



Faculté des sciences sociales

Faculty of Social Sciences

Département de science économique
Department of Economics

ENGINEERING ECONOMICS

ECO 1192C

Green Version of the First Set of Assignments

C.Théoret

Winter 2018

A. Assignment Instructions

1. Consult Brightspace “Grades” for your specific assignment.
2. Your score for completing a different assignment will be zero.
3. A GREEN Scantron (answer sheet) is required for your answers.
4. The colour of your answer sheet is identified by a short “Hi-Liter” bar in its upper right-hand corner.
5. The “Course Code” for this assignment on the answer sheet is **ECO1192CG**. Do not forget to darken the appropriate ovals.
6. Answer sheets will be distributed and collected at the beginning of the **February 15th** 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 cash crop farmer is considering the replacement of one of its aging tractors. The key parameters of the three tractors under scrutiny are provided below.			
<u>Parameters</u>	<u>Alpha</u>	<u>Beta</u>	<u>Gamma</u>
1. Initial Cost (\$)	300,000	340,000	390,000
2. Revenues (\$)	240,000 at EOY1 decreasing by 2% annually thereafter	250,000 at EOY1 increasing by 2,000 annually thereafter	294,500 annually
3. Operating costs (\$)	130,000 at EOY1 increasing by 1,000 annually thereafter	193,000 at EOY1 decreasing by 2% annually thereafter	EOY1-EOY8 = 190,000; EOY9-EOY16 = 200,000
4. End-of-life salvage value (\$)	5,000	7,000	-15,000
5. Useful life (years)	4	8	16
<ul style="list-style-type: none"> • EOY = End-of-year • Industry Standard = 4.5 years • MARR = 10% 			

1. Alpha's Net Present Worth (NPW) (rounded to the nearest \$100) of
a) \$22,800; b) \$24,500; c) \$27,000; d) \$29,700.
2. Beta's NPW (rounded to the nearest \$100) is
a) \$59,000; b) \$61,300; c) \$64,100; d) \$78,100.
3. Gamma's Net Future Worth (NFW) (rounded to the nearest \$100) after 5 years is
a) \$312,900; b) \$325,600; c) \$412,900; d) \$415,300.
4. Alpha's Annual Equivalent Worth (AEW) (rounded to the nearest \$100) is
a) \$7,800; b) \$8,500; c) \$9,300; d) \$9,500.
5. Gamma's AEW (rounded to the nearest \$100) over 30 years (it was repeated several times) is
a) \$10,900; b) \$11,200; c) \$11,600; d) \$13,800.

6. The best tractor based on the NFW method is
a) Alpha; b) Beta; c) Gamma.
7. Based on the simple payback method, Alpha's recovery period (to the nearest half or full year) is
a) 2.5; b) 3.0; c) 3.5; d) 4.0.
8. Based on the simple payback method, Beta's "project balance" after 2 years (rounded to the nearest \$100) is
a) \$-220,100; b) \$-119,900; c) \$54,100; d) \$79,100.
9. Based on the discounted payback method, Beta's recovery period (to the nearest half or full year) is
a) 7.0; b) 7.5; c) 8.0; d) 9.0.
10. Based on the discounted payback method, Beta's "project balance" after 2 years (rounded to the nearest \$100) is
a) \$-296,300; b) \$-285,800; c) \$-89,400; d) \$36,800.
11. Based on the simple payback method, Gamma's recovery period (rounded to the nearest half or full year) is
a) 3.5; b) 4.5; c) 6.0; d) 7.0.
12. Alpha's benefit/cost (B/C) ratio (second decimal; no rounding) is
a) 0.88; b) 1.03; c) 1.12; d) 1.18.
13. Gamma's benefit/cost (B/C) ratio (second decimal; no rounding) is
a) 0.96; b) 1.01; c) 1.04; d) 1.17.
14. The incremental B/C ratio (second decimal; no rounding) between the Alpha and Beta tractors is
a) 0.95; b) 1.07; c) 1.12; d) 1.16.
15. The incremental B/C ratio (second decimal; no rounding) between the Beta and Gamma tractors is
a) 0.67; b) 0.94; c) 1.02; d) 1.15.
16. Alpha's Internal Rate of Return (IRR) (first decimal; no rounding) is
a) 12.9%; b) 13.5%; c) 14.1%; d) 14.5%.
17. Beta's Internal Rate of Return (IRR) (first decimal; no rounding) is
a) 12.7%; b) 13.4%; c) 13.8%; d) 14.1%.
18. The incremental Internal Rate of Return (Δ IRR) between the Alpha and Gamma tractors (second decimal; no rounding) is

- a) 10.29%; b) 10.52%; c) 11.47%; d) 12.23%.
19. Alpha's External Rate of Return (ERR) (second decimal; no rounding) is
a) 13.47%; b) 14.13%; c) 14.77%; d) 15.19%.
20. Gamma's External Rate of Return (ERR) (second decimal; no rounding) is
a) 8.67%; b) 9.67%; c) 10.45%; d) 11.44%.
21. The incremental External Rate of Return (Δ ERR) between the Alpha and Gamma tractors (second decimal; no rounding) is
a) 10.43%; b) 10.85%; c) 11.49%; d) 12.18%.
22. The incremental External Rate of Return (Δ ERR) between the Beta and Gamma tractors (second decimal; no rounding) is
a) 9.55%; b) 9.85%; c) 10.17%; d) 11.75%.
23. The best tractor based on the Simple Payback method is
a) Alpha; b) Beta; c) Gamma.
24. Must the annual equivalent (AE) and the simple payout methods come to the same conclusion as to the acceptance of a project?
a) Yes; b) No.
25. If the company's farm tractor budget is \$700,000, which tractor(s) should it purchase assuming that tractors are independent investments?
a) Gamma only; b) Alpha and Beta; c) Alpha and Gamma; d) Beta and Gamma.
26. Joan plans to make a bank deposit of \$500 on December 31, 2018 increasing annually thereafter by 10% until December 31, 2022. Which of the following answers would provide the balance in her savings account on December 31, 2022 if the bank offers a 12% rate of interest compounded annually?
a) $FW=500(F/A, 12\%, 5)$ where $FW = \text{Future Worth}$
b) $FW=\{500/(0.1-0.12)\}\{1-[(1+0.10)/(1+0.12)]^5\}$
c) $FW=5(500)/(1+0.10)$
d) $FW=\{500/(0.1-0.12)\}\{1-[(1+0.10)/(1+0.12)]^5\}(F/P, 12\%, 5)$

0-0-0

		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	