Faculté des sciences sociales | Faculty of Social Sciences
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Département de science économique
Department of Economics

# ENGINEERING ECONOMICS

**ECO 1192C**

## White Assignment

**C.Théoret** **Winter 2017**

## A. Assignment Instructions

1. **Consult the Excel assignment allocation file on Blackboard Learn for your specific assignment.**
2. **Your score for completing a different assignment will be zero.**
3. **A WHITE Scantron (answer sheet) is required for your answers.**
4. **The "Course Code" for this assignment on the answer sheet is ECO1192CW. Do not forget to darken the appropriate ovals.**
5. **Answer sheets will be distributed and collected at the beginning of the February 16th lecture.**
6. **Late answer sheets will be most definitely rejected.**
7. **Please note that the last answer for each question is implicitly "None of these answers" unless the answers provided cover all possibilities (e.g., Answers a) True; b) False).**

***Example:*** ***If the answers provided for a question are a), b), c) and d) seem incorrect to you, please add the answer "e) None of these answers" on the answer sheet. Of course, the alphabetic character of the answer that you add will depend on the alphabetic character of the last answer provided (i.e., it could be c), d) or e)).***

## B. Problems and Questions

**A company is planning an advertising campaign to promote the sale of a new product but is undecided as to the geographic coverage of the campaign. The key parameters of the three advertising campaigns are provided below.**

| Project Parameters | Local | Regional | Provincial |
|---|---|---|---|
| 1. Initial Cost ($) | 300,000 | 500,000 | 900,000 |
| 2. Revenues ($) | 400,000 at EOY1 increasing annually by 2% thereafter. | 600,000 at EOY1 increasing annually by 10,000 thereafter. | 850,000 at EOY1 increasing annually by 4% thereafter. |
| 3. Operating Costs ($) | 309,000 at EOY1 increasing annually by 3% thereafter. | 465,000 at EOY1 increasing annually by 5,000 thereafter. | 710,000 at EOY1 increasing annually by 50,000 thereafter. |
| 4. End-of-life salvage value ($) | 0 | -10,000 | -80,000 |
| 5. Useful life (years) | 5 | 5 | 10 |

- **Industry Standard = 4 years**
- **MARR = 10%**

1. A Local campaign's Net Present Worth (NPW) (rounded to the nearest $100) is
   a) $34,900; b) $35,200; c) $35,500; d) $36,900

2. A Regional campaign's NPW (rounded to the nearest $100) is
   a) $38,600; b) $38,900; c) $39,700; d) $39,900.

3. If the Regional campaign was repeated for a second five-year period (i.e., years 6 to 10; same parameter values as in the first cycle), its NFW (rounded to the nearest $100) after 10 years would be
   a) $153,400; b) $163,800; c) $167,600; d) $169,900.

4. After 20 years (it was repeated several times), a Provincial campaign's Annual Equivalent Worth (AEW) (rounded to the nearest $100) is
   a) $12,700; b) $13,900; c) $14,000; d) $14,300.

5. The Regional campaign's AEW (rounded to the nearest $100) is
   a) $9,800; b) $10,300; c) $10,500; d) $11,100.

6. The best campaign based on the NPW method is

a) Local; b) Regional; c) Provincial.

7. Based on the simple payback method, a Local campaign's recovery period (nearest half or full year) is
a) 2.5 years; b) 3.0; c) 3.5; d) 4.0.

8. Based on the simple payback method, a Provincial campaign's "project balance" after 2 years (rounded to the nearest $100) is
a) $-649,900; b) $-636,000; c) $-622,300; d) $-618,600.

9. Based on the discounted payback method, the recovery period (nearest half or full year) of the Local campaign is
a) 4.5 years; b) 5.0; c) 6.0; d) 6.5.

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10. Based on the discounted payback method, the Provincial campaign's "project balance" after 3 years (rounded to the nearest $100) is
a) $-659,600; b) $-698,400; c) $-742,100; d) $-757,700.

