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

Engineering Economics
ECO 1192
Practice Examination #1

35 Multiple-Choice Questions and Answers

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

3. 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.

4. A common period of analysis must be used with the Present Worth Method to determine the economic validity of two projects with unequal lives.
a) True
b) False

5. A common period of analysis must be used with the Annual Equivalent Worth or Annuity Method (AEW) to determine the better of two projects with unequal lives.
a) True
b) False

6. 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.

7. A project with a negative annual equivalent worth (AEW) must have a negative internal rate of return.
a) True
b) False

8. A project with a Net Present Worth (NPW) = $0 must have a rate of return
a) Less than MARR
b) Greater than MARR
c) Equal to MARR.

9. 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.

10. 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 these answers.

INFORMATION FOR QUESTIONS 11 to 14

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

11. With a MARR = 15% and without capital rationing, valid independent projects are:
    a) A, B, C, D and E
    b) A, B, C, D, E and F
    c) E
    e) None of the above answers.

12. With a MARR = 23% and without capital rationing, valid independent projects are:
    a) A and B
    b) A, B and C
    c) A
    d) None of the above answers.

13. 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.

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

15. 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 16 TO 24		
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

16. 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.

17. 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.

18. 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). (what are these propositions)?

19. 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.

20. 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.

INFORMATION FOR QUESTIONS 16 TO 24

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. 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.

22. A friend claims that Project B's Internal Rate of Return (IRR) can be calculated from any 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 either equations A and B.
d) Your friend is correct.

INFORMATION FOR QUESTIONS 16 TO 24		
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

23. 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

24. 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+(P/F,10%,5)}(F/P,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

25. If a project's NPW < $0, its annual equivalent worth (AEW) must be
a) greater than MARR
b) = MARR
c) greater than $0
d) less than $0.

26. 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..

27. Must a common period of analysis be used to determine the better of two mutually exclusive projects of different duration using the External Rate of Return Method (ERR)?
a) Yes
b) No

28. A project's external rate of return (ERR) is the same whether calculated using the Net Present Worth (NPW) Method or the Annual Equivalent Method (AEW).
a) True
b) False **(You cannot use AEW to calculate a project's ERR)**

29. If a project is valid based on the Simple Payback Method, it must also be valid based on the Present Worth Method (PW)?
a) True
b) False

30. If MARR > 0%, a project's recovery period will be shorter with the Discounted Payback Method than with the Simple Payback Method?
a) True
b) False

31. The External Rate of Return method (ERR) assumes that the cash inflows generated by a project will be reinvested at
a) a predetermined rate such as MARR

b) the project's calculated internal rate of return.

32. The baseline for accepting or rejecting a project using the simple payback method is
a) MARR
b) 1
c) $0
d) the project's industry threshold (average duration or life).

33. If two (2) projects have identical (equal) recovery periods using the discounted payback method, they must have the same Net Present Worth.
a) True
b) False

34. The Present Worth Method (PW) and the Discounted Payback Method are based on
a) profitability and liquidity criteria respectively
b) liquidity and equity criteria respectively
c) profitability and integrity criteria respectively.
d) opportunity and repeatability criteria respectively.

35. If a project's annual equivalent worth (AEW) is $0, its internal rate of return must be
a) 0%
b) positive but less than MARR
c) greater than MARR
d) = MARR.

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Questions	Answers
1	C
2	A
3	C
4	B
5	B
6	C
7	B (must be less than MARR but not necessarily negative)
8	C
9	D (a nominal rate cannot exceed its effective rate)
10	D [$(1+0.01)^{12} = (1+x)^2$; Solve for "x"; Nominal rate = 2x=12.304%]
11	B
12	A
13	E (F is best project)
14	B
15	B
16	C
17	D
18	E
19	B
20	A (Project A takes 3 years relative to 4 years on average)
21	B
22	D* (Your friend is right in that the three methods can be used to calculate Project B's IRR)
23	A
24	D
25	D
26	B
27	A (yes because ERR is a single sum method)
28	B (You cannot use AEW to calculate a project's ERR)
29	B
30	B
31	A
32	D
33	B
34	A
35	D