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

Engineering Economics
ECO 1192

First Practice Examination **C.Théoret**

30 Multiple-Choice Questions

1. The baseline for the acceptance or rejection of a project using the Present Worth Method is
   a) MARR
   b) Recovery period less than the industry threshold
   c) $0
   d) 1
   e) None of the above answers.

2. If the rate of interest is 12% compounded quarterly, the effective (annual) rate of interest is
   a) 3%
   b) 12%
   c) 12.55%
   d) None of the above answers.

3. With the Present Worth Method, you must use a common period of analysis 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) 12%
b) 12.68%
c) 1%
d) None of the above answers.

5. A project with an annual equivalent worth (AEW) of $-100 (negative) must have a negative internal rate of return.
a) True
b) False

6. A project with a $0 Net Present Worth (NPW) must have a rate of return less than the MARR.
a) True
b) False.

7. A nominal rate of interest will exceed its corresponding effective rate of interest when
a) simple interest (as opposed to compound interest) is used.
b) a project has an infinite life.
c) the effective rate of interest exceeds MARR.
d) None of the above answers.

8. Which nominal (annual) rate of interest compounded semi-annually is equivalent to a monthly rate of 1%?
a) 12%
b) 6%
c) 6.152%
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	26	-	-	-	-	-
B	24	25	-	-	-	-
C	22	24	22	-	-	-
D	20	21	20	20	-	-
E	19	18	19	18	18	-
F	15	16	17	16	16	17

9. With a MARR = 15% and no capital rationing, valid independent projects are:
   a) A, B, C, D and E
   b) A, B, C, D, E and F
   c) D
   d) E
   e) None of the above answers.

10. With a MARR = 23% and no capital rationing, valid independent projects are:
    a) A and B
    b) A, B and C
    c) A
    d) None of the above answers.

11. With a MARR = 15% and no capital rationing, the best mutually exclusive project is:
    a) A
    b) C
    c) D
    d) E
    e) None of the above answers.

12. With a MARR = 23% and no capital rationing, the best mutually exclusive project is:
    a) A
    b) B
    c) D

d) E
e) F

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

INFORMATION FOR QUESTIONS 14 TO 22		
DETAILS	***PROJECT A***	***PROJECT B***
First Cost($)	60,000	90,000
Economic Life (years)	5	10
Annual Revenues ($)	30,000	30,000
Annual operating cost ($)	10,000	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) -60,000(P/A,10%,5) + 30,000 -10,000 + 1,000(P/F,10%,5)
b) -60,000 + 30,000 -10,000 + 1,000(P/F,10%,5)
c) -60,000(A/P,10%,5) + 30,000 -10,000 + 1,000(A/F,10%,5)
d) -60,000 + 30,000 -10,000 + 1,000
e) None of the above answers.

15. Project A's Present Worth can be calculated from answer
a) -60,000(P/A,10%,5) + 30,000 -10,000 + 1,000(P/F,10%,5)
b) -60,000(A/P,10%,5) + (30,000 -10,000)(P/A,10%,5) + 1,000(P/F,10%,5)
c) -60,000 + (30,000 -10,000) + 1,000(P/F,10%,5)
d) -60,000 + (30,000 -10,000)(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) -60,000(P/F,i*%,5) + (30,000 -10,000)(P/A,i*%,5) + 1,000(P/F,i*%,5)

= $0
b) -60,000 + 30,000 -10,000 + 1,000(P/F,i* = $0
c) Answer a) only.
d) Answer b) only.
e) Neither answer a) nor answer b).

17. Project A's External Rate of Return (i*) can be calculated from answer
a) -60,000(P/A,10%,5) + 30,000 -10,000 + 1,000(P/F,10%,5) = $0
b) -60,000(F/P,i*%,5) + (30,000 -10,000)(F/A,10%,5) + 1,000 = $0
c) -60,000 + (30,000 -10,000)(P/F,i*%,5) + 1,000(P/F,10%,5) = $0
d) -60,000(F/P,i*%,5) + (30,000 -10,000)(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 4 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) -90,000(P/A,10%,10)+21,000-2,000(P/F,10%,10) + 500(P/G,10%,10)
b) -90,000(F/P,10%,10) - 2,000 + 21,000(F/A,10%,10) + 500(F/G,10%10)
c) -90,000(F/P,10%,10) - 2,000 + 21,000(F/A,10%,10) - 500(F/G,10%10)
d) -90,000-2,000(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. -90,000(F/P,i*,10)+21,000(F/A,i*,10)-2,000-500(F/G,i*,10) = $0
B. -90,000+21,000(P/A,i*,10)-2,000(P/F,i*,10)-500(P/G,i*,10) = $0
C. -90,000(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 equation B only.
c) Project B's IRR can be calculated from equations A and B only.
d) Your friend is wrong.

