



UNIVERSITI
TEKNOLOGI
PETRONAS

FINAL EXAMINATION MAY 2024 SEMESTER

COURSE : PEB4102 - ENGINEERING ECONOMICS
DATE : 5 AUGUST 2024 (MONDAY)
TIME : 9:00 AM - 11:00 AM (2 HOURS)

INSTRUCTIONS TO CANDIDATES

1. Answer **ALL** questions in the **OMR** sheet.
2. Indicate clearly answers that are cancelled, if any.
3. Do not leave the examination hall during the exam without permission.
4. **DO NOT** open this Question Booklet until instructed.
5. **DO NOT** take the question paper out of the examination hall.

Note :

- i. There are **FIFTEEN (15)** pages in this Question Booklet including the cover page .
- ii. **DOUBLE-SIDED** Question Booklet.

1. In the power-sizing technique, what does the exponent typically represent?
 - A. The rate of inflation.
 - B. The learning curve effect.
 - C. The economy of scale for the specific type of equipment.
 - D. The anticipated profit margin.

2. How does the Learning Curve Theory impact cost estimation in manufacturing?
 - A. Costs increase linearly as production volume increases.
 - B. Costs decrease at a constant rate per unit produced.
 - C. Costs decrease exponentially as cumulative production increases due to increased efficiency.
 - D. Costs remain constant regardless of production volume.

3. Which of the following is **NOT** a typical parameter in parametric cost estimation?
 - A. Size or capacity of the equipment.
 - B. Historical cost data.
 - C. Project completion time.
 - D. Number of labour hours.

4. In which scenario is the detailed estimation method preferred over parametric estimation?
 - A. When a quick and rough estimate is needed.
 - B. When historical data is unavailable or unreliable.
 - C. When the project scope is similar to past projects.
 - D. When detailed design and specifications are available.

5. If a project manager uses the bottom-up estimation technique, what is a potential disadvantage?
 - A. It may be less accurate than other methods.
 - B. It typically requires less time to complete.
 - C. It might underestimate the project duration and cost.
 - D. It is more time-consuming and may overlook indirect costs.

6. Why is it important to differentiate between fixed and variable costs during cost estimation?
- A. To ensure all costs are equally distributed.
 - B. To accurately predict how costs will change with production levels.
 - C. To allocate overhead costs precisely.
 - D. To minimize both types of costs simultaneously.
7. What is the primary purpose of a cost index in cost estimation?
- A. To forecast future costs based on current trends.
 - B. To adjust historical costs to present or future costs.
 - C. To determine the fixed costs of a project.
 - D. To calculate the marginal cost of production.
8. In life-cycle cost analysis, which of the following costs would **NOT** typically be included?
- A. Initial capital costs
 - B. Operating and maintenance costs
 - C. Disposal or decommissioning costs
 - D. Opportunity costs of capital
9. Which cost estimation technique is best suited for evaluating the trade-offs between different design options early in the project lifecycle?
- A. Detailed estimation
 - B. Parametric estimation
 - C. Analogous estimation
 - D. Life-cycle cost analysis

10. When analysing the optimal volume for profit maximization, what does the break-even point represent?
- A. The volume at which total costs are minimized.
 - B. The volume at which total revenue equals total cost, resulting in zero profit.
 - C. The volume at which variable costs are covered.
 - D. The volume at which fixed costs are maximized.
11. Why is the concept of incremental cost used in decision-making?
- A. To determine the total cost of producing all units.
 - B. To compare the additional costs of producing one more unit to the additional revenue it generates.
 - C. To allocate fixed costs across units produced.
 - D. To calculate the average cost per unit.
12. Which of the following statements about sunk costs is true?
- A. Sunk costs should be considered when making future economic decisions.
 - B. Sunk costs represent the fixed costs that do not change with production levels.
 - C. Sunk costs are past expenditures that cannot be recovered and should not affect future decisions.
 - D. Sunk costs include all variable costs incurred to date.
13. Which of the following is **NOT** a characteristic of variable costs?
- A. Variable cost change in total with changes in the level of production.
 - B. Variable cost typically associated with direct materials and labour.
 - C. Variable cost remains constant per unit of production.
 - D. Variable cost includes costs such as rent and salaries.

14. Which of the following best describes the main objective of engineering economics?
- A. Maximizing technological efficiency regardless of cost.
 - B. Minimizing costs at all times.
 - C. Balancing technical and financial considerations to make informed decisions.
 - D. Focusing only on the technical aspects of engineering projects.
15. Why is the time value of money a critical concept in engineering economic analysis?
- A. It helps in calculating the future value of a project accurately.
 - B. It ensures that all costs are inflated to match future prices.
 - C. It accounts for the fact that money has different values at different points in time.
 - D. It focuses on the historical cost data for better accuracy.

