ENGINEERING ECONOMICS
ECO 1192B

First Partial Examination

C.Théoret **Winter 2005**

Please Note:

1. **You have 75 minutes (7 pm to 8:15 pm) to complete Partial Examination #1 which consists of 35 multiple choice questions.**
2. **All questions must be answered on the Scantron sheet.**
3. **Please indicate your name, student number and course number on the front of the Scantron sheet. Failure to provide this information could result in the cancellation of your examination.**
4. **Correct answers are worth one (1) point and incorrect answers zero (0).**
5. **You may keep the examination questionnaire.**
6. **You MUST show your University of Ottawa I.D. card as you hand-in the answer sheet AND sign the attendance sheet.**

1. If the rate of interest is 16% compounded annually, the nominal rate of interest is
   a) 16%
   b) 16.98%
   c) 8%
   d) 4%
   e) None of the above answers.

2. If the rate of interest is 16% compounded annually, the effective rate of interest is
   a) 16%
   b) 16.98%
   c) 8%
   d) 4%
   e) None of the above answers.

3. If the rate of interest is 16% compounded annually, the actual (or periodic) rate of interest is
   a) 16%
   b) 16.98%

c) 8%
d) 4%
e) None of the above answers.

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

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

6. If the rate of interest is 12% compounded quarterly, the actual rate of interest is
a) 12%
b) 3%
c) 4%
d) None of the above.

7. If the rate of interest is 12% compounded continuously, the nominal rate of interest is
a) 12%
b) 12.55%
c) 12.75%
d) None of the above.

8. If the rate of interest is 12% compounded continuously, the effective rate of interest is
a) 12%
b) 12.55%
c) 12.75%
d) None of the above.

9. The annual effective rate of interest equivalent to a quarterly rate of 6% is
a) 6%
b) 1.5%
c) 6.136%
d) 24.8%
e) None of the above answers

10. What is the value of (P/F,i%, N) when N=1 and the interest rate is 0%?
    a) 0
    b) 1
    c) N
    d) infinity
    e) None of the above answers.

11. What is the value of (A/F,i%,N) when N=1 and the interest rate is 0%?
    a) 0
    b) 1
    c) N
    d) infinity
    e) None of the above answers.

12. What is the value of (P/A,i%,N) when N=1 and the interest rate is 0%?
    a) 1
    b) N
    c) infinity
    d) None of the above.

13. What is the value of (A/F,i%,N) when N tends to infinity and the interest rate is 10%?
    a) 0
    b) 1
    c) N
    d) None of the above.

14. What is the value of (P/A,i%,N) when N tends to infinity and the interest rate is 10%?
    a) N
    b) 1
    c) infinity
    d) None of the above.

15. You are to plot the life "N" of a project on the horizontal axis of a two-dimensional graph against the interest rate factor (P/F,i%,N) on the vertical axis. Is the relationship between the interest rate factor and the life of the project
    a) positive
    b) negative
    c) independent
    d) none of the above.

16. You are to plot the life "N" of a project on the horizontal axis of a two-dimensional graph against the interest rate factor (A/F,i%,N) on the vertical axis. Is the relationship between the interest rate factor and the life of the project

a) positive
b) negative
c) independent
d) none of the above.

17. A project with a negative Present or Future Worth must have an individual external rate less than the MARR.
a) True
b) False

18. The External Rate of Return (ERR) method assumes that cash inflows generated by a project will be reinvested at a predetermined external rate of return (e.g., MARR).
a) True
b) False

19. The incremental internal rate of return (IRR) is a rate of return based on the differences in the net cash flows between two projects.
a) True
b) False

20. Mutually exclusive projects A & B have identical lives ($N_A = N_B$) and individual internal rates of return greater than the MARR. If Project A's first cost (P) is larger than Project B's first cost and the incremental internal rate of return between the two projects is less than the MARR, which project would you select?
a) A
b) B
c) A and B
d) Neither A nor B
e) Insufficient information to select better project.

