UNIVERSITY OF ESWATINI

DEPARTMENT OF GEOGRAPHY, ENVIRONMENTAL SCIENCE AND PLANNING

MAIN EXAMINATION-MAY 2021

BA HUM., BASS, B.Ed. & B.Sc.

TITLE OF PAPER: HAZARDS, RISKS AND VULNERABILITY ANALYSES

COURSE CODE: GEP 419

TIME ALLOWED: THREE (3) HOURS

INSTRUCTIONS: 1. ANSWER THREE (3) QUESTIONS

2. QUESTION 1 IS COMPULSORY

3. ANSWER ANY TWO QUESTIONS FROM SECTION B

4. WHERE APPROPRIATE, ILLUSTRATE YOUR ANSWER WITH DIAGRAMS AND EXAMPLES

MARKS ALLOCATION: QUESTION ONE (1) CARRIES 40 MARKS AND THE REST OF THE QUESTIONS CARRY 30 MARKS EACH.

THIS QUESTION PAPER SHOULD NOT BE OPENED UNTIL PERMISSION HAS BEEN GRANTED BY THE INVIGILATOR

GEP 419 HAZARDS, RISKS AND VULNERABILITY ANALYSES DEC 2020

SECTION A: COMPULSORY

QUESTION 1

a) A community in Siphofaneni faces multiple risks with different Probabilities of
    Consequences of damage or death (P_d) as follows:

Risk	Probability (P_d)	Frequency/Year	Receptor
Fire	0.9	2	Property, Environment, Production, Equipment
Drought	0.6	1	People, Livestock, Environment,
Flooding	0.3	1	Property
Earthquake	1	0	People, Property, Environment, Production, Equipment

i) Calculate the total risk faced by this community.   (10 marks)

ii) From your calculation above which risk should be prioritised and why?   (2 marks)

b) A pressurised storage tank with a highly flammable substance is located in a busy
    industrial area that is also frequented by daily employees. Discuss any 5 sets of layers
    of protection aimed at preventing or minimizing:

i) Occurrence of an undesirable event   (5 marks)

ii) Risk of consequences   (5 marks)

c) Risk had been defined as a function of probability or likelihood of undesirable event
    multiplied by degree of vulnerability. Using any example of risk, explain why some
    communities are more prone to risks compared to others.   (18 marks)

                                                                        (40 Marks)

SECTION B: ANSWER ANY TWO QUESTIONS FROM THIS SECTION

QUESTION 2

a) State the three types of risk assessment.   (9 marks)

b) Discuss the steps followed when conducting any of them.   (21 marks)

(30 Marks)

QUESTION 3

a) Calculate the average daily dose (ADD) and the lifetime average daily dose (LADD) in
    mg/L-d that an adult male receives from drinking water from a well that contains 40 µg/L
    of acid. Assume the individual is exposed for 35 years, drinks 2 L/day of water, 7
    days/week, 49 weeks per year (because every year he visits his family for 3 weeks) and he
    weighs 65 kg. Also assume 85% of the acid is absorbed into his body each time he drinks
    the water.   (20 marks)

b) Why are time weighted averages important in exposure assessment?   (10 marks)

(30 Marks)

QUESTION 4

a) Discuss the difference between exposure and dose.   (15 marks)

b) State why integrated exposures and exposure profiles are important in risk
    characterization for carcinogens?   (15 marks)

(30 Marks)

QUESTION 5

Explain why the vulnerability analysis of a coupled human-environment systems is
particularly complex?   **(30 Marks)**