Jordan University of Science and Technology
Faculty of Engineering
Engineering Economy, IE341
Final Exam: Jan 27 2010

Name:

For the following 30 multiple choice questions, summarize your answer in the following table:

#	A	B	C	D	E	F
1						
2						
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#	A	B	C	D	E	F
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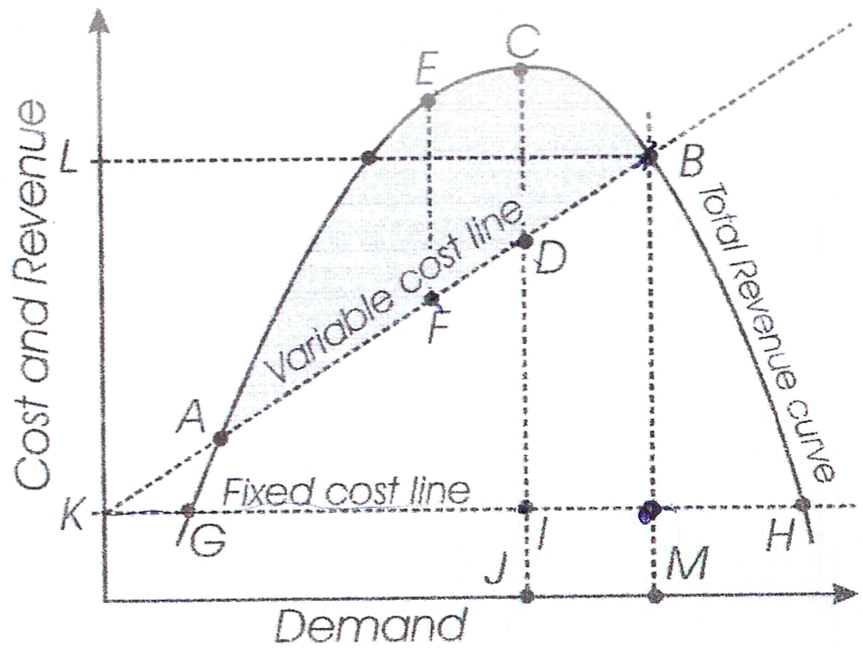
Answer the following 30 MCQs:

Consider he following sketch of the costs and total revenues and answer the next three questions



1. The value of the variable cost per demand unit (c_v) can be calculated as:

a) *A* *b)* *(L-K)/(M)*
c) *(L-K)/(M-J)* *d)* *D-I*
e) *E-F*

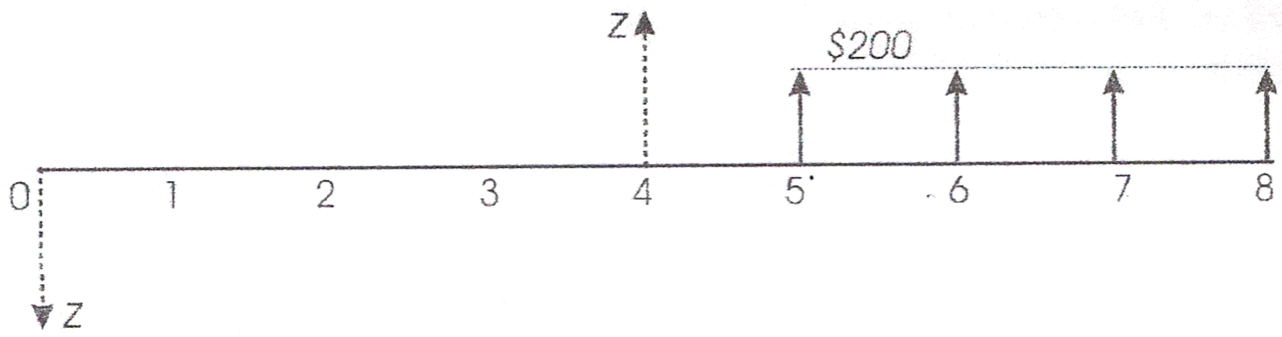
2. The maximum profit can be found by the length of the line:

