
Exam for the lecture „Introduction to Environmental Sciences“

29 June 2012

Last name: First name:

Matr. No.: faculty: Semester:

Branches: Master Bachelor Diplom Staatsexamen
 Magister PhD Other: _____

Explication:

For the open questions is the maximum score in parenthesis after the questions.

For multiple-choice questions is *more than one answer possible*.

Duration: *90 minutes*.

The exam is considered passed if at least 50% of the maximum number of possible points has been achieved.

Evaluation:

Correct answer: + 1 point

Wrong answer: – 1 point

Abstention: 0 point

Good Luck!

Question

possible answers

correct

wrong

1. Unit: Introduction: Environmental problems and environmental drivers

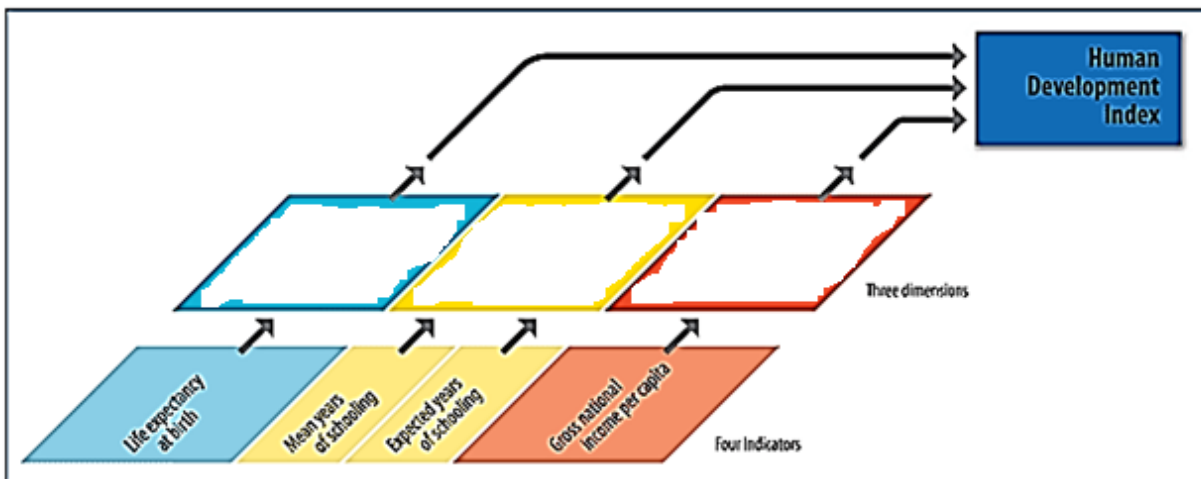
1. What characterizes the new 'quality' of environmental degradation in the 20th Century?
- a) Explosive growth of population, economic performance, energy and resource consumption
 - b) Occurrence of local forest damage
 - c) Decline in the fertility of farmlands
 - d) Explosive increase of water and air pollution and generating waste products
 - e) Local contamination of drinking water
 - f) Change from local to global impairments of the environment

2. Write the three missing terms in the boxes: (3 points)

a) Health, b) Education c) Living Standards

Components of the Human Development Index

The HDI—three dimensions and four indicators



Note: The indicators presented in this figure follow the new methodology, as defined in box 1.2.

Source: HDRO.

3. Which of the following definitions are correct?
- a) Proven reserves: part of the resources which is identified and well analyzed
 - b) Recoverable reserves: assumed total resources
 - c) Static range: Current reserves are related to current consumption
 - d) Dynamic range: here are the future (then current) reserves related to future consumption

