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Continuing Education Course #602
What Every Engineer Should Know About
Engineering Economic Analysis, Part II

1. A **rational decision** is made when the marginal benefit of an action is greater than or equal to the marginal cost.
 a. True
 b. False
2. Marginal costs refer to the change in total costs per unit change in output.
 a. True
 b. False
3. In marginal cost, the focus is on the increased total cost that will arise from the production of one more unit of output
 a. True
 b. False
4. Because decisions affect a company or an individual's reality, they are often a simplification of reality because of the difficulty of conceptualizing and contextualizing the choice situation inherent in the complexity and high dimensionality of the reality space
 a. True
 b. False
5. Marginal benefit generally increases as consumption increases
 a. True
 b. False
6. The opportunity cost of a choice is the next best alternative not taken.
 a. True
 b. False
7. Which of the following is true about Rational decision making
 a. Rational decisions are emotional or random decisions.
 b. To choose rationally is to choose in an explainable way to only the decision maker
 c. Rational decision making is NOT different from intuitive decision making.
 d. Because it uses logic, rational decision-making most often follows an identifiable path or process to arrive at a decision
8. There are several ways to select the best alternative from a set of viable alternatives such as
 a. Experience, Experimentation, Research and Analysis
 b. Documentation, Experimentation, and Research and Analysis
 c. Experimentation, Analysis, and Computation
 d. None of the above

9. There are usually many possible alternatives for any given problem. One option that must be considered in each analysis is the "do nothing" alternative
- a. True
 - b. False
10. Decision aids are methods, techniques, tools, and models that have the promise as well as the potential to enhance the effectiveness and/or efficacy of the decision.
- a. True
 - b. False
11. Mutually exclusive projects are projects where more than one project can be selected out of all the possible investments or projects
- a. True
 - b. False
12. Non-mutually exclusive projects are those where an investor has different alternative proposals or projects available, but more than one project can be selected consistent with capital or budget constraints.
- a. True
 - b. False
13. With respect to cash flows, an independent project is one whose cash flows have no impact on the acceptance or rejection of other projects
- a. True
 - b. False
14. A dependent project is one whose acceptance or selection does NOT affect the occurrence or the selection of the other projects.
- a. True
 - b. False
15. Which method is the preferred analytical tool when analyzing mutually exclusive projects because of its more conservative or realistic reinvestment rate assumptions
- a. Internal rate of return (IRR)
 - b. Net Present value (NPV)
 - c. Pay Back Period
 - d. a and b
16. Dependent projects have interrelated project dependencies in their activities or tasks. Which of the following are common types of dependencies:
- a. finish one set of tasks-then- start the next set (finish-to-start)
 - b. finish one set -then-finish the next set (finish-to-finish)
 - c. start the set of tasks-then- start the next set (start-to-start)
 - d. all of a, b, c
17. Which of the following is true of the Time Value of Money (TVM)
- a. TVM provides the assurance that any amount of money is worth less the earlier it is received.
 - b. TVM provides the assurance that any amount of money is worth more the earlier it is received.
 - c. TVM provides the assurance that any amount of money is worth the same, the earlier it is received.
 - d. None of the above
18. At the most basic level, the time value of money demonstrates that, all things being equal, it is better to have money later rather than now.

- a. True
- b. False

19. An investment requires a deposit of \$1,000 for 5 years at an interest rate of 10% compounded annually. What is the compound interest factor?

- a. 0.5735
- b. 0.7623
- c. 0.9738
- d. 0.6105

20. An investment requires a deposit of \$1,000 for 5 years at an interest rate of 10% compounded annually. What is the compound interest?

- a. \$610.51
- b. \$762.32
- c. \$573.50
- d. \$973.82

Questions 21-27.

The savings account policy of a bank says as follows: "12 % interest rate compounded monthly." Assume the amount the potential customer wants to deposit initially is \$10,000 and the duration is one year.

