



ESCUELA SUPERIOR POLITÉCNICA DEL LITORAL

FACULTAD DE CIENCIAS NATURALES Y MATEMÁTICAS

DEPARTAMENTO DE CIENCIAS QUÍMICAS Y AMBIENTALES



SECOND EVALUATION OF ENVIRONMENTAL IMPACT OF PROJECTS (70 PTS)

I SEMESTER 2014-2015

SEPTIEMBRE 2014

NOMBRE:

PARALELO:.....

NOTA: Este examen está diseñado para ser resuelto de manera individual, puede usar una calculadora ordinaria para sus cálculos aritméticos, un lápiz o esferográfico. Solo puede comunicarse con la persona responsable de la recepción del examen; y, cualquier instrumento de comunicación que hubiera traído, deberá apagarlo y ponerlo en la parte anterior del aula, junto con algún otro material que se encuentre acompañándolo. No consultará libros, notas, ni algún apunte adicional a las que se entreguen en esta evaluación. *Desarrolle los temas de manera ordenada. Firme como constancia de haber leído lo anterior.*

Firma

1. Write the letter according to the concept of each term (1 e/o) pts)

	Term	Concept	
A	Scope	supervision reports	
B	Environmental index	Find a way to do things in a better way	
C	Environmental Indicator	Subjective valuation	
D	Importance	Representative number or a descriptive classification of environmental data	
E	Magnitude	Methodology for impact valuation	
F	Mitigate	responsible of the process of EIA in front of the authorities	
G	Environmental Management Plan	determines the focus and methods to be applied in the elaboration of the environmental impact assessments	
H	Network	Summary of potential impacts	
I	Promotor	Objective Valuation	
J	Secondary source of information	Simple measurement that indicate potential changes in the original environment of the evaluated site	

2. What can be done in order to minimize the impact? (6 pts)

3. How the compensation of impacts can be done. Indicate which is the best and worst case. (5 pts)

4. What characteristic does the organism selected as an indicator has to fulfil . Why? (4 pts)

5. Read the following cases and then answer the questions in each case

CASE 1 (17 pts)

A concrete fabric has been working in an industrial area for about 18 yrs. In the last 5years its production has increased significantly. In the surroundings of this industrial area is located an urban area, which in the last year has been complaining about the quality of the air in that place. For this reason they ask the Municipality to perform the environmental studies. Therefore, the fabric will temporally close or continue working according to the results obtained. You are part of the environmental team and you have to indicate the Municipality what is the level of the air quality in the area and the effect it has to the health. You perform the measurements of the environmental parameters of the air, with the following results:

$\text{SO}_2 = 1.10 \text{ ppm}$ $\text{NO}_2 = 1.8 \text{ ppm}$ $\text{CO}_2 = 4.0 \text{ ppm}$ $\text{O}_3 = 2.7 \text{ ppm}$ Particulate matter ($>10\mu\text{m}$) = 60 ug/m_3

- Choose the correct formula (a, b or c) (2 pts)
- Calculate the value of the air quality index. Write your calculations (5 pts)
- According to the table given below what is the level of the air quality and what is the impact to health (3 pts)
- Which are the sensitive groups? And **why** are they called sensitive groups? (3 pts)
- Mention two reasons of why environmental indicators are important and were created (4pts)

AQI	Level of the quality of the air	Impact to health
0-50	Good	Good
51-100	Moderate	Moderate
101-150	Alert	Not Good for sensitive groups
151-200	Aware	Bad
201-300	Emergency	Very bad
301-500	Significant harmful	Dangerous

Possible formulas to be used for calculating the air quality index (CHOOSE the correct one):

- $AQI_{cont} = AQI_{high}/AQI_{low} + BP_{high}/BP_{low}$
- $AQI_{cont} = BP_{high} + BA_{low} + BP_{high} - C_{cont}$
- $AQI_{cont} = ((AQI_{high} - AQI_{low})/(BP_{high} - BP_{low})) * (C_{cont} - BP_{low}) + AQI_{low}$