a) *C-D* *b)* *E-F*
c) *L-K* *d)* *C-J*

3. The value of the fixed cost is:

a) *M* *b)* *J*
c) *K* *d)* *L*

. The value of Z that makes a continuous compounding of the cash inflow equal to the outflow in this diagram for $r = 2\%$ is:



a) *\$45.7* *b)* *\$9287.8*
c) *\$9139.2*

5. A local college parking enforcement bureau issues parking tickets that must be paid within one week. The person receiving the ticket may pay either \$5 immediately, or \$7 if the payment is deferred one week. What nominal interest rate is implied in the arrangement?

a) *40%* *b)* *1040%*
c) *2080%*

6. For a project with the following cash flow diagram, if MARR = 10%, do you recommend to continue in such project:

a) *I recommend continuing* *b)* *I don't recommend continuing.*
c) *Gain and loss are indifferent* *d)* *The interest rate is not available, so I cannot know the answer.*

7. It's better to have a loan that is compounded continuously rather than annually for the same interest rate.

a) *True* *b)* *False*

8. For some project, your MARR = 20%, PW(15%)= +\$10000, PW(25%)= -15000. Will you take this project?

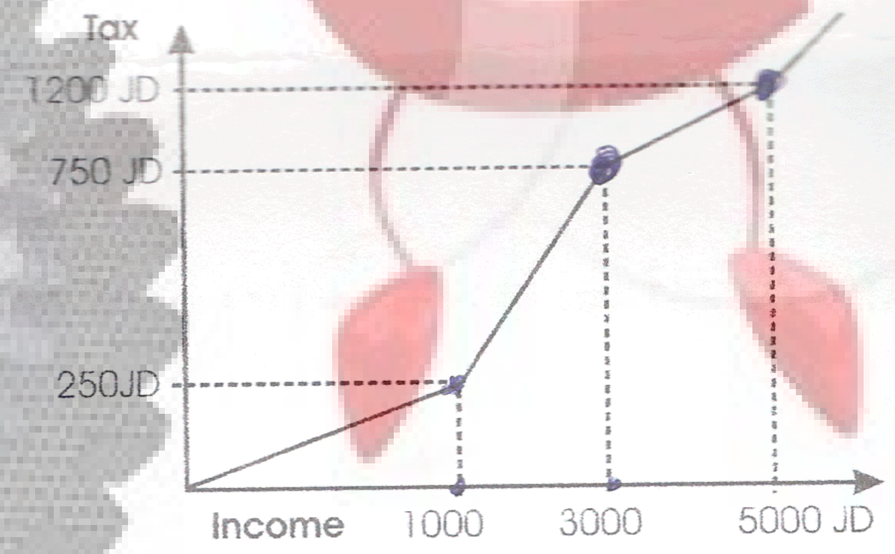
a) *Yes* *b)* *No.*

9. Consider the following tax chart. If your income is 1600JD, what will be your tax?

a) *400 JD* *b)* *250 JD*
c) *750 JD* *d)* *150 JD*

10. If your income is 4000 JD, what will be your tax?

a) *225 JD* *b)* *960 JD*
c) *750 JD* *d)* *975 JD*
e) *More than 1000JD*



11. A machine costs \$2550 on January 1, 2010, and \$3930 on January 1, 2013. The average inflation rate over these three years was 7% per year. What is the true percentage increase in the cost of the machine from 2010 to 2013?

a) *24. 03%* *b)* *18. 00%*
c) *19. 07%* *d)* *17. 58%*
e) *35. 11%*

12. If you want to receive a 7% inflation-free return on your investment and you expect inflation to be 9% per year, what actual interest rate must you earn?

a) *16%* *b)* *7%*
c) *2%* *d)* *1%*
e) *9%*

13. A person just turned 21 years old. If inflation is expected to average 2.4% per year for the next 44 years, how much will \$1 today be worth when this person retires at age 65?

a) *\$0.31* *b)* *\$0.45*
c) *\$0.35* *d)* *\$0.75*

oil refinery has decided to purchase some new drilling equipment for $550.000. The equipment will be kept for 10 years before being sold. The estimated SV for depreciation purposes is to be $25.000. Use this information to solve the next 3 problems.

