Final Exam

Continuing Education Course #385

Sustainability Comparisons for All Engineers

1. Sustainability strives to do which of the following?
   - ○ a. Minimize cost above all else
   - ○ b. Meet the needs of the present without compromising the ability to meet future needs
   - ○ c. Maintain things the same

2. Which of the following are the three categories of sustainability?
   - ○ a. Economic, Environmental, Social
   - ○ b. Earnings, Environment, Project
   - ○ c. Past, Present, Future

3. What is the purpose of a Life Cycle Assessment?
   - ○ a. Compute the total cost of ownership
   - ○ b. Quantify the social impact
   - ○ c. Determine the long term environmental impact

4. Which of the following are nonrenewable forms of energy?
   - ○ a. Geothermal, plant matter, tidal power
   - ○ b. Geothermal, fossil fuels, methane
   - ○ c. Nuclear power, coal, petroleum, natural gas

5. What is the precautionary principle?
   - ○ a. Always use caution during design
   - ○ b. Precautionary measures should be taken even if a cause and effect relationship are not fully established
   - ○ c. Precautionary measures should align with known threats

6. Which are greenhouse gases?
   - ○ a. water vapor, carbon dioxide, methane
   - ○ b. carbon dioxide, methane, nitrogen
   - ○ c. carbon dioxide, nitrogen, helium

7. LEED certification applies to which items?
   - ○ a. Buildings and facilities
   - ○ b. Products and materials
   - ○ c. Processes and systems

8. Which of the following is NOT a common approach to comparing alternatives?
   - ○ a. Advantages Table
   - ○ b. Qualitative Comparison
   - ○ c. Single-Criteria Scoring

9. A table that lists criteria with terms "Good, Fair, and Poor" is an example of which approach?
- a. Advantages Table
- b. Qualitative Comparison
- c. Quantitative Comparison

10. How is Multi-Criteria Scoring different from other comparison approaches?
- a. More than one criteria is used
- b. A final numerical score is given for each alternative
- c. Results are shown in a table

11. Which of the following are common normalization techniques?
- a. Internal, external, and existing
- b. Internal, external, and reference
- c. Internal, external, and standard

12. At what step should indicators be selected?
- a. After normalizing the indicator values
- b. After calculating the indicator values
- c. After gaining backgroud information on the alternatives

13. Indicators should be chosen from which categories?
- a. Economic, Environmental, Social
- b. Standards, References, Project
- c. Past, Present, Future

14. Which of the following indicators is in the Environmental category?
- a. Litigation Risk
- b. Water Consumption
- c. Safety

15. Which of the following indicators is in the Economic category?
- a. Lifecylce Cost
- b. Energy Consumption
- c. Partnership Potential

16. Which of the following indicators is in the Environmental category?
- a. Life Span
- b. Greenhouse Gas Emmissions
- c. Employee Productivity

17. Which of the following indicators is in the Social category?
- a. Operating Cost
- b. Stormwater Management
- c. Aesthetics

18. Which of the following is NOT true for selecting indicators?
- a. Economic indicators are the most difficult to quantify.
- b. Indicators should reflect the significant sustainability impacts
- c. Indicators should be independent of each other.

19. Which of the following is NOT a common technique for determining weight factors?

- ○ a. Analytic Hierarchy Process
- ○ b. Random selection
- ○ c. Give equal weight for each of the three categories

20. What is the goal of a sensitivity analysis?
- ○ a. Check how sensitive the stakeholders are to design changes
- ○ b. Have another engineer review the calculations
- ○ c. See if small changes in the calculations can result in a different winner