PM ₁₀ ug/m ₃				SO ₂ ppm				NO ₂ ppm				CO ₂ ppm				O ₃ ppm			
BP	BP	AQI	AQI	BP	BP	AQI	AQI	BP	BP	AQI	AQI	BP	BP	AQI	AQI	BP	BP	AQI	AQI
low	high	low	high	low	high	low	high	low	high	low	high	low	high	low	high	low	high	low	high
0	54	0	50	NA	NA	101	150	0.5	1.0	95	130	0.5	1.5	115	200	0.3	1.0	100	180
55	154	51	100	0.65	1.24	201	300	1.1	2.5	180	301	1.6	3.5	201	310	1.1	2.5	200	350
155	254	101	150	1.25	2.04	301	500	2.6	4.0	350	550	3.6	4.5	315	450	2.6	3.0	380	580

CASE 1 - ANSWERS

Formula selected		
AQI PM ₁₀	AQI SO ₂	AQI CO ₂
AQI NO ₂	AQI O ₃	
Value considered for the calculation of the AQI _{air}		
Level of quality of the air & Impact to health	Level	Impact to health
Sensitive groups	Sensitive Groups	Why are they called sensitive groups
Reasons to create environmental indicators	Reason 1	Reason 2

CASE 2 (17pts)

In a sanitary refill there have some filtrations. Authorities decide to do an audit in order to decide if this filtrations have polluted the underground waters located just in the surroundings of the sanitary landfill. The environmental legislation determines that measurements and samples must be taken from a control point located maximum at 150 m distance from the sanitary landfill. According to the results obtained from the lab analysis you must decide if the filtrations have polluted the aquifer or not.

Parameters	Control Point d=200 m	Control Point 2 d=180 m	Control Point 3 d=140 m	Control Point 4 d=160 m
Cloruro de vinilo	0.001 mg/l	0.002 mg/l	0.0015 mg/l	0.001 mg/l
Endrin	0.0001 mg/l	0.0002 mg/l	0.00015 mg/l	0.00012 mg/l
Arsenico	0.04 mg/l	0.03 mg/l	0.07 mg/l	0.05 mg/l
Mercurio	0.001 mg/l	0.0014 mg/l	0.002 mg/l	0.001 mg/l
Plata	0.04 mg/l	0.04 mg/l	0.046 mg/l	0.05 mg/l
Cadmio	0.0005 mg/l	0.01 mg/l	0.05 mg/l	0.009 mg/l
Bario	0.5 mg/l	1 mg/l	1.0 mg/l	0.8 mg/l
Metoxicloro	0.09 mg/l	0.08 mg/l	0.2 mg/l	0.002 mg/l

- Which control(s) point(s) you selected as reference point(s) for your analysis? Why? (4pts)
- Is the aquifer polluted or not due to filtrations from the sanitary refill? EXPLAIN how did you get that conclusion (3 pts)
- What national legislation are you using to determine the fulfillment of the admissible levels or not? (3pts)
- Give four characteristics of the audit report (4 pts)
- What kind of audit are you performing in this case? Why? 3 pts

Control(s) Point(s) selected Why?	Is the aquifer polluted explain	Legislation document used	Characteristics of the audit report	Type of audit Why?

CASE 3 (11 pts)

In an area close to Chongón there are a group of important aquifers in the area. This zone is well known since the main activity carry on by the local people is agriculture. In order to protect their crops they use two main pesticides **RADIN 11** and **PESTDIE**. Lately, in the last two years they have noticed that quality of the water in the aquifer has decreased. For this reason they asked the local authority to perform the environmental measurements to determine the water quality in the aquifer. Determine the water quality of the aquifer

- What is the name of the underground quality index you will use (2 pt)
- Calculate the underground quality index according to the parameters given in table of information (8 pts).
- Define how is the quality of the underground water according to table (1 pt)

Variable	Characteristics of the aquifer	Calculation	Value	Quality of the underground water according to table
Conductivity	4.5 x 10 ⁻² cm/s			
Surface soil (<2m)	Arcilla arenosa			
Terrain tilt	20 %			
Depth of the aquifer	8 m			
Recharge	90 mm			
Impact Zone Vadosa	Lutita			
Aquifer environment	Arenisca masiva			
Name of Underground water index				