14. Using the SL method, the annual depreciation on the equipment is

a) *$50.000* *b)* *$51.500*
c) *$52.500* *d)* *$55.000*

15. Using the SL method, the BV at the end of the depreciable life is

a) *$0* *b)* *$35.000*
c) *$25.000* *d)* *$50.000*

16. If SL depreciation is used and the equipment is sold for $35.000 at the end of 10 years, the taxable gain on the disposal of the equipment is

a) *$35.000* *b)* *$15.000*
c) *$25.000* *d)* *$10.000*

17. A small pump costs $ 16000 and has a life of eight years and a $2000 SV at that time. If the 200% DB method is used to depreciate the pump, the BV at the end of year four is

a) *$9000* *b)* *$8000*
c) *$6000* *d)* *$5000*

18. Increased demand for a country's exports causes its currency to _____ in the long run, while increased demand for imports causes its currency to _____.

a) *depreciate; appreciate.* *b)* *depreciate; depreciate.*
c) *appreciate; depreciate.* *d)* *appreciate; appreciate.*

19. Suppose for some year the income of a small company is $110000; the expenses are $65000; the depreciation is $25000; and the effective income tax rate= 40%. For this year, the ATCF is most nearly

a) *$8750* *b)* *$4700*
c) *$14000* *d)* *$29700*
e) *$37.000*

20. A company can purchase a certain machine or rent one. If purchased, the machine will cost $15,000 and will have a 5-year life with a 10% salvage value and the operating cost will be $8000 per year. If the machine is rented, it will cost $400 per day. At an interest rate of 10% per year, the minimum number of days the machine must be needed to justify its purchase is:

a) *33 days* *b)* *32 days*
c) *29 days* *d)* *45 days*

21. Either of the service alternatives below can be used in a certain process. Find the Rate of Return on the incremental cash flow if N=5 years.

	Alternative A	Alternative B
First Cost$	-60,000	-40,000
Annual Cost, $/yr	-19,000	-25,000
Salvage Value, $	10,000	$8,000

A1 = A2

a) *10 %* *b)* *9 %*
c) *14 %*

22. The cash flows associated with two alternatives are tabulated in the table below. The equation used to find the rate of return on the increment of investment between the two alternatives is

Year	Alt A	Alt B	B-A
0	-2500	-3500	-1000
1	1000	1500	500
2	1000	1500	500
3	1000	1500	500

a) *0 = -1000 + 500 (A/P, i ,3)* *b)* *0 = -1000(P/F, i, 3) + 500(F/A, i, 3)*
c) *0 = -1000(P/F, i, 3) + 500(F/A, i, 3)* *d)* *None of the Above*

23. At the end of each year, a worker invests $2,000 into an account for 4% interest rate. The worker makes every payment for the next 30 years except for the payment at the end of 10th year. That is, no money is invested at the end of year 10. How much money will be in the account at the end of the 30 years?

a) $ 107,788
b) $ 109,209
c) $ 108,568
d) $ 112,170

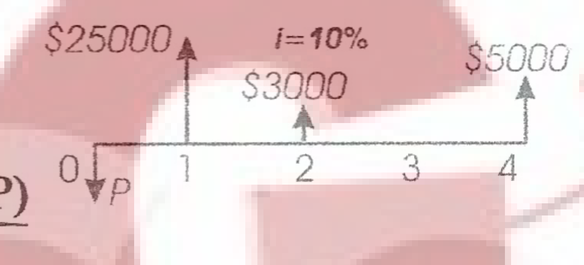
24. The fixed costs for producing a certain item are $200,000 per year. If the item sells for $50 per unit and it has a variable cost of $30 per unit, the number of units the company must sell each year to break even is:?

