Université d'Ottawa University of Ottawa
Faculté des sciences sociales Faculty of Social Sciences
Science Économique Economics

Engineering Economics

ECO 1192B

First Mid-Term Examination

C.Théoret Winter 2012

1. This 85-minute examination contains 30 multiple-choice questions.
2. One (1) point for correct answers; zero (0) for incorrect answers.
3. All questions must be answered on the answer (Scantron) sheet which must be handed in as you leave the examination room.
4. Please indicate your name, student number and course number on the front of the Scantron sheet (darken appropriate bubbles).
5. Please
   - leave your student ID card visible at all times
   - sign the attendance sheet as you submit your answer sheet.

1. The baseline for the acceptance or rejection of a project using the Internal Rate of Return (IRR) method is
   a) MARR
   b) Recovery period less than the industry threshold
   c) $0
   d) 1

2. If the rate of interest is 16% compounded semi-annually, the effective (annual) rate of interest is
   a) 4%
   b) 8%
   c) 16%
   d) 16.64%.

3. With the Annuity Method, a common period of analysis must be used to determine the economic validity of two projects with unequal lives.
a) True
b) False

4. If the rate of interest is 12% compounded monthly, the actual monthly rate of interest is
a) 1%
b) 12%
c) 12.68%
d) None of the above answers.

5. If a project's Net Present Worth is $50, its internal rate of return must exceed the MARR.
a) True
b) False

6. Projects A and B have a one-year life and no salvage value. Project A's first cost is $50 and its profits after one year are $75. Project B has a first cost of $60 and a profit of $80 after one year. If MARR = 10%, which project is better based on the incremental IRR method?
a) A
b) B
c) Impossible to identify the better project without additional information
d) A and B are equally valid.

7. What is the relationship between a nominal and an effective interest rate?
a) The nominal rate of interest can exceed the effective interest rate.
b) At best, the nominal rate of interest can be equal to the effective interest rate.
c) The effective of interest is always equal to the nominal interest rate.
d) The nominal interest rate is always equal to the actual rate of interest.

8. Which annual rate of interest compounded quarterly is equivalent to a monthly rate of 1%?
a) 3%
b) 12%
c) 12.12%
d) None of the above answers.

INFORMATION FOR QUESTIONS 9 to 12

Projects A to F • are ranked in ascending order of their first cost • have identical lives (N) • have negligible salvage values (SV=0).						
PROJECTS	RATES OF RETURN					
	A	B	C	D	E	F
A	28	-	-	-	-	-
B	26	25	-	-	-	-
C	23	22	21	-	-	-
D	21	20	20	19	-	-
E	20	19	18	18	17	-
F	18	17	16	16	16	14

9. Without capital rationing and with a MARR = 16%, valid independent projects are:
   a) A, B, C, D, E and F
   b) A, B, C, D and E
   c) A, B, D
   d) B, D, E
   e) None of the above answers.

10. Without capital rationing and with a MARR = 23%, valid independent projects are:
   a) A, B, C, D, E and F
   b) A, B, C, D and E
   c) A, B, D
   d) B, D, E
   e) None of the above answers.

11. Without capital rationing and with a MARR = 18%, the best project is:
   a) A
   b) B
   c) C
   d) D
   e) E

12. Without capital rationing and with a MARR = 22%, the best project is:
   a) A
   b) B
   c) D
   d) E
   e) F

13. The Internal Rate of Return (IRR) method assumes that the cash inflows generated by a project will be reinvested in the project at the MARR.
a) True
b) False

INFORMATION FOR QUESTIONS 14 TO 22		
DETAILS	***PROJECT A***	***PROJECT B***
First Cost($)	80,000	100,000
Economic Life (years)	5	10
Annual Revenues ($)	30,000	30,000
Annual operating cost ($)	15,000	9,000 in the first year followed by annual decreases of $500 (e.g., 8,500 in year 2; 8,000 in year 3, etc.)
Salvage Value ($)	1,000	-2,000
MARR (%)	10	10

14. Project A's Annual Equivalent Worth can be calculated from answer
a) ~~-80,000(P/A,10%,5) + 30,000 -15,000 + 1,000(P/F,10%,5)~~
b) ~~-80,000 + 30,000 -15,000 + 1,000(P/F,10%,5)~~
c) -80,000(A/P,10%,5) + 30,000 -15,000 + 1,000(A/F,10%,5)
d) ~~-80,000 + 30,000 -15,000 + 1,000~~
e) None of the above answers.

15. Project A's Present Worth can be calculated from answer
a) -80,000(P/A,10%,5) + 30,000 -15,000 + 1,000(P/F,10%,5)
b) ~~-80,000(A/P,10%,5) + (30,000 -15,000)(P/A,10%,5) + 1,000(P/F,10%,5)~~
c) -80,000 + (30,000 -15,000) + 1,000(P/F,10%,5)
d) -80,000 + (30,000 -15,000)(P/A,10%,5) + 1,000(P/F,10%,5)
e) None of the above answers.

16. Project A's Internal Rate of Return (i*) can be calculated from answer
a) -80,000(P/F,i*%,5) + (30,000 -15,000)(P/A,i*%,5) + 1,000(P/F,i*%,5) = $0
b) -80,000 + 30,000 -15,000 + 1,000(P/F,i* = $0
c) -80,000(P/A,i*%,5) + (30,000 -15,000)(F/A,i*%,5) + 1,000(P/F,i*%,5) = $0
d) -80,000(F/P,i*%,5) + (30,000 -15,000)(F/A,i*%,5) + 1,000 = $0
e) Impossible to calculate IRR from these answers.

