    d. Mudflow

13. Which one of these brings about the alteration of the chemical composition of rocks?
    a. Dissolution
    b. Frost action
    c. Salt crystal formation
    d. Landslide

14. The soil's ability to resist changes in pH is referred to as _____
    a. Its buffering capacity
    b. Its cation exchange capacity
    c. Its structural stability
    d. Its redox capacity

15. A Caldera is a _____
    a. Vent through which magma is ejected
    b. Enlarged vent exposed when a volcano blew up
    c. Collapsed magma chamber
    d. Depression containing molten magma which can be seen from the surface

16. Which of this is a dry climatic region?
    a. Am
    b. ET
    c. Bsh
    d. Cwb

17. Saturation occurs when:
    a. Vapor pressure is greater than saturation pressure
    b. Vapor pressure is less than saturation pressure
    c. Vapor pressure is insignificant
    d. Vapor pressure is equal to saturation pressure

18. The lower part of the troposphere has the highest concentration of :
    a. Dust only
    b. Smoke only
    c. Water vapor and ozone
    d. Moisture only

19. Which are the most significant aspects of the Koppen's climate Classification system?
    a. Precipitation and pressure
    b. Precipitation and Temperature
    c. Temperature and wind
    d. Temperature and pressure

20. The material carried in solution in a river is called Which of these definitions best describes a soil profile
    a. Suspended load
    b. Bed load
    c. Saltation
    d. Dissolved load

SECTION B: ESSAY

ANSWER ANY TWO QUESTIONS

QUESTION 1

With the aid of diagrams, describe the main extrusive and intrusive volcanic features. **[20 marks]**

QUESTION 2

Describe how the three main categories of rock found on the Earth's surface are formed. **[20 marks]**

QUESTION 3

a. Describe the factors that may cause a soil creep. [10 marks]

b. What are the effects of soil creep on our environment? [10 marks]

[20 marks]

SECTION C: TECHNIQUES AND SKILLS

ANSWER ALL QUESTIONS

QUESTION 1

a) Explain three ways in which scale can be expressed. [6 marks]

b) Distinguish between a small and large scale. [4 marks]

QUESTION 2

With reference to topographical map of Swaziland (PWD 12) calculate the following:
i) Surface area of farm number 922 in km^2 and in hectares. [4 marks]

ii) Cultivated area of farm number 922 in km^2 and in hectares. [4 marks]

QUESTION 3

With reference to tables 1, 2, and 3 calculate the amount of in-coming and out-going and net solar radiation in Manzini (26.30^0S) under the hypothetical conditions shown in the table below.

Month	es	T(^{0}C)	n(hours)	R_i	R_o	H
January	16.4	23	8.0			
June	11.8	9	9.5			
November	21.8	27	13.2			

[12 marks]

QUESTION 4

Atmospheric pressure decreases with an increase in altitude at an approximate rate of 12.7 millibars (mb) per 100 metres. Estimate the atmospheric pressure in millibars at the following locations:

a) Mount Everest (35 000 m) [2 marks]
b) Tugela Gorge (135 m) [2 marks]
c) Bulembu Mountain (1590 m) [2 marks]
d) Gobolondlo Mountain (1800 m) [2 marks]
e) Mahamba Mountain (1650) m) [2 marks]

[40 Marks]

TABLE 1: SOLAR RADIATION (R_a) EXPRESSED IN EQUIVALENT EVAPORATION (MM/DAY)

Latitude	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
60°N	1.4	3.6	7.0	11.1	14.6	16.4	15.6	12.6	8.5	4.7	2.0	0.9
50°N	3.7	6.0	9.2	12.7	15.3	16.6	16.1	13.7	10.4	7.1	4.4	3.1
40°N	6.2	8.0	11.1	13.8	15.9	16.7	16.3	14.7	12.1	9.3	6.8	5.6
30°N	8.1	10.5	12.8	14.7	16.1	16.5	16.2	15.2	13.5	11.2	9.1	7.9
20°N	10.8	12.4	14.0	15.2	15.7	15.8	15.8	15.4	14.4	12.9	11.3	10.4
10°N	12.8	13.9	14.8	15.2	15.0	14.8	14.9	15.0	14.8	14.2	13.1	12.5
Equator	14.6	15.0	15.2	14.7	13.9	13.4	13.6	14.3	14.9	15.0	14.6	14.3
10°S	14.6	15.0	15.2	14.7	13.9	13.4	13.6	14.3	14.9	15.0	14.6	14.3
20°S	16.8	15.7	15.1	13.9	12.5	11.7	12.0	13.1	14.4	15.4	15.7	15.8
30°S	17.2	15.8	13.5	10.9	8.6	7.5	7.9	9.7	12.3	14.8	16.7	17.5
40°S	17.3	15.1	12.2	8.9	6.4	5.2	5.6	7.6	10.7	13.8	16.5	17.8
50°S	16.9	14.1	10.4	6.7	4.1	2.9	3.4	5.4	8.7	12.5	16.0	17.6
60°S	16.5	12.6	8.3	4.3	1.8	0.9	1.3	3.1	6.5	10.8	15.1	17.5

Source: Shaw, 1983. *Hydrology in Practice*.