21. The Internal Rate of Return Method (based on the Present Worth Method) is used to determine the acceptability of projects A and B which have different economic lives ($N_A \neq N_B$). Is a common period of analysis necessary to determine their acceptability?
a) Yes
b) No

22. Does the Internal Rate of Return (IRR) for a project depend on the summary measure underlying the rate calculation? For example, would the Present Worth Method generate a different internal rate of return than would the Annual Equivalent Method?
a) Yes
b) No

23. Ten (10) end-of-year deposits of $1000 are made to an account bearing interest at 18% per year compounded quarterly. Methods (some correct, some incorrect) for calculating the account balance following the tenth and final deposit of $1,000 are:

i) 1000(F/A, 18%,10)
ii) 1000(F/A, 19.25%,10)
iii){1,000/4}(F/A, 4.5%, 40)
iv) 233.74(F/A, 4.5%, 40)

The correct method (s) is (are)

a) i)
b) ii) and iii)
c) ii) and iv)
d) iii) and iv)
e) i) and iii)

INFORMATION FOR QUESTIONS 24 and 25.

Year	Net Cash Flow ($)
0	0
1	1,000
2	1,500
3	2,000
4	2,500

MARR = 10%

24. The present worth (at time n=0) of the net cash flows in the Table above is given by

a) 1,000(P/A,10%,5) + 500(P/G,10%,5)
b) 1,000(P/A,10%,4) + 500(P/G,10%,4)
c) 1,000(A/P,10%,5) + 500(A/G,10%,5)
d) 1,000 + 500(P/G,10%,5)
e) None of the above answers.

25. The present value or worth (at time n=0) of the cash flow shown in the Table above could also be obtained by one of the following:

a) 1000 +1500+2000+2500

b) 1000+1500(P/F,10%,1)+ 2000(P/F,10%,2)+2500(P/F,10%,3)
c) 1000(P/F,10%,1)+1500(P/F,10%,2)+ 2000(P/F,10%,3)+2500(P/F,10%,4)
d) 1000(F/P,10%,1)+1500(F/P,10%,2)+ 2000(F/P,10%,3)+2500(F/P,10%,4)
d) 1,000 + 500(P/G,10%,5)
e) None of the above answers.

INFORMATION FOR QUESTIONS 26 TO 33

DETAILS	*PROJECT A*	*PROJECT B*
First Cost($)	20,000	30,000
Economic Life (years)	5	10
Annual Revenues ($)	15,000	12,000
Annual operating cost ($)	5,000	4,000 in the first year followed by annual decreases of $200 (e.g., 4,000 in year 1; 3,800 in year 2, etc.)
Salvage Value ($)	1,000	-5,000
MARR (%)	10	10

26. Which of the following answers is the Annual Equivalent Worth of Project A?
a) -20,000(A/P,10%,5)+1,000(A/F,10%,5)+15,000-5,000
b) -20,000(A/P,i*,5)+1,000(A/F,i*,5)+10,000
c) -20,000-1,000(P/F,10%,5)+(10,000)(P/A,10%,5)
d) -20,000(F/P,10%,5)+1,000+10,000(F/A,10%,5)
e) None of the above answers.

27. Which of the following answers is the Future Worth of Project A?
a) -20,000(A/P,10%,5)+1,000(A/F,10%,5)+15,000-5,000
b) -20,000(A/P,i*,5)+1,000(A/F,i*,5)+10,000

c) -20,000(F/P,10%,5)+1,000+10,000(P/A,10%,5)
d) -20,000(F/P,10%,5)+1,000+10,000(F/A,10%,5)
e) None of the above answers.

28. Which of the following answers is NOT Project A's internal rate of return?
a) -20,000(A/P,i*,5)+1,000(A/F,i*,5)+15,000 – 5,000 = 0
b) -20,000(F/P,i*,5)+1,000+10,000(F/A,i*,5) = 0
c) -20,000+1,000(P/F,i*,5)+10,000(P/A,i*,5) = 0
d) {-20,000(A/P,i*,5)+1,000(A/F,i*,5)+15,000 – 5,000}(F/A,i*,5) = 0
e) None of the above answers.

29. Project A's External Rate of Return (i*) is found from
a) -20,000(F/P,10%,5)+1,000(P/F,10%,5)+10,000(P/F,10%,5) = 0
b) -20,000(F/P,i*,5)+1,000(F/P,i*,5)+10,000 = 0
c) -20,000(F/P,10%,5)+1,000-10,000(F/A,i*,5) = 0
d) -20,000(F/P,i*,5)+1,000+10,000(F/A,10%,5) = 0
e) None of the above answers.