TABLE Q16 shows the cash flow of Project A. Please refer to TABLE Q16 for Questions 16 to 21.

TABLE Q16

Year	USD
0	-20,000.00
1	4,000.00
2	4,000.00
3	4,000.00
4	4,000.00
5	4,000.00
6	4,000.00
7	4,000.00

16. What is the Net Present Value (NPV, PW) when the interest rate is 6%?
- A. \$ 2,130
 - B. \$ 2,330
 - C. \$ 2,530
 - D. \$ 2,730
17. What is the Net Present Value (NPV, PW) when the interest rate is 8%?
- A. \$ 825
 - B. \$ 1,025
 - C. \$ 1,225
 - D. \$ 1,425
18. What is the Net Present Value (NPV, PW) when the interest rate is 11%?
- A. - \$ 551
 - B. - \$ 751
 - C. - \$ 951
 - D. - \$ 1,151

19. What is the Future Worth (Future Value) at year 7 when the interest rate is 6%?
- A. \$ 3,303
 - B. \$ 3,503
 - C. \$ 3,703
 - D. \$ 3,903
20. What is the Future Worth (Future Value) at year 7 when the interest rate is 8%?
- A. \$ 1,215
 - B. \$ 1,415
 - C. \$ 1,615
 - D. \$ 1,815
21. What is the Future Worth (Future Value) at year 7 when the interest rate is 11%?
- A. - \$ 1,990
 - B. - \$ 2,190
 - C. - \$ 2,390
 - D. - \$ 2,590

TABLE Q22 shows the cash flow of Project B. Please refer to TABLE Q22 for Questions 22 to 27.

TABLE Q22

Year	USD
0	-8,000.00
1	2,000.00
2	1,000.00
3	3,000.00
4	4,000.00

22. What is the Net Present Value (NPV, PW) when the interest rate is 5%?
- A. \$ 494
 - B. \$ 694
 - C. \$ 894
 - D. \$ 1,094
23. What is the Net Present Value (NPV, PW) when the interest rate is 7%?
- A. \$ 243
 - B. \$ 443
 - C. \$ 643
 - D. \$ 843
24. What is the Net Present Value (NPV, PW) when the interest rate is 9%?
- A. \$ 473
 - B. \$ 273
 - C. \$ 73
 - D. -\$ 173

25. What is the Future Worth (Future Value) at year 7 when the interest rate is 5%?
- A. \$ 776
 - B. \$ 976
 - C. \$ 1,176
 - D. \$ 1,376
26. What is the Future Worth (Future Value) at year 7 when the interest rate is 7%?
- A. \$ 190
 - B. \$ 390
 - C. \$ 590
 - D. \$ 790
27. What is the Future Worth (Future Value) at year 7 when the interest rate is 9%?
- A. \$ 116
 - B. - \$ 116
 - C. - \$ 316
 - D. - \$ 516
28. A study period is the _____.
- A. year of challenger was bought
 - B. year of defender was bought
 - C. time period over which alternatives are compared
 - D. time period over which investments are made
29. There are seven fundamental principles of engineering economy. Which of the following below is **NOT** among the principles?
- A. Develop the alternatives
 - B. Focus on the differences
 - C. Create alternatives
 - D. Use a consistent viewpoint

30. Use a MARR of 10% and useful life of 5 years to select between the investment alternatives below. Which of the statement is **TRUE**?

Hint: $(PV)_n = \text{cash flow}/(1 + r)^n$

	Alternative	
	X	Y
Capital investment	-\$150,00	-\$225,00
Annual revenues less Expenses	\$85,00	\$90,00

- A. $PW_X = \$ 147,235$
- B. $PW_Y = \$ 87,190$
- C. A is better economically
- D. B is better economically
31. A study period is the time period over which mutually exclusive alternatives (MEAs) are compared and it must be appropriate for the decision situation. Another term for study period is _____.
- A. revenue time
- B. planning horizon
- C. service duration
- D. investment
32. Which of the following statement is **FALSE** about service project?
- Project revenues depend on the choice of alternatives.
 - Project revenues do not depend on the choice of alternatives.
 - Revenue and cost streams vary with choice of alternatives.
 - Fixed (or constant) revenues for all alternatives.
- A. i and iii
- B. i and iv
- C. ii and iii
- D. ii and iv