21. How many interest periods, m , are there?

- a. $m = 6$
- b. $m = 24$
- c. $m = 12$
- d. $m = 9$

22. What is the interest rate, i , in the first month

- a. $i = 12\%$
- b. $i = 1\%$
- c. $i = 1.2\%$
- d. $i = 0.1\%$

23. How much is the future amount, F , at the end of the first month?

- a. $F = \$10,000$
- b. $F = \$10,200$
- c. $F = \$10,100$
- d. $F = \$10,010$

24. How much interest was accrued in the first month?

- a. \$120
- b. \$1,000
- c. \$10
- d. \$100

25. What is the effective (annual) interest rate, i_a

- a. $i_a = 12\%$
- b. $i_a = 10\%$
- c. $i_a = 12.68\%$
- d. $i_a = 120\%$

26. How much is the future amount, F , at the end of the year?

- a. $F = \$10,200$
- b. $F = \$10,000$
- c. $F = \$11,100$
- d. $F = \$11,268$

27. How much interest was accrued in the first year?

- a. \$1,268
- b. \$1,100
- c. \$1,101
- d. \$1,010

28. In the incremental ROR analysis for multiple mutually exclusive alternatives, if the incremental ROR (or IRR) is equal to or exceeds the MARR, the "Challenger" is selected and becomes the "Defender" for the next round of analysis.

- a. True
- b. False

29. When performing the "Incremental ROR analysis" of multiple mutually exclusive alternatives, the first step is to order all the alternatives from the largest to the smallest initial investment.

- a. True
- b. False

30. When an incremental rate of return analysis is conducted correctly, the alternative identified as best by the present worth method will also be identified as best by the incremental ROR analysis

- a. True
- b. False

31. When only one alternative can be selected from those available, the alternatives are said to be mutually exclusive

- a. True
- b. False

32. In evaluating independent alternatives, each alternative is compared against the "Do Nothing" alternative

- a. True
- b. False

33. The External Rate of Return (ERR) is the equivalent rate at which the present worth of the investment expenditure is considered to be invested to yield a future worth equal to the future worth of the revenues invested at the (MARR) rate

- a. True
- b. False

34. The ERR is the ROR on a project where any excess cash from a project is assumed to earn interest at a pre-determined explicit rate, usually the Minimum Acceptable ROR (MARR).

- a. True
- b. False

35. We have a case of multiple rates of return MIRR when more than one rate of return from the same project will result in the net present value (NPV) being greater than zero

- a. True
- b. False

36. The Profitability Index (PI) is the ratio of payoffs to investment of a proposed project and represents the relationship between the costs and benefits of a proposed project. A higher PI means that a project will be considered

more attractive. Which of the following is true?

- a. If $PI > 1$, then the project is economically viable
- b. If $PI < 1$, then the project is economically viable
- c. If $PI = 1$, then the project will not break even
- d. none of the above is true

37. In a non-discounted Payback Period Analysis (PA) an initial investment of \$180,000 generates cash inflows of \$20,000 per year for two years and then generates cash inflows of \$30,000 per year for six additional years. That is [\$20k (y1) \$20k (y2) \$30k(y3) \$30k(y4) 30k(y5) \$30k(y6) \$30k(y7) \$30k(y8)]

What is the payback period?

- a. 5 years and 9 months
- b. 6 years and 8 months
- c. 7 years and 8 months
- d. 8 years and 0 months

38. Coping with uncertainty is one of the generally accepted ways to deal with uncertainty. Which of the following is (are) appropriate coping mechanisms

- a. adaptation
- b. diversification
- c. imitation
- d. flexibility
- e. all are appropriate coping mechanisms

39. Which of the following about decision under certainty is NOT true?

- a. Decision under certainty is typically one in which accurate, objective/measurable, and reliable types of information are available to the decision maker.
- b. The outcome of the alternatives is well known.
- c. The future outcome is highly and reliably predictable.
- d. The alternatives are unknown and are not transparent

40. When the mutually exclusive alternatives under consideration have only disbursements (service alternatives), the do-nothing alternative must be included so that a rate of return analysis can be conducted on the incremental cash flow

- a. True
- b. False

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