UNIVERISTY OF SWAZILAND
DEPARTMENT OF GEOGRAPHY, ENVORONMENTAL SCIENCE AND PLANNING
SUPPLEMENTARY EXAMINATION, JULY 2006
B.A., B.Ed., B.S., B.A.S.S.

TITLE OF PAPER: INTRODUCTION TO THE NATURAL ENVIRONEMNT

COURSE NUMBER: **GEP 111**

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

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

SECTION A: **MULTIPLE CHOICE**

- **(i)** **ANSWER ALL QUESTIONS ON THE ANSWER SHEET PROVIDED. PUT A CROSS ON THE CORRECT ANSWER**
- **(ii)** **THIS SECTION CARRIES 30 MARKS**

SECTION B: **SHORT ESSAY**

- **(i)** **ANSWER ANY TWO QUESTIONS ONLY**
- **(ii)** **EACH QUESTION CARRIES 15 MARKS**

SECTION C: **TECHNIQUES AND SKILLS**

- **(i)** **ANSWER ANY ONE QUESTION ONLY**
- **(ii)** **YOU ARE PROVIDED WITH A TOPOGRAPHIC MAP, TRACING PAPER AND GRAPH PAPER**
- **(iii)** **EACH QUESTION CARRIES 40 MARKS**

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

SECTION A: MULTIPLE CHOICE QUESTIONS
ANSWER ALL QUESTIONS

1. Energy transformations in the ecosystem occur by means of a series of steps or levels referred to as:
   A. Decomposers
   B. Amino acids
   C. Biological oxidation
   D. Food chain
2. The organisms which are able to manufacture their own foods from inorganic substances by using sunlight or chemical energy are called:
   A. Heterotrophs
   B. Oxidation
   C. Autotrophs
   D. Respiration
3. The driving force of an ecosystem is:
   A. Predator
   B. Biomes
   C. Solar energy
   D. Equilibrium
4. Potential evapotranspiration and water balance are mainly determined by the relationship between:
   A. Trophic level
   B. Primary productivity
   C. Herbivores and light
   D. Temperature and moisture
5. Phosphorous is available to plants directly from the soil which also supplies other major nutrients such as:
   A. Calcium, magnesium, potassium and sulphur
   B. Oxygen, carbon dioxide and carbohydrates
   C. Nitrogen, ammonia and nuclear acids
   D. Sugars, carbon dioxide and sulphur dioxide
6. The nitrogen gas is converted into forms that plants can use by two processes:
   A. Fossil fuels and energy
   B. Biological fixation and atmospheric fixation
   C. Animal wastes and ammonia
   D. Lithification and carbon dioxide
7. Denitrification is a process carried out by other specialised group of bacteria which convert:
   A. Proteins into urea
   B. Ammonia into nitrate
   C. Nitrate into sugars
   D. Nitrate into nitrogen gas
8. One important component of the oxygen cycle involves:
   A. Oxygen and ammonia
   B. Photosynthesis and respiration

C. Atmospheric fixation
D. Oxidation and respiration

9. Greenhouse effect is caused by:
   A. Sea-level rise
   B. Dramatic increase in carbon dioxide and methane
   C. Chlorofluorocarbons (CFCs) and pollution
   D. Acid rain

10. Large-scale movements of lithospheric plates cause either a convergence or divergence of the plates. Which of the following landforms is associated with plate convergence?
   A. Shallow focus earthquakes
   B. Andesitic volcanoes
   C. Basaltic volcanoes
   D. Oceanic ridge

11. The critical temperature at which saturation occurs as a consequence of cooling is called:
   A. Relative temperature
   B. Dew-point temperature
   C. Adiabatic temperature
   D. Saturation temperature

12. Saturation occurs when:
   A. Vapour pressure is greater than saturation pressure
   B. Vapour pressure is less than saturation vapour pressure
   C. Vapour pressure is equal to saturation vapour pressure
   D. Vapour pressure is insignificant

13. The movement of material down-slope under the influence of gravity is known as:
   A. Erosion
   B. Weathering
   C. Mass wasting
   D. Denudation

14. Which of the following is a dry climatic region?
   A. Am
   B. ET
   C. Bsh
   D. Cwb

15. A normal fault occurs in response to:
   A. Compressional forces
   B. Tensional forces
   C Horizontal displacement
   D. Vertical displacement

16. The material carried in liquid within a river is called:
   A. Suspended load
   B. Dissolved load
   C. Bed load
   D. Siltation

