UNIVERSITY OF SWAZILAND

FACULTY OF HEALTH SCIENCES

DEPARTMENT OF ENVIRONMENTAL HEALTH SCIENCE

TYPE OF ASSESSMENT	FINAL EXAMINATION
TITLE OF PAPER	ENVIRONMENTAL IMPACT ASSESSMENT AND AUDITING
COURSE CODE	EHS448
DURATION	2 HOURS
DATE	OCTOBER – NOVEMBER 2021
TOTAL NUMBER OF MARKS	100
INSTRUCTIONS	1. DO NOT OPEN THIS PAPER UNTIL YOU ARE INSTRUCTED TO DO SO.
	2. ANSWER ALL QUESTIONS.
	3. BEGIN YOUR ANSWERS TO EACH QUESTION ON A FRESH PAGE. ENSURE THAT ALL ANSWER SHEETS ARE NUMBERED CORRECTLY.
	4. POOR HANDWRITING AND CARELESSNESS IN ENGLISH LANGUAGE GRAMMAR SHALL RESULT IN LOSS OF MARKS.
	5. IN THE UNFORTUNATE CASES OF MISCONDUCT, DURING THE EXAMINATION, RELEVANT ACADEMIC REGULATIONS SHALL BE APPLIED.

Question 1 [25 Marks]: *Multiple choice questions*

1. It has been said that auditing in EIA faces a number of major problems, mainly related to nature of impacts, project modifications, monitoring data, comprehensiveness, clarity, and interpretation. In questions (i) to (v) below, identify the most relevant problem.

   (i)   Most auditing studies pay little attention to examining the underlying causes of predictive errors. This relates to;
   - (a) Comprehensiveness
   - (b) Clarity
   - (c) Monitoring data
   - (d) Interpretation

   (ii) Few published auditing studies are explicit about the criteria used to establish prediction accuracy. This relates to;
   - (a) Nature of impact prediction
   - (b) Comprehensiveness
   - (c) Clarity
   - (d) Monitoring data

   (iii) Most monitoring data are collected and provided by the project proponent, which may give rise to fears of possible bias in the provision of information. This relates to;
   - (a) Project modifications
   - (b) Monitoring data
   - (c) Interpretation
   - (d) Nature of impact predictions

   (iv) Testable predictions often relate to relatively minor impacts, with major impacts being referred to only in qualitative terms. This relates to;
   - (a) Nature of impact predictions
   - (b) Project modifications
   - (c) Monitoring data
   - (d) Comprehensiveness

   (v)   Many auditing studies are concerned only with certain types of impacts (e.g. biophysical but not socio-economic; operational but not construction-stage impacts) and are therefore not full-project EIA audits. This relates to;
   - (a) Interpretation
   - (b) Monitoring data
   - (c) Comprehensiveness
   - (d) Project modifications

2. In unit 5 of EHS448 (Monitoring and Auditing: After the decision) you learned about monitoring procedures of some countries, including the United Kingdom (UK), Netherlands, California, Hong Kong. In questions (i) to (v) below, identify the relevant country.

   (i)   Offences carry stiff penalties of up to $250,000 and six months imprisonment. This is applicable to;
   - (a) California
   - (b) Hong Kong
   - (c) The UK
   - (d) Netherlands

(ii) Under procedures introduced since 2000 major projects must set up a monitoring website This is applicable to;
(a) Hong Kong
(b) Netherlands
(c) California
(d) The UK

(iii) An environmental review and management programme is part of monitoring procedures of;
(a) The UK
(b) Hong Kong
(c) Netherlands
(d) California

(i) If monitoring reveals that mitigation measures are ignored or are not completed, sanctions could be imposed, which could include 'stop work' orders, fines and restitution. This is applicable to;
(a) The UK
(b) California
(c) Netherlands
(d) Hong Kong

(iv) One of the components of a monitoring programme is a summary of the significant impacts identified in the environmental impact report (EIR). This is applicable to;
(a) California
(b) The UK
(c) Netherlands
(d) Hong Kong

(v) The Environmental Monitoring and Audit (EM&A) manual includes three stages of an event action plan. This is applicable to;
(a) Netherlands
(b) The UK
(c) California
(d) Hong Kong

3. Methods of impact prediction can take any form, including mathematical and compute-based models, statistical models, physical/architectural models and experimental methods, expert judgment and analogue models, etc. In questions (i) to (v) below, identify the most relevant method.

