

**UNIVERSITY OF SWAZILAND**  
**DEPARTMENT OF GEOGRAPHY, ENVIRONMENTAL SCIENCE AND**  
**PLANNING**

**FINAL EXAMINATION, DECEMBER 2014**

**B.A.,B.Ed., BSc.,BASS, IDE.**

**TITLE OF PAPER: INTRODUCTION TO THE NATURAL ENVIRONMENT**

**COURSE NUMBER: GEP 111**

**TIME ALLOWED: THREE (3) HOURS**

**INSTRUCTIONS: THIS PAPER IS DIVIDED INTO TWO SECTIONS**

**SECTION A: TECHNIQUES AND SKILLS**

- 1. ANSWER ALL QUESTIONS (COMPULSORY)**
- 2. THIS SECTION CARRIES 40 MARKS**

**SECTION B: SHORT ANSWERS / ESSAYS**

- 1. ANSWER ANY TWO QUESTIONS**
- 2. EACH QUESTION CARRIES 30 MARKS**

**SPECIAL REQUIREMENTS: Area measurement grid, Tracing paper, OHP Soluble pens,  
Map of Swaziland 1:50 000 Sidvokodvo Sheet No. 17**

**THIS PAPER SHOULD NOT BE OPENED UNTIL PERMISSION IS GRANTED BY  
THE INVIGILATOR**

**GEP 111: INTRODUCTION TO THE NATURAL ENVIRONMENT – DECEMBER 2014****SECTION A: TECHNIQUES AND SKILLS (40 MARKS)****COMPULSORY****QUESTION 1**

- a) Using Map of Swaziland 1:50 000 Sheet No.17,
- i) Calculate the straight line distance (in km) between Mandisa Trigonometric Station and Nkonyeni Trigonometric Station. (2 marks)
  - ii) Give the six figure grid reference of Masundwini School. (2 marks)
  - iii) Calculate the total area for Farm no. 522 in square kilometres and hectares. (6 marks)
- b) Copy and complete Table 1 below. (10 marks)

Table 1. A hypothetical relationship between temperature, wind speed and wind- chill factor

Temperature ( $^{\circ}\text{C}$ )	Wind speed (mph)	Wind-chill factor ( $\text{Kcal./m}^2/\text{hr}$ )
27	41	.....
21	47	.....
-10	18	.....
40	61	.....
34	52	.....

c) Atmospheric pressure decreases with an increase in altitude at an approximate rate of 12.7 millibars (mb) per 100 metres. Given that atmospheric pressure is 1 000 millibars at sea level, estimate the atmospheric pressure in (mb) at the following locations.

- |      |                                      |           |
|------|--------------------------------------|-----------|
| i)   | Mount Everest (29 340 ft)            | (2 marks) |
| ii)  | Tugela Gorge (160 m)                 | (2 marks) |
| iii) | Bulembu Mountain (1390 m)            | (2 marks) |
| iv)  | Mt. Kilimanjaro (5 890 m)            | (2 marks) |
| v)   | Scaba Trigonometric Station (1429 m) | (2 marks) |

d) With reference to Table 2 below, determine the intensity of solar radiation at the following locations during winter in the southern hemisphere.

- |      |                       |                        |           |
|------|-----------------------|------------------------|-----------|
| i)   | Ngwempisi (Swaziland) | (26.45 <sup>0</sup> S) | (2 marks) |
| ii)  | Madrid (Spain)        | (40.25 <sup>0</sup> N) | (2 marks) |
| iii) | Nakuru (Kenya)        | (0.16 <sup>0</sup> S)  | (2 marks) |
| iv)  | Alberta (Canada)      | (54.40 <sup>0</sup> N) | (2 marks) |
| v)   | Nsoko (Swaziland)     | (27.01 <sup>0</sup> S) | (2 marks) |

**(40 MARKS)**

Table 2. Relationship between noon solar angle and intensity of solar radiation

Solar angle	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°
0°	00.00	01.75	03.49	05.23	06.98	08.72	10.45	12.19	13.92	15.64
10°	17.36	19.08	20.79	22.50	24.19	25.88	27.56	29.24	30.90	32.56
20°	34.20	35.84	37.46	39.07	40.67	42.26	43.84	45.40	46.95	48.48
30°	50.00	51.50	52.99	54.46	55.92	57.36	58.78	60.18	61.57	62.93
40°	64.28	65.61	66.91	68.20	69.47	70.71	71.93	73.14	74.31	75.47
50°	76.60	77.71	78.80	79.86	80.90	81.92	82.90	83.87	84.80	85.72
60°	86.60	87.46	88.29	89.10	89.88	89.88	90.63	92.05	92.72	93.36
70°	93.97	94.55	95.11	95.63	96.13	96.59	97.03	97.44	97.81	98.16
80°	98.48	98.77	99.03	99.25	99.45	99.62	99.76	99.86	99.94	99.98

**SECTION B: ANSWER ANY TWO QUESTIONS**

**QUESTION 2:**

Explain where in the Solar System other forms of life than those known from Earth may occur, and give reasons for this assumption.

**(30 MARKS)**

**QUESTION 3:**

- i) Discuss why the ozone layer in the atmosphere currently is threatened, and what negative effects would result from its total depletion. (15 marks)
- ii) Explain how legislative measures have already served for the partial recover of the ozone layer.

(15 marks)

**(30 MARKS)**

**QUESTION 4:**

- (i) Describe the events that occur during the process of plate tectonics. (15 marks)
- (ii) By evaluating the speed of plate movement outline the historical dimensions during which the current continents have evolved. (15 marks)

**(30 MARKS)**

**QUESTION 5:**

The so-called 'Snow Ball Earth' is a term applied for the total glaciation of our planet Earth at various episodes during the Precambrian.

- (i) Discuss how it was possible for early forms of life to survive in such an environment. (15 marks)
- (ii) Discuss why water is essential for the maintenance of organisms. (15 marks)

**(30 MARKS)**