17. Project A's External Rate of Return (i*) can be calculated from answer
a) -80,000(F/P,10%,5) + 30,000 -15,000 + 1,000(P/F,10%,5) = $0
b) -80,000(F/P,i*%,5) + (30,000 -15,000)(F/A,10%,5) + 1,000 = $0
c) -80,000(F/P,i*,5) + (30,000 -15,000)(P/F,i*%,5) + 1,000(P/F,10%,5) = $0
d) -80,000(F/P,i*%,5) + (30,000 -15,000)(P/A,10%,5) + 1,000 = $0
e) None of the above answers.

18. If the average recovery period for projects similar to Project A is 5 years, would Project A be acceptable based on the Simple Payback Method?
a) Yes.
b) No.
c) Need for information to comment on Project A's validity.

19. Project B's Net Future Worth can be calculated from answer
a) -100,000(P/A,10%,10)+21,000-2,000(P/F,10%,10) + 500(P/G,10%,10)
b) -100,000(F/P,10%,10) - 2,000 + 21,000(F/A,10%,10) + 500(F/G,10%10)
c) -100,000(F/P,10%,10) - 2,000 + 21,000(F/A,10%,10) - 500(F/G,10%10)
d) -100,000-2,000(P/F,10%,10) + 21,000(P/A,10%,10) + 500(P/G,10%,10)
e) None of the above answers.

20. A friend claims that Project B's Internal Rate of Return (IRR) can be calculated from any one of the following equations:
A. -100,000(F/P,i*,10)+21,000(F/A,i*,10)-2,000-500(F/G,i*,10) = $0
B. -100,000+21,000(P/A,i*,10)-2,000(P/F,i*,10)+500(P/G,i*,10) = $0
C. -100,000(A/P,i*,10)+21,000-2,000(A/F,i*,10)+500(A/G,i*,10) = $0

Your view is that
a) Project B's IRR can be calculated from equation A only.
b) Project B's IRR can be calculated from equations A and B only.
c) Project B's IRR can be calculated from equations B and C only.
d) Project B's IRR can be calculated from equations A and C only.

21. The incremental internal rate of return between projects A and B can be calculated from answer

a) -80,000(A/P,i****,5) + (30,000 -15,000) + 1,000(A/F,i****,5)
= -100,000(A/P,i**,10) + 21,000 - 2,000(A/F,10%,10) + 500(A/G,i**,10)

b) -80,000 + (30,000 -15,000)(P/A,i**,5) + 1,000(P/F,i**,5)
= -100,000 + 21,000-2,000(P/F,i**,10) - 500(A/G,i**,10)

c) {-80,000 + (30,000 -15,000)(P/A,10%,5) + 1,000(P/F,i**,5)}[1+(P/F,i**,5)]
= -100,000+21,000(P/A,i**,10)-2,000(P/F,i**,10)-500(P/G,i**,10)

d) -80,000(A/P,i**,5)(F/A,i**,10) + (30,000 -15,000)(F/A,i**,10) + 1,000{1+(F/P,i**,5)}
= -100,000(F/P,i**,10)+21,000(F/A,i**,10)-2,000(P/F,i**,10) +500(F/G,10%,10)

e) None of the above answers

22. The incremental external rate of return between projects A and B can be calculated from answer

a) -80,000(F/P,i**,5) + (30,000 -15,000)(F/A,10%,5) + 1,000
= -100,000(F/P,i**,10)+21,000-2,000(A/F,10%,10) - 500(A/G,i**,10)

b) -80,000 + (30,000 -15,000)(P/A,10%,5) + 1,000(P/F,10%,5)
= -100,000(F/P,i**,10)+21,000-2,000(A/F,i**,10)-500(A/G,i**,10)

c) -80,000(A/P,i**,5) + (30,000 -15,000) + 1,000(A/F,10%,5)
= -100,000(A/P,i**,10)+21,000-2,000(A/F,i**,10)-500(A/G,i**,10)

d) -80,000{1+(P/F,10%,5)}(F/P,i**,10) + (30,000 -15,000)(F/A,10%,10)
+ 1,000{1+(F/P,10%,5)}
= -100,000(F/P,i**,10)+21,000(F/A,10%,10)-2,000+500(F/G,10%,10)

e) None of the above answers

23. The main focus of the payback method is

a) project profitability
b) equity in the distribution of project profits
c) economic efficiency
d) recovery of a project's initial cost.

24. If a project's net cash flows change sign (- to + and + to -) 4 times during the life of the project, one can conclude that the project

a) will have 4 different IRRs
b) will have 2 different IRRs and 2 different ERRs
c) will have a NPW = $0
d) could have 4 different IRRs.

25. The ERR method assumes that all profits generated by a project will be invested
a) in the project.
b) at MARR.
c) at a higher rate than MARR.
d) at a rate lower than MARR.

26. A project can have
a) multiple IRRs and ERRs.
b) multiple IRRs and a single ERR.
c) a single IRR and multiple ERRs.
d) a single IRR and no ERR.

27. If a project is found to be valid based on the Future Worth Method, it must also be valid based on the simple payback method.
a) True.
b) False.

28. In this course, the ERR decision criterion is said to be an approximate method for analysing projects because profits generated by a project are
a) invested outside the project even though its first cost has not been fully recovered
b) invested outside the project only after the project's first cost has been fully recovered
c) always invested in the project (thus no external investment).
d) invested outside the project when its balance because positive.

QUESTIONS 29 and 30		
End of year	Net Annual Cash Flows	Project Balance
0	-2,000	
1	+1,000	
2	+600	XX
MARR = 10%		

29. What is the dollar value of XX based on the simple payback method?
~~a) $-2,000~~
~~b) $-1,000~~
~~c) $-400~~
d) $1,940
e) None of the above answers.