(i) They can be divided into deterministic and stochastic models. These are;
(a) Statistical models
(b) Physical/architectural models and experimental methods
(c) Mathematical and computer-based models
(d) Expert judgment and analogue models

(ii) They can be used in a pollution-monitoring study to describe the concentration of a pollutant as a function of the stream-flow rates and the distance downstream. These are;
(a) Statistical models
(b) Mathematical models
(c) Expert judgment and analogue models
(d) Physical/architectural models and experimental methods

(iii) They are illustrative or scale models that replicate some element of the project-environment interaction. These are;
   (a) Experimental methods
   (b) Statistical models
   (c) Physical/architectural models
   (d) Expert judgment models

(iv) They use existing data inventories, often supplemented by special surveys, to predict impacts on receptors. These are;
   (a) Experimental methods
   (b) Mathematical and compute-based models
   (c) Physical/architectural models
   (d) Expert judgment models

(v) They include comparing the impacts of a proposed development with a similar existing development. These are;
   (a) Physical/architectural models
   (b) Mathematical models
   (c) Expert judgment and analogue models
   (d) Experimental methods

4. Methods of impact identification often include checklists, magnitude matrices, weighted matrices, distributional impact matrices, simple matrices, networks, chain analysis, overlays, etc. In questions (i) to (v) below, identify the most relevant method.

   (i) The method does not consider factors such as the likelihood of an impact, indirect impacts or the difference between reversible and irreversible impacts. These are;
   (a) Weighted matrices
   (b) Overlay maps
   (c) Simple matrices
   (d) Networks

   (ii) Alternative project sites can be determined mathematically. These are;
   (a) Checklists
   (b) Distributional impact matrices
   (c) Both simple checklists and simple matrices
   (d) Weighted matrices

   (iii) They can require considerable knowledge of the environment. These are;
   (a) Overlays
   (b) Networks
   (c) Checklists
   (d) Distributional impact matrices

   (iv) They effectively take decisions away from decision-makers. Further, they may be difficult for lay people to understand. These are;
   (a) Checklists
   (b) Overlays
   (c) Networks
   (d) Weighted matrices

   (v) They are particularly good in identifying varying spatial impacts. These are;
   (a) Weighted matrices
   (b) Simple matrices
   (c) Distributional impact matrices

(d) Magnitude matrices

5. It has been said that EIA is a process, and not a once-off activity. It consists of not less than 15 steps, according to your textbook. In questions (i) to (v) below, identify the most relevant step of the EIA process.

(i) It involves the introduction of measures to avoid, reduce, remedy or compensate for any significant adverse impacts. This is;
   (a) Prediction of impacts
   (b) Mitigation
   (c) Description of project/development
   (d) Description of the environmental baseline

(ii) It includes a clarification of the purpose and rationale of the project, and an understanding of its various characteristics. This is;
   (a) Identification of the main impacts
   (b) Description of the environmental baseline
   (c) Description of project/development
   (d) Decision-making

(iii) It involves the consideration of the EIS by the relevant authority. This is;
   (a) Post-decision monitoring
   (b) Decision-making
   (c) Auditing
   (d) Mitigation

(iv) It can be used to assess the quality of predictions and the effectiveness of mitigation. This is;
   (a) Post-decision monitoring
   (b) Prediction of impacts
   (c) Identification of impacts
   (d) Auditing

(v) It involves the systematic appraisal of the quality of the EIS. This is;
   (a) Mitigation
   (b) Review
   (c) Scoping
   (d) Screening

Question 2 [25 Marks]: *Short-answer questions*

1. Study Table 1 carefully and answer questions (a) to (g).

Table 1:

Environmental component	(i)	Alternative sites					
		Site A		Site B		Site C	
		(ii)	(iii)	(ii)	(iii)	(ii)	(iii)
Air quality	21	3		5		3	
Water quality	42	6		2		5	
Noise	9	5		7		9	
Ecosystem	28	5		4		3	

(a) Suggest a topic for Table 1 [2].