11. Based on the simple payback method, the Regional campaign's "project balance" after 3 years (rounded to the nearest $100) is
a) $-75,700; b) $-80,000; c) $-85,100; d) $-88,300.

12. The benefit/cost (B/C) ratio (second decimal; no rounding) of the Provincial campaign is
a) 0.97; b) 1.01; c) 1.06; d) 1.08.

13. The benefit/cost (B/C) ratio (second decimal; no rounding) of the Regional campaign is
a) 1.01; b) 1.05; c) 1.09; d) 1.12.

14. The incremental B/C ratio ((second decimal; no rounding) between the Local and the Regional campaigns is
a) 0.88; b) 1.00; c) 1.06; d) 1.08.

15. The incremental B/C ratio (second decimal; no rounding) between the Regional and Provincial campaigns is
a) 0.96; b) 1.00; c) 1.04; d) 1.08.

16. The Provincial campaign's Internal Rate of Return (IRR) (second decimal; no rounding) is
a) 11.55%; b) 11.96%; c) 12.13%; d) 12.29%.

17. The Regional campaign's Internal Rate of Return (IRR) (second decimal; no rounding) is
a) 12.88%; b) 12.97%; c) 13.02%; d) 13.34%.

18. The incremental Internal Rate of Return (ΔIRR) between the Local and Provincial campaigns (second decimal; no rounding) is
a) 10.44%; b) 10.70%; c) 10.78%; d) 10.89%.

19. A Local campaign's External Rate of Return (ERR) (second decimal; no rounding) is
a) 12.10%; b) 12.48%; c) 12.78%; d) 12.95%.

20. The Regional campaign's External Rate of Return (ERR) (second decimal; no rounding) is
a) 11.70%; b) 11.89%; c) 11.95%; d) 12.22%.

21. The incremental External Rate of Return (ΔERR) between the Local and Provincial campaigns (second decimal; no rounding) is
a) 10.11%; b) 10.22%; c) 10.49%; d) 10.79%.

22. The incremental External Rate of Return (ΔERR) between the Regional and Provincial campaigns (second decimal; no rounding) is
a) 10.52%; b) 10.69%; c) 10.88%; d) 11.13%.

23. If the company's advertising budget is $1,000,000, which geographic campaign(s) should it consider assuming that campaigns are geographically independent?
a) Provincial only; b) Local and Regional; c) Local and Provincial;
d) Regional and Provincial.

24. Luigi is planning a major vacation in exactly 5 years with a $30,000 price tag. He intends to deposit money every three months in a newly created vacation savings account that pays 6% compounded monthly. The first deposit is planned for 3 months from today.

Which of the following answers would provide Luigi with the required quarterly deposit to reach his $30,000 goal in exactly 5 years?
a) A = 30,000(A/F,6%,5)
b) A = 30,000(A/F,{6%/12},5)
c) A = 30,000(A/F,{6%/12},20)
d) A = 30,000(A/F,i%,20) where i% = $(1+\{0.06/12\})^{(12/4)}$ -1