Question	possible answers	correct	wrong
4. „Neolithic revolution“:	a) For about 1,5 Million years (cooking purposes; hunting; maintenance of an open landscape; security)	<input type="checkbox"/>	<input type="checkbox"/>
	b) Through advanced tools and social structures (hunter and gatherer groups): 20.000 – 10.000 B.C.	<input type="checkbox"/>	<input type="checkbox"/>
	c) Beginnings of agriculture about 9.000 bis 7000 B.C. in the Middle East, 4.500 B.C in the Paris basin	<input type="checkbox"/>	<input type="checkbox"/>
	d) Beginnings of mining, 8.000 B.C.; use of metals copper 7000 B.C. in Anatolia, bronze 3.500 B.C. in Egypt, iron 800 B.C. in central Europe	<input type="checkbox"/>	<input type="checkbox"/>
	a) First settlements such as Jericho in Palestine or Catal Hüyük in central anatolia around 7.000 B.C. with approximately 100.000 people	<input type="checkbox"/>	<input type="checkbox"/>

2. Unit: Pressures on the Natural Environment

5. In the field of ecosystems exists the term **succession**. What does primary and secondary succession mean? (2 points)

6. Carbon Stocks at the atmosphere in <i>Billion Metric Tons</i> is:	a) 80000000	<input type="checkbox"/>	<input type="checkbox"/>
	b) 40000	<input type="checkbox"/>	<input type="checkbox"/>
	c) 4000	<input type="checkbox"/>	<input type="checkbox"/>
	d) 1500	<input type="checkbox"/>	<input type="checkbox"/>
	e) 825	<input type="checkbox"/>	<input type="checkbox"/>
	f) 580.	<input type="checkbox"/>	<input type="checkbox"/>

7. What characterizes biogeochemical cycles?	a) Flows of chemical elements through the compartments of the biosphere	<input type="checkbox"/>	<input type="checkbox"/>
	b) They cannot be influenced by humans	<input type="checkbox"/>	<input type="checkbox"/>
	c) They include physical, chemical and economic processes	<input type="checkbox"/>	<input type="checkbox"/>
	d) They are only relevant for local and regional site conditions	<input type="checkbox"/>	<input type="checkbox"/>
	e) Is forced by solar radiation and geological processes	<input type="checkbox"/>	<input type="checkbox"/>

Question	possible answers	correct	wrong
8. What is the correct order of layers of the atmosphere from the bottom to the top?	a) Troposphere – Stratosphere – Mesosphere – Ionosphere	<input type="checkbox"/>	<input type="checkbox"/>
	b) Stratosphere – Troposphere – Mesosphere – Ionosphere	<input type="checkbox"/>	<input type="checkbox"/>
	c) Troposphere – Mesosphere – Stratosphere – Ionosphere	<input type="checkbox"/>	<input type="checkbox"/>
	d) Stratosphere – Ionosphere – Mesosphere – Troposphere	<input type="checkbox"/>	<input type="checkbox"/>
9. The ecosphere	a) Includes all organisms and their interactions within their environment	<input type="checkbox"/>	<input type="checkbox"/>
	b) Is an close system in relation to the energy,	<input type="checkbox"/>	<input type="checkbox"/>
	c) Is characterized by the diversity of species and ecosystems with different habitat conditions	<input type="checkbox"/>	<input type="checkbox"/>
	d) Poses with the photosynthesis the basic of the food chain	<input type="checkbox"/>	<input type="checkbox"/>
	e) is an open system in relation to material flows.	<input type="checkbox"/>	<input type="checkbox"/>

