Faculté des sciences sociales | Faculty of Social Sciences

uOttawa

Département de science économique
Department of Economics

ENGINEERING ECONOMICS

ECO 1192A

Blue Assignment

C.Théoret **Fall 2016**

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 BLUE Scantron (answer sheet) is required for your answers.**
4. **The colour of your answer sheet is identified by a short "Hi-Liter" line in its upper right-hand corner.**
5. **The "Course Code" for this assignment on the answer sheet is ECO1192AB. Do not forget to darken the appropriate ovals.**
6. **Answer sheets will be distributed and collected at the beginning of the October 18th lecture.**
7. **Late answer sheets will be most definitely rejected.**
8. **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 considering the replacement of one of its trucks. The key parameters of the three trucks under study are provided below.			
Project Parameters	**Ford**	**GM**	**Volvo**
1. Initial Cost ($)	**400,000**	**500,000**	**575,000**
2. Annual revenues ($)	**200,000 annually**	**225,000 annually**	**240,000 at EOY1 increasing annually by 2% thereafter**
3. Annual costs ($)	**75,000 annually**	**130,000 at EOY1 increasing annually by 1% thereafter**	**90,000 at EOY1 increasing annually by $1,000 thereafter**
4. End-of-life salvage value ($)	**50,000**	**30,000**	**40,000**
5. Useful life (years)	**4**	**10**	**5**
• **Industry Standard = 4 years** • **MARR = 10%**			

1. Ford's Net Present Worth (NPW) (rounded to the nearest $100) is
   a) $28,600; b) $30,400; c) $32,600; d) $32,700.

2. GM's NPW (rounded to the nearest $100) is
   a) $63,400; b) $63,700; c) $64,600; d) $64,800.

3. Volvo's Net Future Worth (NFW) (rounded to the nearest $100) after 5 years is
   a) $71,600; b) $72,700; c) $78,800; d) $78,900.

4. Ford's NFW (rounded to the nearest $1000) after 20 years (it was repeated several times) is
   a) $298,000; b) $300,000; c) $302,000; d) $304,000.

5. Volvo's Annual Equivalent Worth (AEW) (rounded to the nearest $100) over 20 years (it was repeated several times) is
   a) $11,700; b) $11,900; c) $13,900; d) $14,100.

6. The best truck based on the NFW method is
   a) Ford; b) GM; c) Volvo.

7. Based on the simple payback method, Ford's recovery period (to the nearest half or full year) is
a) 1.0; b) 1.5; c) 2.0; d) 3.5.

8. Based on the simple payback method, GM's "project balance" after 2 years (rounded to the nearest $100) is
a) $295,600; b) -$295,900; c) -$311,300; d) -$311,600.

9. Based on the discounted payback method, GM's recovery period (to the nearest half or full year) is
a) 6.5; b) 7.0; c) 8.5; d) 9.5.

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10. Based on the discounted payback method, GM's "project balance" after 2 years (rounded to the nearest $100) is
a) $-299,900; b) $-301,700; c) $-399,000; d) $-406,800.

11. Based on the simple payback method, Volvo's recovery period (rounded to the nearest half or full year) is
a) 3.0; b) 3.5; c) 4.0; d) 4.5.

12. Ford's benefit/cost (B/C) ratio (rounded to the nearest 1st decimal) is
a) 0.9; b) 1.0; c) 1.7; d) 1.9.

13. Volvo's benefit/cost (B/C) ratio (rounded to the nearest 1st decimal) is
a) 1.0; b) 1.1; c) 1.3; d) 1.4.

14. The incremental B/C ratio (rounded to the nearest 1st decimal) between the Ford and GM trucks is
a) 0.7; b) 1.0; c) 1.1; d) 1.2.

15. The incremental B/C ratio (rounded to the nearest 1st decimal) between the GM and Volvo trucks is
a) 0.7; b) 1.0; c) 1.1; d) 1.2.

