

1- A small metal – machining company produces parts according to customer order. One particular is frequently ordered in batch sizes 15-150 units . the company has determined that the part can be produced on three different machine tools M1, M2,M3. An economic analysis reveals the following data.

Machine	Fixed cost/order	Variable cost/unit
M1	\$300	\$9
M2	500	5
M3	750	3

a- Use both graphical and analytical approaches , determine the most economical machine(s) to use for order sizes from 0-150 units.

b- For an order size of 75 units, what the minimum total cost for machining order.

2- Answer the following:

a- Differentiate between depreciation methods (sketch your answer)

b- An individual purchased an asphalt plant 6 years ago for \$ 250000 . He expects to sell it when it is 12 years old for \$70000. he has an offer to sell it now and asks you to find the current depreciated book value for the plant. You explain that there are three common depreciation methods for finding book value. Find the current book value is by all the three methods.

3- Discuss the following:

a- The cost structure for manufacturing.

b- Measuring the worth of investment methods

c- Total cash flow approach (Ranking Approach) and Incremental cash flow approach

d- Why payback period method is recommended for use.

e- How MARR can be specified.

4- Brock Associates invested \$40000 in a business venture with the following cash flow results:

EOY	CF	EOY	CF	EOY	CF
0	-\$40000	3	\$11000	6	\$11000
1	5000	4	14000	7	8000
2	8000	5	14000	8	5000

If MARR is 15 %, determine the following :

a- Present worth

b- Annual worth

c- Future worth

d- Internal rate of return

e- External rate of return

f- Savings / investment ratio

g- Payback period

5- Given the following table, compare alternatives using :

a- Ranking approaches (PW, AW, FW)

b- Incremental approaches (IRR, ERR, S/I ratio)

Note (MARR= 15%)

Cash flow profiles for four investment alternatives				
Net cash flows for Alternatives				
End of year, t	A _{0t}	A _{1t}	A _{2t}	A _{3t}
0	\$0	\$ 0	-\$50000	-\$75000
1	0	4500	20000	20000
2	0	4500	20000	25000
3	0	4500	20000	30000
4	0	4500	20000	35000
5	0	4500	20000	40000

10%

Compound Interest Factors

10%

n	SINGLE PAYMENT		UNIFORM PAYMENT SERIES				GRADIENT SERIES	
	Compound Amount Factor	Present Worth Factor	Sinking Fund Factor	Capital Recovery Factor	Compound Amount Factor	Present Worth Factor	Gradient Uniform Series	Gradient Present Worth
	Find F Given P F/P	Find P Given F P/F	Find A Given F A/F	Find A Given P A/P	Find F Given A F/A	Find P Given A P/A	Find A Given G A/G	Find P Given G P/G
1	1.100	.9091	1.0000	1.1000	1.000	.909	0	0
2	1.210	.8264	.4762	.5762	2.100	1.736	.476	.826
3	1.331	.7513	.3021	.4021	3.310	2.487	.937	2.329
4	1.464	.6830	.2155	.3155	4.641	3.170	1.381	4.378
5	1.611	.6209	.1638	.2638	6.105	3.791	1.810	6.862
6	1.772	.5645	.1296	.2296	7.716	4.355	2.224	9.684
7	1.949	.5132	.1054	.2054	9.487	4.868	2.622	12.763
8	2.144	.4665	.0874	.1874	11.436	5.335	3.004	16.029
9	2.358	.4241	.0736	.1736	13.579	5.759	3.372	19.421
10	2.594	.3855	.0627	.1627	15.937	6.145	3.725	22.891

15%

Compound Interest Factors

15%

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	Find F Given P F/P	Find P Given F P/F	Find A Given F A/F	Find A Given P A/P	Find F Given A F/A	Find P Given A P/A	Find A Given G A/G	Find P Given G P/G
1	1.150	.8696	1.0000	1.1500	1.000	.870	0	0
2	1.323	.7561	.4651	.6151	2.150	1.626	.465	.756
3	1.521	.6575	.2880	.4380	3.472	2.283	.907	2.071
4	1.749	.5718	.2003	.3503	4.993	2.855	1.326	3.786
5	2.011	.4972	.1483	.2983	6.742	3.352	1.723	5.775
6	2.313	.4323	.1142	.2642	8.754	3.784	2.097	7.937
7	2.660	.3759	.0904	.2404	11.067	4.160	2.450	10.192
8	3.059	.3269	.0729	.2229	13.727	4.487	2.781	12.481
9	3.518	.2843	.0596	.2096	16.786	4.772	3.092	14.755
10	4.046	.2472	.0493	.1993	20.304	5.019	3.383	16.979

20%

Compound Interest Factors

20%

n	SINGLE PAYMENT		UNIFORM PAYMENT SERIES				GRADIENT SERIES	
	Compound Amount Factor	Present Worth Factor	Sinking Fund Factor	Capital Recovery Factor	Compound Amount Factor	Present Worth Factor	Gradient Uniform Series	Gradient Present Worth
	Find F Given P F/P	Find P Given F P/F	Find A Given F A/F	Find A Given P A/P	Find F Given A F/A	Find P Given A P/A	Find A Given G A/G	Find P Given G P/G
1	1.200	.8333	1.0000	1.2000	1.000	.833	0	0
2	1.440	.6944	.4545	.6545	2.200	1.528	.455	.694
3	1.728	.5787	.2747	.4747	3.640	2.106	.879	1.852
4	2.074	.4823	.1863	.3863	5.368	2.589	1.274	3.299
5	2.488	.4019	.1344	.3344	7.442	2.991	1.641	4.906
6	2.986	.3349	.1007	.3007	9.930	3.326	1.979	6.581
7	3.583	.2791	.0774	.2774	12.916	3.605	2.290	8.255
8	4.300	.2326	.0606	.2606	16.499	3.837	2.576	9.883
9	5.160	.1938	.0481	.2481	20.799	4.031	2.836	11.434
10	6.192	.1615	.0385	.2385	25.959	4.192	3.074	12.887