3. Unit: Impacts: Global environmental problems

10. Task of United Nations Environment Program (UNEP):	a) Assessing global, regional and national environmental conditions and trends	<input type="checkbox"/>	<input type="checkbox"/>
	b) Developing international and national environmental instruments	<input type="checkbox"/>	<input type="checkbox"/>
	c) Facilitating the transfer of knowledge and technology for sustainable development	<input type="checkbox"/>	<input type="checkbox"/>
	d) Encouraging new partnerships and mind-sets within civil society and the private sector	<input type="checkbox"/>	<input type="checkbox"/>
11. The 4 major problems of GEO-4 are:	a) Atmosphere (increasing temperature, GHG emission)	<input type="checkbox"/>	<input type="checkbox"/>
	b) Land (land degradation)	<input type="checkbox"/>	<input type="checkbox"/>
	c) Education (environmental instruments)	<input type="checkbox"/>	<input type="checkbox"/>
	d) Water (drinking water situation, availability of water)	<input type="checkbox"/>	<input type="checkbox"/>
	e) Biodiversity (degradation of ecosystems)	<input type="checkbox"/>	<input type="checkbox"/>
	a) Health (Impact on the organism)	<input type="checkbox"/>	<input type="checkbox"/>
12. An important publication of the IPCC (Intergovernmental Panel on Climate Change) is:	a) the Kyoto protocol	<input type="checkbox"/>	<input type="checkbox"/>
	b) the Assessment Report	<input type="checkbox"/>	<input type="checkbox"/>
	c) the Millenium Report	<input type="checkbox"/>	<input type="checkbox"/>
	d) the Global Environment Outlook	<input type="checkbox"/>	<input type="checkbox"/>

4. Unit: Responses

13. Technic is:	a) Instrument of progress	<input type="checkbox"/>	<input type="checkbox"/>
	b) Cause of environmental problems	<input type="checkbox"/>	<input type="checkbox"/>
	c) Instrument to reused environmental problems	<input type="checkbox"/>	<input type="checkbox"/>

Question	possible answers	correct	wrong
14. The Kyoto protocol	a) Was adopted in 1997	<input type="checkbox"/>	<input type="checkbox"/>
	b) Entered into force in 2005	<input type="checkbox"/>	<input type="checkbox"/>
	c) The industrialized states have committed themselves to reduce greenhouse gas emissions by around 20% with reference to 1990 by the years 2008-2012.	<input type="checkbox"/>	<input type="checkbox"/>
	d) The signatory states accept in doing so different emission reduction obligations	<input type="checkbox"/>	<input type="checkbox"/>
	e) for the reductions of emissions flexible mechanisms are defined	<input type="checkbox"/>	<input type="checkbox"/>
15. Which are the possibilities of the internalisation of externalities based on the example of the chemical plant and the fisher? (Situation: The chemical plant may discharge chemicals unfiltered [without costs] into a river, as a consequence the fishes die.	a) taxation of the discharge	<input type="checkbox"/>	<input type="checkbox"/>
	b) prohibition on discharge and appropriate disposal of the chemicals	<input type="checkbox"/>	<input type="checkbox"/>
	c) filtering of the chemicals	<input type="checkbox"/>	<input type="checkbox"/>
	d) compensation for fishermen	<input type="checkbox"/>	<input type="checkbox"/>
	e) the fisher has to look for another river since the chemical plant was there first and has therefore the right to discharge	<input type="checkbox"/>	<input type="checkbox"/>
	f) the chemical plan is official approved in plans and this resolution is unalterable, i.e. the fisher must accept the legal status	<input type="checkbox"/>	<input type="checkbox"/>
	g) closure of the chemical plant	<input type="checkbox"/>	<input type="checkbox"/>

5. Unit: Influences on industrial environmental protection

16. REACH is	a) Registration, Evaluation, Authorisation and Restriction of Chemicals	<input type="checkbox"/>	<input type="checkbox"/>
	b) Restriction of (the use of certain) hazardous substances	<input type="checkbox"/>	<input type="checkbox"/>
	c) energy related products	<input type="checkbox"/>	<input type="checkbox"/>
17. Management Systems – Quality Management certificate mean that the company:	a) confirm a high quality of a product	<input type="checkbox"/>	<input type="checkbox"/>
	b) sets itself quality objectives (CIP),	<input type="checkbox"/>	<input type="checkbox"/>
	c) controls – and improves - the quality	<input type="checkbox"/>	<input type="checkbox"/>
	d) meets a certain (possibly self-prescribed) quality.	<input type="checkbox"/>	<input type="checkbox"/>
18. Management Systems – Environmental Management certificate mean that the company:	a) confirm a low environmental impact or major environmental activities	<input type="checkbox"/>	<input type="checkbox"/>
	b) applies an EMS,	<input type="checkbox"/>	<input type="checkbox"/>
	c) sets itself environmental objectives (CIP),	<input type="checkbox"/>	<input type="checkbox"/>
	d) collects environmental data	<input type="checkbox"/>	<input type="checkbox"/>
	e) controls – and improves - processes with environmental impact	<input type="checkbox"/>	<input type="checkbox"/>
	f) meets the environmental requirements.	<input type="checkbox"/>	<input type="checkbox"/>