16. Ford's Internal Rate of Return (IRR) (rounded to the nearest 1st decimal) is
a) 13.3%; b) 13.5%; c) 14.1; d) 14.4%.

17. GM's Internal Rate of Return (IRR) (rounded to the nearest 1st decimal) is
a) 12.1%; b) 12.8%; c) 13.0%; d) 13.3%.

18. The incremental Internal Rate of Return (ΔIRR) between the Ford and Volvo trucks (rounded to the nearest 1st decimal) is
a) 9.9%; b) 11.1%; c) 24.3%; d) 24.8%.

19. Ford's External Rate of Return (ERR) (rounded to the nearest 1st decimal) is
a) 12.0%; b) 12.3%; c) 13.1; d) 13.3%.

20. Volvo's External Rate of Return (ERR) (rounded to the nearest 1st decimal) is
a) 8.6%; b) 8.9%; c) 12.6%; d) 12.9%.

21. The incremental External Rate of Return (ΔERR) between the Ford and GM trucks (rounded to the nearest 1st decimal) is
a) 9.8%; b) 10.1%; c) 12.7%; d) 16.3%.

22. The incremental External Rate of Return (ΔERR) between the GM and Volvo trucks (rounded to the nearest 1st decimal) is
a) 8.9%; b) 9.1%; c) 9.3%; d) 10.3%.

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ENGINEERING ECONOMICS

ECO 1192A

Pink Assignment

C.Théoret **Fall 2016**

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 PINK Scantron (answer sheet) is required for your answers.**
4. **The colour of your answer sheet is identified by a short "Hi-Liter" line in its upper right-hand corner.**
5. **The "Course Code" for this assignment on the answer sheet is ECO1192AP. Do not forget to darken the appropriate ovals.**
6. **Answer sheets will be distributed and collected at the beginning of the October 18th lecture.**
7. **Late answer sheets will be most definitely rejected.**
8. **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 considering the purchase of a computer for its new office design division. The key parameters of the three computers under study are provided below.			
Project Parameters	**Alpha**	**Beta**	**Gamma**
1. Initial Cost ($)	300,000	380,000	400,000
2. Annual revenues ($)	150,000 at EOY1 decreasing annually by $3,000 thereafter.	170,000 at EOY1 increasing annually by 2,000 thereafter	200,000 at EOY1 decreasing annually by 3% (not 2%) thereafter
3. Annual costs ($)	60,000 at EOY1 increasing annually by $1,000 thereafter.	93,000 at EOY1 increasing annually by 3% thereafter	100,000 at EOY1 increasing annually by 1% thereafter
4. End-of-life salvage value ($)	30,000	0	-20,000
5. Useful life (years)	5	10	10
• Industry Standard = 4 years • MARR = 10%			

1. Alpha's Net Future Worth (NFW) (rounded to the nearest $100) after 5 years is
   a) $46,600; b) $46,900; c) $52,000; d) $52,100

2. Beta's NFW (rounded to the nearest $100) after 10 years is
   a) $175,100; b) $182,000; c) $188,900; d) $192,400.

3. Gamma's Net Present Worth (rounded to the nearest $100) is
   a) $49,800; b) $49,900; c) $55,400; d) $55,800.

4. Alpha's Annual Equivalent Worth (AEW) (rounded to the nearest $100) is
   a) $8,500; b) $8,800; c) $10,100; d) $10,300.

5. Beta's Annual Equivalent Worth (AEW) (rounded to the nearest $100) over 20 years (it was repeated several times) is
   a) $10,800; b) $11,400; c) $11,700; d) $12,300.

6. The best computer based on the NPW method is
   a) Alpha; b) Beta; c) Gamma.

7. Based on the simple payback method, Gamma's recovery period (to the nearest half or full year) is

a) 3.3 years; b) 4.2; c) 4.6; d) More than 5 years.

8. Based on the simple payback method, Beta's project balance after 2 years (rounded to the nearest $100) is
a) $-198,700; b) $-207,000; c) $-209,900; d) $-210,300.

9. Based on the discounted payback method, Gamma's recovery period (to the nearest half or full year) is
a) 7.0 years; b) 7.5; c) 9.0; d) 9.5.

