UNIVERSIRY OF SWAZILAND

DEPARTMENT OF GEOGRAPHY, ENVIRONMENTAL SCIENCE AND PLANNING

FINAL EXAMINATION: DECEMBER 2012

BSc. 1, BA 1, HUM 1, BED 1

TITLE OF PAPER	:	Introduction to the Physical Environment
COURSE NUMBER	:	GEP 111
TIME ALLOWED	:	3 hours
INSTRUCTIONS	:	ANSWER ONE QUESTION FROM SECTION A (40 MARKS) ANSWER ANY TWO QUESTIONS FROM SECTION B (60 MARKS) ILLUSTRATE YOURS ANSWERS WITH APPROPRIATE DIAGRAMS WHERE NECESSARY
MARKS ALLOCATED	:	EACH QUESTION OF SECTION A CARRIES 40 MARKS. THE OTHER QUESTIONS CARRY 30 MARKS EACH. TOTAL MARKS 100

THIS PAPER IS NOT TO BE OPENED UNTIL PERMISSION HAS BEEN GRANTED BY THE INVIGILATOR

..................Material needed: Map of Mbabane (PWD 11)...............

SECTION A: TECHNIQUES AND SKILLS (40 MARKS)

CHOOSE AND ANSWER ONE QUESTION ONLY

QUESTION 1

a) Complete the table below:

(12 marks)

Area on Map	Scale of Map	True area on Earth
144 cm^2	1:60 000	............m^2
..........cm^2	1: 150 000	127.7 ha
84 cm^2	....	21.38 km^2

b) With reference to the topographical map of Swaziland (PWD 11), use the six-figure grid reference system to state the location of the following places/features: (4 marks)

i) Makhebelele dipping tank
ii) Mlilwane Camp
iii) Waterford Kamhlaba
iv) Msunduza Trigonometrical station

c) With reference to the topographical map of Swaziland (PWD 11), what features are found at the following locations?

(4 marks)

i) 244069
ii) 117219
iii) 185288
iv) 205265

d) Explain fully how you would arrange aerial photographs to attain a stereoscopic view under a mirror stereoscope?

(12 marks)

e) A camera, with a focal length of 6.0 cm, mounted on an aircraft flying at an altitude of 7 000 metres above sea level was used to take photographs of an area located at approximately 1000 metres above sea level. What is the scale of those aerial photographs?

(8 marks)

QUESTION 2 (40 MARKS)

a) Define the following terms:

(10 marks)

i) Geographic grid

ii) Parallels
iii) Horizontal equivalent
iv) Satellite image
v) Watershed

b) With reference to Tables 1, 2 and 3, calculate the amount of in-coming, out-going and the net solar radiation in Leeds under the hypothetical conditions shown below in Table b. 1. Leeds is found at 53.48 S and 1.34 W.

Table b.1

(15 marks)

Month	e_s	T(º C)	n(hours)	Ri	Ro	H
June	23.9	23.5	13.0			
September	15.1	15.8	6.5			
December	09.8	06.0	3.0			

c) Using the information in Tables 1, 2 and 3, calculate the incoming and outgoing net radiation in the Table c.1 for the month of October.

Table c.1

(15 marks)

Location	e_s	T (º C)	n(hours)	Ri	Ro	H
22ºN	14	21	10.5			
0º	16	27	12			
13ºS	12	15	8			

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

Latitude	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
60ºN	1.4	3.6	7.0	11.1	14.6	16.4	15.6	12.6	8.5	4.7	2.0	0.9
50ºN	3.7	6.0	9.2	12.7	15.5	16.6	16.1	13.7	10.4	7.1	4.4	3.1
40ºN	6.2	8.0	11.1	13.8	15.9	16.7	16.3	14.7	12.1	9.3	6.8	5.6
30ºN	8.1	10.5	12.8	14.7	16.1	16.5	16.2	15.2	13.5	11.2	9.1	7.9
20ºN	10.8	12.4	14.0	15.2	15.7	15.8	15.8	15.4	14.4	12.9	11.3	10.4
10ºN	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*

<u>TABLE 2:</u> 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 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	1 2.8
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 2:

Describe the processes that occur during continental drifting, and discuss why the ocean floor is generally of younger stratigraphical age than the continents.

(30 marks)

QUESTION 3:

Compare the terrestrial planets and some of the larger moons of Jupiter and Saturn according to their rock composition and their atmosphere. Which conclusion may be drawn for the potential existence of life on each of them? Your answer should make reference how the information for these planetary bodies was obtained.

(30 marks)

QUESTION 4:

Discuss why the ozone layer in the atmosphere currently is threatened, what negative effects would result from its depletion, and how it may be protected in future.

(30 marks)

QUESTION 5:

Give an overview of the evolution and development of life forms during the geological history of the Earth.

(30 marks)