Question

possible answers

correct

wrong

6. Unit: Environmental Management Systems

19. Write the missing terms in the boxes (2 points) :

a) EMAS-Regulation b) ISO 14001

Goal	Continuing improvement of the operational environmental performance (and of the EMS)	Continuing improvement of the EMS
Applies to	EU and associated countries	Worldwide
Members	All organisations that want to improve their environmental performance	Trade, Service industry, Producing companies
Testing	Mandatory testing	Private economic testing
Testing method	Validation and registration	Certification
System verification	Entry in the register, participation logo	Certificate
Entry into the system	By means of the first test of the Environmental Statement	Establishment of the entire auditable system
System boundaries	Organisation	Organisational unit
Product inspection	Strong component of the system	Strong component of the system
Publicity	Publication obligation of environmental politics and advertising with the participation logo	Publication obligation of environmental politics

7. Unit, 8. Unit : Instruments for industrial environmental protection

20. Environmental performance indicators – Internal target groups are:
- a) Management
 - b) EM officers, environmental officers
 - c) Plant / Production Manager
 - d) Customers, suppliers
 - e) Controlling, cost accounting
 - f) Staff, works council
 - g) Banks, insurance
 - h) Authorities
 - i) Associations, NGOs, neighbours, institutions / science

Question

possible answers

correct

wrong

21. Give some examples in the boxes for EU COMMISSION RECOMMENDATION concerning the selection and use of environmental performance Indicators (2003/532/EC): **(4 points)**

OPERATIONAL PERFORMANCE: INPUT INDICATORS

Indicator category	Examples of indicators	Examples of measurement units
Materials		
Energy		
Emissions		

22. The Global Reporting Initiative is a global initiative to promote sustainability
- a) It lists 10 indicators, of which 5 environmental indicators
 - b) It lists 81 indicators, of which 30 environmental indicators
 - c) It lists 81 indicators, of which 50 environmental indicators

9. Unit: Resource Efficiency

23. Resource efficiency means:
- a) producing the same amount of products with fewer natural resources
 - b) producing the same amount of products amount with less employees
 - c) producing more products with the same amount of natural resources
 - d) producing more products with the new machines

Question	possible answers	correct	wrong
24. Natural resources are:	a) Energetic raw materials like oil, coal, gas, wind	<input type="checkbox"/>	<input type="checkbox"/>
	b) Biotic raw materials like wood, food, plants	<input type="checkbox"/>	<input type="checkbox"/>
	c) Manpower (e.g. employees)	<input type="checkbox"/>	<input type="checkbox"/>
	d) Area (e.g. ground of company)	<input type="checkbox"/>	<input type="checkbox"/>
25. Objectives of resource efficiency are:	a) reducing the use of the land and preventing their degradation.	<input type="checkbox"/>	<input type="checkbox"/>
	b) reducing environmental pollution.	<input type="checkbox"/>	<input type="checkbox"/>
	c) reducing cost of production	<input type="checkbox"/>	<input type="checkbox"/>
	d) reducing the use of raw materials.	<input type="checkbox"/>	<input type="checkbox"/>
26. Starting points for better resource efficiency are:	a) using electricity instead of gas or oil for heat production (steam, oven...).	<input type="checkbox"/>	<input type="checkbox"/>
	b) process optimisation through cleaner production.	<input type="checkbox"/>	<input type="checkbox"/>
	c) optimisation of consumption behaviour, e.g. drive your car fuel saving.	<input type="checkbox"/>	<input type="checkbox"/>
	d) selection of raw materials with lower environmental impact	<input type="checkbox"/>	<input type="checkbox"/>