a) 11000 units
b) 9000 units
c) 18500 units
d) 10000 units

25. The overall rate of return results shown below are for independent alternatives. If the company's MARR is 10% per year, the ones which should be selected are:

	W	X	Y	Z
First Cost, $	-30,000	-65,000	-75,000	-92,000
Rate of Return, %	16	9	22	7

a) X,Y
b) W,Y
c) Z,W
d) X,Z



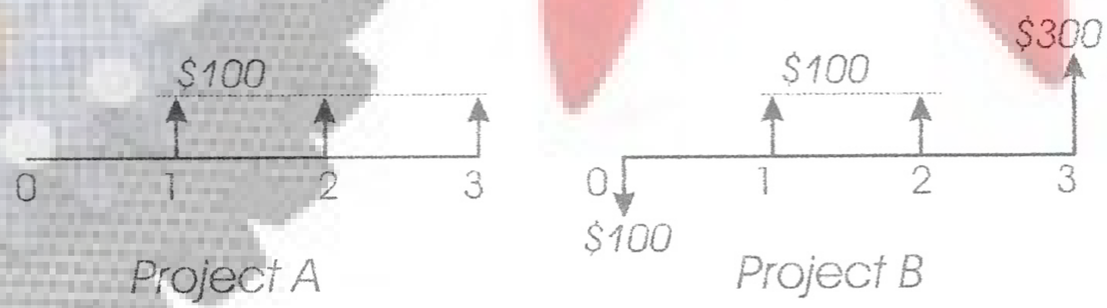
26. Consider the cash flow diagram, how much do you need to deposit today (P)

a) $28,622
b) $2479
c) $22727
d) $3415

27. Suppose that the exchange rate between the dollar and the Euro is fixed at 1 Euro per dollar. If U.S. inflation rises relative to Euro, this will force:

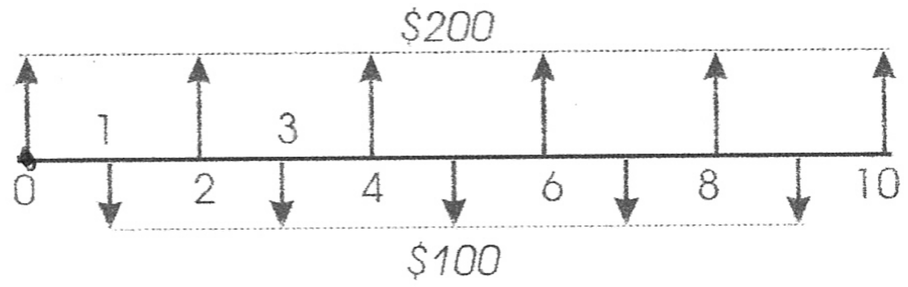
a) The U.S. central bank to sell dollars and increase their holdings of Euros.
b) The U.S. central bank to sell dollars and decrease their holdings of Euros
c) The U.S. central bank to buy up excess dollars and reduce their holdings of Euros
d) The U.S. central bank to buy up excess dollars and increase their holdings of Euros.

28. The internal rate of return of the difference between project B and A (i.e., B-A) is:



a) 10%
b) $\sqrt[3]{300/100} - 1$
c) $\sqrt[3]{200/100} - 1$
d) $\sqrt[3]{400/100} - 1$
e) less than 10%

29. The present worth of the following series of payments for i≈2% per year is:



a) $1090.4
b) $463
c) $453.9
d) $636.5
e) $1253.4
f) $890.4

30. As the price of a bond rises, the yield on the bond:

a) Could rise or fall
b) falls
c) Rises.
d) Does not change.