33. Which of the following statement is **FALSE** about revenue?
- i. Project revenues depend on the choice of alternatives.
 - ii. Project revenues do not depend on the choice of alternatives.
 - iii. Revenue and cost streams vary with choice of alternatives.
 - iv. Fixed (or constant) revenues for all alternatives.
- A. i and iii
B. i and iv
C. ii and iii
D. ii and iv
34. When conducting mutually exclusive alternative (MEA), alternative that requires a minimum investment of capital and produces satisfactory functional results will _____.
- A. not be chosen
B. be chosen
C. be brought as a meeting agenda
D. be ignored
35. The statement below refers to _____.
- “The period of time (years) that yields the minimum equivalent uniform annual cost (EUAC) of owning and operating as asset”
- A. Ownership Life
B. Physical Life
C. Economic Life
D. Useful Life
36. For investment alternatives, the PW of all cash flows must be _____. This is at the given MARR to be attractive.
- A. large
B. small
C. positive
D. negative

37. For cost alternatives, the PW of all cash flows must be _____.
- A. large
 - B. small
 - C. positive
 - D. negative
38. According to asset evaluation, what could we do with existing asset?
- i. Keep it
 - ii. Abandon it (do not replace)
 - iii. Replace it, but keep it for backup purposes
 - iv. Dispose of it, and replace it with another
- A. i, ii and iii
 - B. i and ii
 - C. i, iii and iv
 - D. **ALL** the above
39. _____ is the term used for a new machine.
- A. Asset
 - B. Advanced
 - C. Challenger
 - D. Technology
40. Which of the following is **NOT** the reason to consider change?
- i. Physical impairment (deterioration) of previous asset
 - ii. Altered/change/new requirements
 - iii. Budget planning
 - iv. New and improved technology is now available
- A. i and ii
 - B. iii only
 - C. i, iii and iv
 - D. iv only

41. Given:

- Original investment = \$10,000
- Current market value = \$4,000
- Repair cost made in the past = \$2,000

What is the sunk cost?

- A. \$2,000
- B. \$4,000
- C. \$6,000
- D. \$8,000

42. Which of the following is the engineering economic principles?

- A. Assessing alternatives based on their similarities.
- B. Using multiple viewpoints when making evaluations.
- C. Making uncertainties implicit.
- D. **ALL** the above.

43. A period for an asset to be kept in productive service is called _____.

- A. Sunk Life
- B. Organic Life
- C. Non-useful Life
- D. Useful Life

44. Which of the following is **NOT** a replacement issue?

- A. Challenger's ownership life
- B. Sunk cost
- C. Outsider viewpoint
- D. Economic life of the asset

45. An asset will be abandoned when _____.

- A. PW is a maximum
- B. PW is a minimum
- C. sunk cost is a minimum
- D. investment is a maximum

46. What is the definition of Mutually Exclusive Alternative (MEA)?
- A. When one of several alternatives that meet the same need is selected, and the others will be rejected.
 - B. When one alternative that meets the need is selected.
 - C. When two of several alternatives that meet the same need are selected, and the others will be rejected.
 - D. When several alternatives do not provide useful data for economic comparison.
47. Which of the following are components of the capital budgeting process?
- i. Performance review
 - ii. Identifying investment opportunities
 - iii. Collecting the investment proposals
 - iv. Implementation
- A. i, ii, and iii
 - B. i, iii, and iv
 - C. i, ii, and iv
 - D. i, ii, iii, and iv
48. Which of the following is **NOT** a good strategy when identifying investment opportunities as a company?
- A. Regular monitoring of the external environment and factors affecting the business.
 - B. Identifying opportunities with high expected sales, regardless of possible external risks.
 - C. Defining corporate strategy based on the organization's SWOT analysis.
 - D. Focusing on opportunities with demonstrated return of investment that meet specific sales target.

49. SWOT analysis is a framework used to evaluate a company's competitive position and to develop strategic planning. SWOT stands for:
- A. Sensitivity, Weaknesses, Obstacles, Threads
 - B. Strategy, Weaknesses, Openings, Threats
 - C. Strengths, Weaknesses, Opportunity, Threads
 - D. **NONE** of the above
50. Which of the following statements are correct about the gathering of the investment proposals?
- i. Proposals are vetted for requirements and standards outlined by the investing authority.
 - ii. Screened and selected proposals are categorized based on their type and objectives.
 - iii. Budgeting and control procedures can be eased by classification of the projects.
- A. i and ii
 - B. i and iii
 - C. i, ii and iii
 - D. **NONE** of the above

- END OF PAPER -