. 10. 11. 12. 13. Unit: Cleaner production

27. Cascade utilisation means:	a) regulate the temperature of a process or oven first to high temperature, then medium, then low temperature	<input type="checkbox"/>	<input type="checkbox"/>
	b) cleaning parts or products by flowing liquids (cleanser, solvents) like in a shower or water-fall.	<input type="checkbox"/>	<input type="checkbox"/>
	c) first material recycling of plastic or wood, then thermal utilisation.	<input type="checkbox"/>	<input type="checkbox"/>
	d) using dirty, used cleaning liquids (cleaning bath, solvents) for pre-cleaning, and clean, new cleaning liquids for the final cleaning	<input type="checkbox"/>	<input type="checkbox"/>
28. Cleaner production means:	a) Design of resource efficient products with e.g. low energy consumption	<input type="checkbox"/>	<input type="checkbox"/>
	b) Optimisation of production processes to minimise waste and emissions.	<input type="checkbox"/>	<input type="checkbox"/>
	c) Optimisation of production processes to maximise resource efficiency.	<input type="checkbox"/>	<input type="checkbox"/>
	d) Optimisation of production processes to minimise the efforts for end-of-pipe-technique (filters, waste and wastewater treatment)	<input type="checkbox"/>	<input type="checkbox"/>
	e) Implement filters for flue gas treatment to reduce NOx and SO2 or filters for waste water treatment.	<input type="checkbox"/>	<input type="checkbox"/>

Question	possible answers	correct	wrong
29. Cleaner production is	a) applicable to big companies of the metal and chemical sector only and not suitable for SMEs.	<input type="checkbox"/>	<input type="checkbox"/>
	b) expensive, because the company has to buy new machines.	<input type="checkbox"/>	<input type="checkbox"/>
	c) reducing the amounts and pollutant load of wastes, waste water and emissions.	<input type="checkbox"/>	<input type="checkbox"/>
	d) causing high investments in filters like flue gas and waste water treatment plants	<input type="checkbox"/>	<input type="checkbox"/>
	e) consisting of simple, promptly executable organisational measures up to the modifying or replacement of the existing manufacturing process	<input type="checkbox"/>	<input type="checkbox"/>
30. Typical Cleaner Production measures are:	a) specific personnel education and motivation of employees	<input type="checkbox"/>	<input type="checkbox"/>
	b) skipping a process or service, which is not needed	<input type="checkbox"/>	<input type="checkbox"/>
	c) reduction of rejects	<input type="checkbox"/>	<input type="checkbox"/>
	d) change of input material, additives, etc. (e.g. less hazardous substances)	<input type="checkbox"/>	<input type="checkbox"/>
	e) separate waste collection in the company	<input type="checkbox"/>	<input type="checkbox"/>
31. Typical Cleaner Production measures for compressed air are:	a) fewer bendings in the pipes	<input type="checkbox"/>	<input type="checkbox"/>
	b) smaller diameter of the pipes	<input type="checkbox"/>	<input type="checkbox"/>
	c) higher pressure	<input type="checkbox"/>	<input type="checkbox"/>
	d) no or less leakages	<input type="checkbox"/>	<input type="checkbox"/>
32. Typical processes in metal working companies are	a) Mechanical Processes (Cutting like Milling, Turning, Drilling, Sawing, Grinding)	<input type="checkbox"/>	<input type="checkbox"/>
	b) Painting of parts	<input type="checkbox"/>	<input type="checkbox"/>
	c) Printing and dyeing of parts	<input type="checkbox"/>	<input type="checkbox"/>
	d) Electroplating of parts	<input type="checkbox"/>	<input type="checkbox"/>
	e) Cleaning of parts	<input type="checkbox"/>	<input type="checkbox"/>
33. In mechanical cutting processes cutting liquids are used to	a) keep the workpiece at a stable temperature	<input type="checkbox"/>	<input type="checkbox"/>
	b) prevent rust on machine, parts and cutters	<input type="checkbox"/>	<input type="checkbox"/>
	c) maximise the life of the cutting tip.	<input type="checkbox"/>	<input type="checkbox"/>
	d) remove paint and dirt from the metal parts.	<input type="checkbox"/>	<input type="checkbox"/>
	e) remove the metal chips.	<input type="checkbox"/>	<input type="checkbox"/>
34. Typical Cleaner Production measures to extend the operating life of Cutting Liquids (CL) are	a) Use aqueous cleansers instead of solvents	<input type="checkbox"/>	<input type="checkbox"/>
	b) Avoidance of tramp oil and dirt impact on the CL	<input type="checkbox"/>	<input type="checkbox"/>
	c) Regular ventilating or circulating of CL esp. on weekends	<input type="checkbox"/>	<input type="checkbox"/>
	d) Use of skimming, filtration and/or separation systems for cleaning the CL	<input type="checkbox"/>	<input type="checkbox"/>
	e) Use HVLP (high volume, low pressure) spray guns	<input type="checkbox"/>	<input type="checkbox"/>