(b) Three alternative sites are shown in Table 1 above. Of the three sites, suggest one suitable site [2]

(c) Provide one explanation for your answer in 1 above [2]

(d) In each of the three sites, identify one environmental component that is likely to be the most affected than all other components [3].

(e) In each of the three sites, identify one environmental component that is likely to be the least affected than all other components [3]

(f) State the names of the factors represented by (i), (ii) and (iii) [6].

(g) It is said that the method shown in Table 1 is particularly attractive. Suggest one reason for this assessment [2].

2. A road construction project that cuts through an undisturbed site has been approved. However, according to Figure 1, whether the project goes ahead or not, changes to the undisturbed environment will occur. State any five factors that could cause these changes [5].
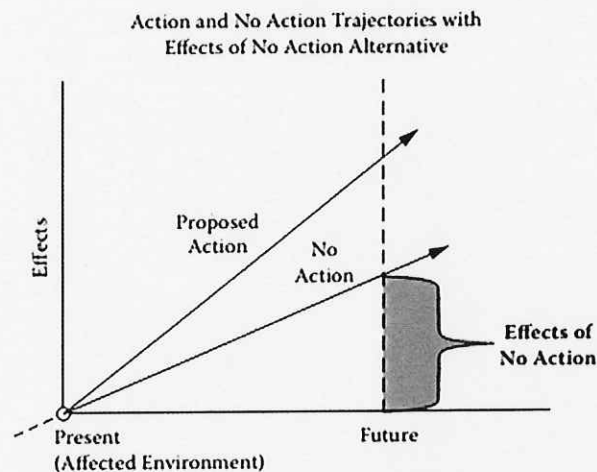

Figure 1: No action alternative

Question 3 [25 Marks]: *Application questions*

1. A recent study on the practice of EIA in Eswatini found that in most cases, the appraisal of impacts related to reduction in unemployment, increase in crime rate, levels of anxiety, etc., often requires more time. On the other hand, appraisal of impacts related to water quality, air quality, noise levels, etc., are often completed within a short space of time. As an EIA specialist, explain one possible cause of this observation [5].

2. Recently, there was a story on the Sunday Times, where EIA companies were blamed for failing to assess the significance of impacts in many projects. In response, the EEA has organized a workshop to train EIA companies on significance of impacts. Suggest one topic and five sub-topics that must be covered during the training, amongst other topics [5].

3. The construction of a new major highway will include the establishment of good quality staff houses, and park and ride facilities, which will be used by construction employees, during the 5-year construction period. Local communities appreciate the fact there will be jobs during the 5-year period, however, they are opposing this development because they feel that after 5 years, they will return to the usual levels of difficulties. As an EIA specialist, you have been tasked to convince these communities that some benefits will continue to exist even after the completion of construction. Describe any two points that you will present [5].

4. During the first community meeting to discuss the construction of a coal power plant at Mpaka, it was observed that people that participated included those from Matsamo, Mbabane, Nhlangano, Manzini, and Siteki, in addition to Mpaka communities. Amongst Mpaka communities, there were those that own land that is likely to be affected by the proposed development. Noticeably,

the most vocal people were particularly those from Matsamo and Nhlangano. After the experience of the first meeting, the developers have decided to reduce the level of participation in the second meeting. As an EIA specialist, suggest two strategies that may be used to reduce the level of participation [5].

5. As the Director of Environmental Affairs at Inyatsi Construction, you are a member of the panel that will interview a number of applicants for the position of Team Project Manager. This person will be in charge of the EIA process for the up-coming highway construction between Manzini and Pigg's Peak. Outline some of the skills that you will be looking for [5].

Question 4 [25 Marks]: *Definition and description of terms and processes (respectively)*

1. Define the following terms;
   (a) Environmental components of the physical environment [3].
   (b) The environmental impacts of a project [2].
   (c) The scope of an EIA [2].
   (d) Mitigation hierarchy [2]
2. Describe the following processes;
   (a) Environmental impact auditing [3].
   (b) Impact identification [3].
   (c) Establishment of the environmental baseline [3].
   (d) Scoping [3].
   (e) Project screening [4].