TABLE 2: MEAN DAILY DURATION OF MAXIMUM POSSIBLE SUNSHINE HOURS (N)

North Lat.	Jan.	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
South Lat.	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
60°N/S	6.7	9.0	11.7	14.5	17.1	18.6	17.9	15.5	12.9	10.1	7.5	5.9
58°N/S	7.2	9.3	11.7	14.3	16.6	17.9	17.3	15.3	12.8	10.3	7.9	6.5
56°N/S	7.6	9.5	11.7	14.1	16.2	17.4	16.9	15.0	12.7	10.4	8.3	7.0
54°N/S	7.9	9.75	11.7	13.9	15.9	16.9	16.5	14.8	12.7	10.5	8.5	7.4
52°N/S	8.38	9.94	11.8	13.8	15.6	16.5	16.1	14.6	13.7	10.6	8.8	7.8
50°N/S	8.56	10.0	11.8	13.7	15.3	16.3	15.9	14.4	12.6	10.7	9.0	8.1
48°N/S	8.8	10.2	11.8	13.6	15.2	16.0	15.6	14.3	12.6	10.9	9.36	8.3
46°N/S	9.1	10.4	11.9	13.5	14.9	15.7	15.4	14.2	12.6	10.9	9.5	8.7
44°N/S	9.3	10.5	11.9	13.4	14.7	15.4	15.2	14.0	12.6	11.0	9.7	8.9
42°N/S	9.4	10.6	11.9	13.4	14.6	15.2	14.9	13.9	12.6	11.1	9.8	9.1
40°N/S	9.63	10.7	11.9	13.3	14.4	15.0	14.7	13.7	12.5	11.2	10.0	9.3
35°N/S	10.1	11.0	11.9	13.1	14.0	14.5	14.3	13.5	12.4	11.3	10.3	9.86
30°N/S	10.4	11.1	12.0	12.9	13.6	14.0	13.9	13.2	12.4	11.5	10.6	10.2
25°N/S	10.7	11.3	12.0	12.7	13.3	13.7	13.5	13.0	12.3	11.6	10.9	10.6
20°N/S	11.0	11.5	12.0	12.6	13.1	13.3	13.2	12.8	12.3	11.7	11.2	10.9
15°N/S	11.3	11.6	12.0	12.5	12.8	13.0	12.9	12.6	12.2	11.8	11.4	11.2
10°N/S	11.6	11.8	12.0	12.3	12.6	12.7	12.6	12.4	12.1	11.8	11.6	11.5
5°N/S	11.8	11.9	12.0	12.2	12.3	12.4	12.3	12.3	12.1	12.0	11.9	11.8
Equator	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0

Source: Shaw, 1983. *Hydrology in Practice.*

TABLE 3: VALUES OF σT^4

°F	0	1	2	3	4	5	6	7	8	9
30	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.6	11.7	11.87
40	11.9	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8
50	12.9	130.0	13.1	13.2	13.3	13.4	13.5	13.6	13.7	13.9
60	14.0	14.1	14.2	14.3	14.4	1.5	14.6	14.5	14.8	14.9
°C										
-0	11.2	11.0								
0	11.2	11.4	11.5	11.7	11.9	12.0	12.2	12.3	12.5	12.7
10	12.9	13.1	13.3	13.5	13.7	13.9	14.0	14.2	14.4	14.6
20	14.8	15.0	15.2	15.4	15.6	15.8	16.0	16.2	16.4	16.6

Source: Shaw, 1983. *Hydrology in Practice.*

ANSWER SHEET FOR SECTION A

EXAMINATION NUMBER_____

FACULTY_____

INSTRUCTION: MARK THE CORRECT ANSWER WITH AN "X"

QUESTION NUMBER	OPTIONS			
1	A	B	C	D
2	A	B	C	D
3	A	B	C	D
4	A	B	C	D
5	A	B	C	D
6	A	B	C	D
7	A	B	C	D
8	A	B	C	D
9	A	B	C	D
10	A	B	C	D
11	A	B	C	D
12	A	B	C	D
13	A	B	C	D
14	A	B	C	D
15	A	B	C	D
16	A	B	C	D
17	A	B	C	D
18	A	B	C	D
19	A	B	C	D
20	A	B	C	D