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| | | DISCRETE CASH FLOWS AND DISCRETE COMPOUNDING | | | | | | | i% = | k% = | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 10.00 | % | DISCRETE RATE OF INTEREST | | | | | 0.1000 | 0.1200 | |
| | | | | | | | | | | | |
| n | (F/P,i%,n) | (P/F,i%,n) | (A/P,i%,n) | (P/A,i%,n) | (A/F,i%,n) | (F/A,i%,n) | (A/G,i%,n) | (P/G,i%,n) | (F/G,i%,n) | (P/C,i,k,N) | (P/C,i,k,N) |
| | | | | | | | | | | i ≠ k | i=k |
| 1 | 1.1000 | 0.9091 | 1.1000 | 0.9091 | 1.0000 | 1.0000 | 0.0000 | 0.0000 | 0.0000 | 0.9091 | 0.9091 |
| 2 | 1.2100 | 0.8264 | 0.5762 | 1.7355 | 0.4762 | 2.1000 | 0.4762 | 0.8264 | 1.0000 | 1.8347 | 1.8182 |
| 3 | 1.3310 | 0.7513 | 0.4021 | 2.4869 | 0.3021 | 3.3100 | 0.9366 | 2.3291 | 3.1000 | 2.7772 | 2.7273 |
| 4 | 1.4641 | 0.6830 | 0.3155 | 3.1699 | 0.2155 | 4.6410 | 1.3812 | 4.3781 | 6.4100 | 3.7367 | 3.6364 |
| 5 | 1.6105 | 0.6209 | 0.2638 | 3.7908 | 0.1638 | 6.1051 | 1.8101 | 6.8618 | 11.0510 | 4.7138 | 4.5455 |
| 6 | 1.7716 | 0.5645 | 0.2296 | 4.3553 | 0.1296 | 7.7156 | 2.2236 | 9.6842 | 17.1561 | 5.7086 | 5.4545 |
| 7 | 1.9487 | 0.5132 | 0.2054 | 4.8684 | 0.1054 | 9.4872 | 2.6216 | 12.7631 | 24.8717 | 6.7215 | 6.3636 |
| 8 | 2.1436 | 0.4665 | 0.1874 | 5.3349 | 0.0874 | 11.4359 | 3.0045 | 16.0287 | 34.3589 | 7.7528 | 7.2727 |
| 9 | 2.3579 | 0.4241 | 0.1736 | 5.7590 | 0.0736 | 13.5795 | 3.3724 | 19.4215 | 45.7948 | 8.8028 | 8.1818 |
| 10 | 2.5937 | 0.3855 | 0.1627 | 6.1446 | 0.0627 | 15.9374 | 3.7255 | 22.8913 | 59.3742 | 9.8719 | 9.0909 |
| 11 | 2.8531 | 0.3505 | 0.1540 | 6.4951 | 0.0540 | 18.5312 | 4.0641 | 26.3963 | 75.3117 | 10.9605 | 10.0000 |
| 12 | 3.1384 | 0.3186 | 0.1468 | 6.8137 | 0.0468 | 21.3843 | 4.3884 | 29.9012 | 93.8428 | 12.0689 | 10.9091 |
| 13 | 3.4523 | 0.2897 | 0.1408 | 7.1034 | 0.0408 | 24.5227 | 4.6988 | 33.3772 | 115.2271 | 13.1974 | 11.8182 |
| 14 | 3.7975 | 0.2633 | 0.1357 | 7.3667 | 0.0357 | 27.9750 | 4.9955 | 36.8005 | 139.7498 | 14.3465 | 12.7273 |
| 15 | 4.1772 | 0.2394 | 0.1315 | 7.6061 | 0.0315 | 31.7725 | 5.2789 | 40.1520 | 167.7248 | 15.5164 | 13.6364 |
| 16 | 4.5950 | 0.2176 | 0.1278 | 7.8237 | 0.0278 | 35.9497 | 5.5493 | 43.4164 | 199.4973 | 16.7076 | 14.5455 |
| 17 | 5.0545 | 0.1978 | 0.1247 | 8.0216 | 0.0247 | 40.5447 | 5.8071 | 46.5819 | 235.4470 | 17.9205 | 15.4545 |
| 18 | 5.5599 | 0.1799 | 0.1219 | 8.2014 | 0.0219 | 45.5992 | 6.0526 | 49.6395 | 275.9917 | 19.1554 | 16.3636 |
| 19 | 6.1159 | 0.1635 | 0.1195 | 8.3649 | 0.0195 | 51.1591 | 6.2861 | 52.5827 | 321.5909 | 20.4128 | 17.2727 |
| 20 | 6.7275 | 0.1486 | 0.1175 | 8.5136 | 0.0175 | 57.2750 | 6.5081 | 55.4069 | 372.7500 | 21.6930 | 18.1818 |