Compound Interest Factors

2%

n	F/P	A/P	F/A	P/A
1	1.020	1.0200	1.000	0.980
2	1.040	.5151	2.020	1.942
3	1.061	.3468	3.060	2.884
4	1.082	.2626	4.122	3.808
5	1.104	.2122	5.204	4.713
6	1.126	.1785	6.308	5.601
7	1.149	.1545	7.434	6.472
8	1.172	.1365	8.583	7.325
9	1.195	.1225	9.755	8.162
10	1.219	.1113	10.950	8.983
11	1.243	.1022	12.169	9.787
12	1.268	.0946	13.412	10.575
13	1.294	.0881	14.680	11.348
14	1.319	.0826	15.974	12.106
15	1.346	.0778	17.293	12.849
16	1.373	.0737	18.639	13.578
17	1.400	.0700	20.012	14.292
18	1.428	.0667	21.412	14.992
19	1.457	.0638	22.840	15.678
20	1.486	.0612	24.297	16.351
21	1.516	.0588	25.783	17.011
22	1.546	.0566	27.299	17.658
23	1.577	.0547	28.845	18.292
24	1.608	.0529	30.422	18.914
25	1.641	.0512	32.030	19.523

4%

n	F/P	F/A	P/A
1	1.040	1.000	0.962
2	1.082	2.040	1.886
3	1.125	3.122	2.775
4	1.170	4.246	3.630
5	1.217	5.416	4.452
6	1.265	6.633	5.242
7	1.316	7.898	6.002
8	1.369	9.214	6.733
9	1.423	10.583	7.435
10	1.480	12.006	8.111
11	1.539	13.486	8.760
12	1.601	15.026	9.385
13	1.665	16.627	9.986
14	1.732	18.292	10.563
15	1.801	20.024	11.118
16	1.873	21.825	11.652
17	1.948	23.697	12.166
18	2.026	25.645	12.659
19	2.107	27.671	13.134
20	2.191	29.778	13.590
21	2.279	31.969	14.029
22	2.370	34.248	14.451
23	2.465	36.618	14.857
24	2.563	39.083	15.247
25	2.666	41.646	15.622

$$d_1 = B(R),$$

$$d_k = B(1-R)^{k-1}(R),$$

$$d_k^* = B[1-(1-R)^k],$$

$$\mathrm{BV}_k = B(1-R)^k.$$

The bonds: $V_n = C(P/F, i\%, N) + rZ(P/A, i\%, N)$

$$i_r = \frac{i_m - f}{1+f}$$

10%

n	P/F	A/F	P/A
1	.9091	1.0000	0.909
2	.8264	.4762	1.736
3	.7513	.3021	2.487
4	.6830	.2155	3.170
5	.6209	.1638	3.791
6	.5645	.1296	4.355
7	.5132	.1054	4.868
8	.4665	.0874	5.335
9	.4241	.0736	5.759
10	.3855	.0627	6.145
11	.3505	.0540	6.495
12	.3186	.0468	6.814
13	.2897	.0408	7.103
14	.2633	.0357	7.367
15	.2394	.0315	7.606

To Find:	Given:		
For single cash flows:			
F	P	e^{rN}	
P	F	e^{-rN}	$(F/A, i\%, N) = \frac{(1+i)^N - 1}{i}$
F	A	$\frac{e^{rN}-1}{e^r-1}$	$(P/A, i\%, N) = \frac{(1+i)^N - 1}{i(1+i)^N}$
P	A	$\frac{e^{rN}-1}{e^{rN}(e^r-1)}$	$(A/F, i\%, N) = \frac{i}{(1+i)^N - 1}$
A	F	$\frac{e^r-1}{e^{rN}-1}$	$(A/P, i\%, N) = \frac{i(1+i)^N}{(1+i)^N - 1}$
A	P	$\frac{e^{rN}(e^r-1)}{e^{rN}-1}$	$(P/G, i\%, N) = \frac{1}{i}\left[\frac{(1+i)^N - 1}{i(1+i)^N} - \frac{N}{(1+i)^N}\right]$
$i = (1 + r/M)^M - 1,$			$(A/G, i\%, N) = \frac{1}{i} - \frac{N}{(1+i)^N - 1}$