INFORMATION FOR QUESTIONS 14 TO 22

DETAILS	***PROJECT A***	***PROJECT B***

First Cost($)	60,000	90,000
Economic Life (years)	5	10
Annual Revenues ($)	30,000	30,000
Annual operating cost ($)	10,000	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

21. The incremental internal rate of return between projects A and B can be calculated from answer
a) -60,000(A/P,i*,5) + (30,000 -10,000) + 1,000(A/F,i*,5)
= -90,000(A/P,i*,10) + 21,000 - 2,000(A/F,10%,10) - 500(A/G,i*,10)
b) -60,000 + (30,000 -10,000)(P/A,i*,5) + 1,000(P/F,i*,5)
= -90,000 + 21,000-2,000(P/F,i*,10) - 500(A/G,i*,10)
c) {-60,000 + (30,000 -10,000)(P/A,i*,5) + 1,000(P/F,i*,5)}[1+(P/F,i*,5)]
= -90,000+21,000(P/A,i*,10)-2,000(P/F,i*,10)-500(P/G,i*,10)
d) -60,000(A/P,i*,5)(F/A,i*,10) + (30,000 -10,000)(F/A,i*,10) + 1,000{1+(F/P,i*,5)]
= -90,000+21,000(P/A,i*,10)-2,000(P/F,i*,10)-500(F/G,i*,10)}[1+(F/P,i*,5)]
e) None of the above answers

22. The incremental external rate of return between projects A and B can be calculated from answer
a) -60,000(F/P,i*,5) + (30,000 -10,000)(F/A,10%,5) + 1,000
= -90,000(F/P,i*,10)+21,000-2,000(A/F,10%,10) - 500(A/G,i*,10)
b) -60,000 + (30,000 -10,000)(P/A,10%,5) + 1,000(P/F,10%,5)
= -90,000(F/P,i*,10)+21,000-2,000(A/F,i*,10)-500(A/G,i*,10)
c) -60,000(A/P,i*,5) + (30,000 -10,000) + 1,000(A/F,10%,5)
= -90,000(A/P,i*,10)+21,000-2,000(A/F,i*,10)-500(A/G,i*,10)
d) -60,000{1+(F/P,10%,5)}(P/F,i*,10) + (30,000 -10,000)(F/A,10%,10)
+ 1,000{1+(F/P,10%,5)}
= -90,000(F/P,i*,10)+21,000(F/A,10%,10)-2,000-500(F/G,10%,10)
e) None of the above answers

INFORMATION FOR QUESTIONS 23 to 26
P ≡ initial cost of a project ($)
N ≡ project life or duration (years)

23. Given two mutually exclusive projects A and B: $P_A = P_B$; $N_A < N_B$; and $NPW_A > NPW_B$. Which project is better?
    a) A
    b) B
    c) Neither A nor B is acceptable
    d) Need more information.

24. Given two mutually exclusive projects A and B: $P_A > P_B$; $N_A = N_B$; and $IRR_A > IRR_B > 0\%$. Which project is better?
    a) A
    b) B
    c) Neither A nor B
    d) Need more information.

25. Given two mutually exclusive projects A and B: $P_A > P_B$; $N_A > N_B$; IRR_A and $IRR_B > 0\%$; and $NPW_A < NPW_B$. Which project is better?
    a) A
    b) B
    c) Neither A nor B
    d) Need more information.

26. Given two mutually exclusive projects A and B: $P_A > P_B$; $N_A > N_B$; and $AEW_B > AEW_A > \$0$. Which project is better?
    a) A
    b) B
    c) Neither A nor B
    d) Need more information.

27. If a project has a negative NPW, its individual internal rate of return (IRR) must be less than MARR.
    a) True
    b) False

28. You must select the best of 10 mutually exclusive projects using the internal rate of return method (IRR). Before performing pair-wise project comparisons, you
    a) must determine the validity of all (ten) projects
    b) must ensure that at least one of the 10 projects is valid
    c) need not bother verifying the validity of any of the projects since

the “best” project is simply the best of the whole lot..

29. Is a common period of analysis necessary to select the better of two mutually exclusive projects A and B using the Annual Equivalent Method (AEW)?
a) Yes
b) No

30. A project’s external rate of return (ERR) is the same whether calculated using the Net Present Worth (NPW) Method or the Net Future Worth (NFW) Method.
a) True
b) False

*** END ***

Question	Answer
1	C
2	C
3	B
4	C
5	B
6	B
7	D
8	D (=12.304%)
9	B
10	A
11	E
12	B
13	B
14	C
15	D
16	E
17	B
18	A
19	B
20	D
21	E
22	E
23	A
24	D
25	B
26	B
27	A
28	B

29	**B**
30	**B**