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10. Based on the discounted payback method, Alpha's project balance after 2 years (rounded to the nearest $100) is
a) $-168,700; b) $-178,000; c) $-180,900; d) $-181,600.

11. Based on the discounted payback method, Gamma's project balance after 3 years (rounded to the nearest $100) is
a) $-210,700; b) $-212,000; c) $-222,900; d) $-223,300.

12. Beta's benefit/cost (B/C) ratio (rounded to the nearest 1st decimal) is
a) 0.8; b) 0.9; c) 1.1; d) 1.2.

13. Gamma's benefit/cost (B/C) ratio (rounded to the nearest 1st decimal) is
a) 0.9; b) 1.1; c) 1.2; d) 1.3.

14. The incremental B/C ratio (rounded to the nearest 1st decimal) between the Alpha and Beta computers is
a) 0.8; b) 1.0; c) 1.1; d) 1.2.

15. The incremental B/C ratio (rounded to the nearest 1st decimal) between the Beta and Gamma computers is
a) 0.3; b) 0.4; c) 0.9; d) 1.2.

16. Beta's Internal Rate of Return (IRR) (rounded to the nearest 1st decimal) is
a) 13.5%; b) 13.7%; c) 14.1; d) 14.3%.

17. Gamma's Internal Rate of Return (IRR) (rounded to the nearest 1st decimal) is
a) 13.5%; b) 13.8%; c) 13.9; d) 14.1%.

18. The incremental Internal Rate of Return (ΔIRR) between Alpha and Gamma (rounded to the nearest 1st decimal) is
a) 8.9%; b) 9.2%; c) 10.3%; d) 11.8%.

19. Alpha's External Rate of Return (ERR) (rounded to the nearest 1st decimal) is

a) 11.5%; b) 12.3%; c) 13.9; d) 14.1%.

20. Beta's External Rate of Return (ERR) (rounded to the nearest 1st decimal) is
a) 10.5%; b) 11.1%; c) 11.9%; d) 12.1%.

21. The incremental External Rate of Return (ΔERR) between Alpha and Gamma (rounded to the nearest 1st decimal) is
a) 8.9%; b) 9.2%; c) 9.9%; d) 10.2%.

22. The incremental External Rate of Return (ΔERR) between Beta and Gamma (rounded to the nearest 1st decimal) is
a) 3.9%; b) 6.2%; c) 6.7%; d) 7.0%.

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ENGINEERING ECONOMICS

ECO 1192A

White Assignment

C.Théoret **Fall 2016**

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 ECO1192AW. Do not forget to darken the appropriate ovals.**
5. **Answer sheets will be distributed and collected at the beginning of the October 18th 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 farmer is considering the purchase of a new tractor. The key parameters of the three tractors under scrutiny are provided below.

Project Parameters	Case	Massey	Kubota
1. Initial Cost ($)	250,000	280,000	330,000
2. Annual revenues ($)	300,000 at EOY1 increasing annually by 2,000 thereafter.	220,000 at EOY1 decreasing annually by 2,000 thereafter.	230,000 at EOY1 increasing annually by 1% thereafter.
3. Annual costs ($)	215,000 at EOY1 increasing annually by 2% thereafter.	145,000 at EOY1 decreasing annually by 2% thereafter.	157,000 at EOY1 increasing annually by 3% thereafter.
4. End-of-life salvage value ($)	-10,000	40,000	25,000
5. Useful life (years)	5	5	10

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

1. The Massey tractor's Net Present Worth (NPW) (rounded to the nearest $100) is
   a) $32,700; b) $34,900; c) $35,100; d) $37,900

2. The Kubota tractor's NPW (rounded to the nearest $100) is
   a) $61,100; b) $64,500; c) $65,800; d) $66,100.

3. The Kubota tractor's NFW (rounded to the nearest $100) after 10 years is
   a) $169,900; b) $171,400; c) $72,100; d) $173,600.

4. The Case tractor's Annual Equivalent Worth (AEW) (rounded to the nearest $100) after 20 years (it was repeated several times) is
   a) $7,800; b) $8,700; c) $9,600; d) $9,900.