Question	possible answers	correct	wrong
35. Typical Cleaner Production measures for Spray Painting are	a) Mix only paint quantities needed	<input type="checkbox"/>	<input type="checkbox"/>
	b) Work dust-free and pre-inspect work pieces before painting to prevent processing of rejects	<input type="checkbox"/>	<input type="checkbox"/>
	c) Reduce the spray pressure as much as possible	<input type="checkbox"/>	<input type="checkbox"/>
	d) Spray at a 90-degree angle and with fixed distance	<input type="checkbox"/>	<input type="checkbox"/>
	e) Control coating thickness and try always to get a high coating thickness.	<input type="checkbox"/>	<input type="checkbox"/>
36. Typical Cleaner Production measures for Galvanisation are	a) Skipping the cleaning and rinsing baths between the different process baths like pickling and galvanisation	<input type="checkbox"/>	<input type="checkbox"/>
	b) Minimise oil, rust and dirt on the work pieces	<input type="checkbox"/>	<input type="checkbox"/>
	c) Pre-inspect work pieces to prevent processing of rejects	<input type="checkbox"/>	<input type="checkbox"/>
	d) reduce the carry-over of one process bath to another	<input type="checkbox"/>	<input type="checkbox"/>
	e) Keep permanent minimum concentrations of metals and chemicals in the process baths by continuous minimum dispensing of chemicals	<input type="checkbox"/>	<input type="checkbox"/>
37. Typical Cleaner Production measures in Textile Industry are	a) Selection and use of better biodegradable or bioeliminable chemicals	<input type="checkbox"/>	<input type="checkbox"/>
	b) energy savings through e.g. heat-insulation of pipes, valves, tanks, machines	<input type="checkbox"/>	<input type="checkbox"/>
	c) recover and re-use alkali from mercerising rinsing water (in big companies)	<input type="checkbox"/>	<input type="checkbox"/>
	d) use high-fixation, low-salt reactive dyes	<input type="checkbox"/>	<input type="checkbox"/>
	e) Adoption of countercurrent washing (eg. reuse the least contaminated water from the final wash for the next-to-last wash)	<input type="checkbox"/>	<input type="checkbox"/>
38. Profitability Analysis	a) Is never needed for Cleaner Production measures, because they always save money	<input type="checkbox"/>	<input type="checkbox"/>
	b) Is given by one single complicated formula defined in VDI GL 3800 and ISO 14088	<input type="checkbox"/>	<input type="checkbox"/>
	c) Consists of different approaches: simple calculating methods for simple CP measures and more advanced methods for CP measures with high investments	<input type="checkbox"/>	<input type="checkbox"/>