17. The scientific study that examines the differences in average weather conditions of various places is known as:

A. Meteorology
B. Climatology
C. Hydrology
D. Seismology

18. The difference in the rate of movement around an orbit during aphelion and perihelion is explained by:

A. Harmonic law
B. Elliptic law
C. Universal gravitation law
D. Equal areas law

19. Conical projections are characterised by:

A. Vertical lines converging at the poles
B. Horizontal lines intersecting at right angles
C. Constant areas
D. None of the above

20. Succession may be driven by modifications of the environment by the plants themselves or by external changes in the physiographic conditions. Therefore, the succession driven by external changes is called:

A. Allogenic
B. Autogenic
C. Primary
D. Secondary

21. The cementation of sediments by a solution of iron, silica and calcium to form sedimentary rock is known as:

A. Oxidation
B. Frost wedging
C. Hydrolysis
D. None of the above

22. There are different forms of parent material from which soils develop. It could be the weathered underlying rock or superficial deposits. Rock debris deposited under the influence of gravity lead to:

A. Alluvium
B. Colluvium
C. Loess
D. Glacial uplift

23. Mineral matter in soil consists of rock fragments of different sizes which can be categorised into fractions. However, the fraction whose diameter ranges between 0.05 and 0.002 mm is called:

A. Sand
B. Silt
C. Clay
D. Gravel

24. The most abundant element in the earth's crust is:

A. Silicon

B. Oxygen
C. Hydrogen
D. Aluminium

25. The increase in temperature with increasing height within the troposphere is known as:
A. Pollution
B. Albedo
C. Temperature inversion
D. Temperature subsidence

26. Which of the following is an igneous rock?
A. Shale
B. Gneiss
C. Gabbro
D. Marble

27. The pressure belt located at about latitude 30^0N and 30^0S of the Equator is known as:
A. Equatorial low
B. Temperate high
C. Sub-polar low
D. Sub-tropical high

28. The lower part of the troposphere has the highest concentration of:
A. Dust only
B. Smoke only
C. Water vapour and ozone
D. Moisture only

29. Plants and algae exist in an ecosystem as:
A. Primary consumers
B. Biomass
C. Primary producers
D. Detritus

30. Organisms that eat either plants or other animals are called:
A. Herbivores
B. Omnivores
C. Carnivores
D. Heterotrophs

SECTION B: SHORT ESSAYS
ANSWER ANY TWO QUESTIONS

QUESTION 1

Discuss the heating and cooling of the earth-atmosphere system. (15 marks)

QUESTION 2

Examine how water revolves in a never-ending cycle between the ocean, atmosphere and land. (15 marks)

QUESTION 3

With illustrations, discuss the carbon cycle. (15 marks)

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

QUESTION 1

a) Explain how a map scale can be expressed. (6 marks)

b) Explain how you would calculate an area of an irregular feature using the Graph Paper Method. (10 marks)

c) With reference to topographical map of Swaziland (PWD 12) calculate the surface area of farm No. 801 in kilometre squares and in hectares. (8 marks)

d) Copy and complete the table below. (6 marks)

Location	Time	Day	Location	Time	Day
164^0E	7:30 am	Monday	95^0W	.....	.....
27^0W	.....	.....	41^0E	9:00 pm	Thursday
155^0W	11:00 am	Saturday	25^0E	.....	.....

e) Explain how material is transported in a river. (6 marks)

f) List two attributes of a map. (2 marks)

QUESTION 2

a) Define the following: (8 marks)

i) A map
ii) A scale
iii) Angle of declination
iv) Local time.

b) Explain fully how would you arrange aerial photographs to attain a stereoscopic view? (12 marks)

c) Given the following hypothetical wind and temperature conditions, calculate the wind-chill factor.

Temperature (^{0}C)	Wind-speed (mph)	Wind-chill factor (kcal./m^2/hr
a) 40	55	
b) -8	10	
c) 20	35	

d) Explain the steps involved in measuring a river discharge using a current meter.
(8 marks)

GEP 111 ANSWER SHEET **EXAM NUMBER.....**

MARK THE CORRECT ANSWER WITH (X) IN THE APPROPRIATE BOX

1	A	B	C	D	16	A	B	C	D
2	A	B	C	D	17	A	B	C	D
3	A	B	C	D	18	A	B	C	D
4	A	B	C	D	19	A	B	C	D
5	A	B	C	D	20	A	B	C	D
6	A	B	C	D	21	A	B	C	D
7	A	B	C	D	22	A	B	C	D
8	A	B	C	D	23	A	B	C	D
9	A	B	C	D	24	A	B	C	D
10	A	B	C	D	25	A	B	C	D
11	A	B	C	D	26	A	B	C	D
12	A	B	C	D	27	A	B	C	D
13	A	B	C	D	28	A	B	C	D
14	A	B	C	D	29	A	B	C	D
15	A	B	C	D	30	A	B	C	D