5. The Kubota tractor's AEW (rounded to the nearest $100) is
   a) $8,800; b) $9,700; c) $10,800; d) $11,100.

6. The best tractor based on the NPW method is
   a) Case; b) Massey; c) Kubota.

7. Based on the simple payback method, the Massey tractor's recovery period (to the nearest half or full year) is

a) 2.9 years; b) 3.7; c) 4.2; d) More than 5 years.

8. Based on the simple payback method, the Case tractor's "project balance" after 2 years (rounded to the nearest $100) is
a) $-69,900; b) $-71,400; c) $-82,300; d) $-83,600.

9. Based on the discounted payback method, the recovery period (to the nearest half or full year) of the Massey tractor 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 Case tractor's "project balance" after 3 years (rounded to the nearest $100) is
a) $-58,600; b) $-60,400; c) $-62,100; d) $-73,200.

11. Based on the simple payback method, the Kubota tractor's "project balance" after 3 years (rounded to the nearest $100) is
a) $-99,700; b) $-101,400; c) $-107,100; d) $-118,300.

12. The benefit/cost (B/C) ratio (rounded to the nearest 1st decimal) of the Case tractor is
a) 0.8; b) 0.9; c) 1.0; d) 1.1.

13. The benefit/cost (B/C) ratio (rounded to the nearest 1st decimal) of the Kubota tractor is
a) 1.0; b) 1.1; c) 1.3; d) 1.4.

14. The incremental B/C ratio (rounded to the nearest 1st decimal) between the Case and Kubota control tractors is
a) 0.8; b) 1.0; c) 1.1; d) 1.2.

15. The incremental B/C ratio (rounded to the nearest 1st decimal) between the Case and Massey tractors is
a) 0.7; b) 1.0; c) 1.1; d) 1.2.

16. The Case tractor's Internal Rate of Return (IRR) (rounded to the nearest 1st decimal) is
a) 13.5%; b) 14.5%; c) 15.7%; d) 16.0%.

17. The Kubota tractor's Internal Rate of Return (IRR) (rounded to the nearest 1st decimal) is
a) 13.8%; b) 14.7%; c) 14.9; d) 15.1%.

18. The incremental Internal Rate of Return (ΔIRR) between the Case and Massey tractors (rounded to the nearest 1st decimal) is
a) 7.9%; b) 8.6%; c) 8.8%; d) 9.1%.

19. The Massey tractor's External Rate of Return (ERR) (rounded to the nearest 1st decimal) is
a) 12.0%; b) 12.3%; c) 12.6; d) 13.1%.

20. The Kubota tractor's External Rate of Return (ERR) (rounded to the nearest 1st decimal) is
a) 12.0%; b) 12.7%; c) 12.9; d) 14.1%.

21. The incremental External Rate of Return (ΔERR) between the Case and Kubota tractors (rounded to the nearest 1st decimal) is
a) 6.9%; b) 8.1%; c) 10.5%; d) 10.9%.

22. The incremental External Rate of Return (ΔERR) between the Massey and Kubota tractors (rounded to the nearest 1st decimal) is
a) 10.8%; b) 11.0%; c) 11.2%; d) 11.4%.

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Engineering Economics
ECO 1192A
Assignment #1

C.Théoret **Answer Key** **Fall 2016**

	Assignment Colour			
Questions	Blue	Pink	White	Questions
1	B	D	B	1
2	D	B	D	2
3	B	C	B	3
4	E [$204,400]	A	E [$13,100]	4
5	B	B	C	5
6	C	B	A	6
7	E [3.1]	C	B	7
8	C	E [-$226,800]	C	8
9	E [8.4]	A	A	9
10	D	E[-$147,100]	A	10
11	E [3.7]	E[-$167,500]	D	11
12	B	C	C	12
13	A	B	A	13
14	B	C	B	14
15	C	B	B	15
16	A	D	E [7.81%]	16
17	C	B	B	17
18	C	D	E [1.03%]	18
19	A	B	C	19
20	E[11.7%]	C	A	20
21	B	D	E [9%]	21
22	D	D	A	22