30. Which of the following answers would give the Present Worth of Project B?
a) -30,000(A/P,10%,10)+8,000-5,000(A/F,10%,10)-200(A/G,10%,10)
b) -30,000-5,000(P/F,10%,10)+8,000(P/A,10%,10)-200(F/G,10%10)
c) -30,000-5,000(P/F,10%,10)+8,000(P/A,10%,10)+200(P/G,10%10)
d) -30,000-5,000(P/F,10%,10)+8,000(P/A,10%,10)-200(P/G,10%10)
e) None of the above answers.

31. Which of the following answers will give Project B's external rate of return?
a) -30,000(F/P,i*,10)+8,000-5,000(A/F,10%,10)+200(P/G,10%,10) = 0
b) -30,000-5,000(F/P,10%,10)+8,000(P/A,10%,10)-200(F/G,10%10) = 0
c) -30,000(F/P,i*,10)-5,000+{8,000-200(A/G,10%10)}(F/A,10%,10) = 0
d) -30,000(F/P,10%,10)-5,000+8,000+200(A/G,10%10) = 0
e) None of the above answers.

32. Which of the following answers would give the incremental internal rate of return between Projects A and B?
a) -20,000(A/P,i*,5)+1,000(A/F,i*,5)+10,000
= -30,000(A/P,i*,10)+8,000-5,000(A/F,10%,10)+200(A/G,i*,10)
b) -20,000(A/P,i*,5)+1,000(A/F,i*,5)+10,000
= -30,000(A/P,i*,10)+8,000-5,000(A/F,i*,10)-200(A/G,i*,10)
c) {-20,000+1,000(P/F,i*,5)+10,000(P/A,i*,5)}[1+(P/F,i*,5)]
= -30,000+8,000(P/A,i*,10)-5,000(P/F,i*,10)-200(A/G,i*,10)
d) {-20,000+1,000(P/F,i*,5)+10,000(P/A,i*,5)}[1+(F/P,i*,5)]
= -30,000(F/P,i*,10)+8,000(F/A,i*,10)-5,000(P/F,i*,10)-200(F/G,i*,10)
e) None of the above answers

33. Which of the following answers would give the incremental external rate of return between Projects A and B?

a) -20,000(A/P,i*,5)+1,000(A/F,i*,5)+10,000
= -30,000(A/P,i*,10)+8,000-5,000(A/F,10%,10)+200(A/G,i*,10)

b) -20,000(A/P,i*,5)+1,000(A/F,i*,5)+10,000
= -30,000(A/P,i*,10)+8,000-5,000(A/F,i*,10)-200(A/G,i*,10)

c) {-20,000+1,000(P/F,i*,5)+10,000(P/A,i*,5)}[1+(P/F,i*,5)]
= -30,000+8,000(P/A,i*,10)-5,000(P/F,i*,10)-200(A/G,i*,10)

d) -20,000{1+(P/F,10%,5)}(F/P,i*,10)+10,000(F/A,10%,10)+1,000{1+(F/P,10%,5)}
= -30,000(F/P,i*,10)+8,000(F/A,10%,10)-5,000-200(F/G,10%,10)

e) None of the above answers

INFORMATION FOR QUESTIONS 34 and 35

The following projects

- are ranked in ascending order of their initial or first cost (P)
- have identical lives or durations (N) and
- negligible salvage values (SV=0).

PROJECTS	RATES OF RETURN (%)					
	A	**B**	**C**	**D**	**E**	**F**
A	22					
B	22	24				
C	23	27	26			
D	19	16	13	21		
E	16	14	11	11	19	
F	13	12	10	9	6	17

34. If A, B, C, D, E and F are mutually exclusive projects and MARR = 20%, the best (valid) project is:

a) B
b) C
c) D
d) None of the above answers.

35. If A, B, C, D, E and F are mutually exclusive projects and MARR = 10%, the best (valid) project is:

a) C

b) D
c) E
d) F
e) None of the above answers.

* END OF PARTIAL EXAMINATION 1 *