UNIVERSITY OF SWAZILAND

DEPARTMENT OF GEOGRAPHY, ENVIRONMENTAL SCIENCE AND PLANNING

SUPPLEMENTARY EXAMINATION, 2011

TITLE OF PAPER   :   Introduction to the Physical Environment

COURSE NUMBER   :   GEP 111

TIME ALLOWED   :   3 hours

INSTRUCTIONS   :   SECTION A IS COMPULSORY
ANSWER ANY TWO QUESTIONS
FROM SECTION B
ILLUSTRATE YOURS ANSWERS
APPROPRIATE DIAGRAMS

MARKS ALLOCATED   :   QUESTION 1 CARRIES 40 MARKS
THE OTHER QUESTIONS CARRY
30 MARKS EACH

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SECTION A: TECHNIQUES AND SKILLS
CHOOSE AND ANSWER ONE QUESTION ONLY

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	$T(^0C)$	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 00 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	15.5	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	12.7	10.6	8.8	7.8
50°N/S	8.58	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 σT⁴**

°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*.

SECTION B: ANSWER ANY TWO QUESTIONS

QUESTION 5:

Give an overview of the evolution and development of life during the geological history of Earth. **(30 marks)**

QUESTION 6:

Discuss where you would preferably drill for water in the lowveld of Swaziland, and why at the chosen place. **(30 marks)**

QUESTION 7:

Discuss the consequences that are related to the climatic warming-up of the Earth. **(30 marks)**

QUESTION 8:

Describe the events that occur during the processes of plate tectonics and continental drifting. **(30 marks)**