

CVL775		CONSTRUCTION ECONOMICS AND FINANCE	MINOR EXAMINATION	
Time allowed 1 hour	16:00 - 17:00		Maximum Marks	20
Venue	LH 410		Date	23.03.2023

ANSWER ALL QUESTIONS. EVALUATION WOULD BE DONE ON THE BASIS OF STEPS USED IN THE SOLUTION. ASSUME MISSING DATA SUITABLY IF REQUIRED. USE OF SCIENTIFIC CALCULATOR, INTEREST TABLE, AND FORMULA SHEETS ARE ALLOWED.

- Q 1. Plans are underway to introduce a new machine to increase output. There are two alternatives, machine A and B. Acquisition cost of the former is \$30,000 and for the latter is \$50,000. Operating costs are paid at the end of each month in proportion to the number of units produced. Fixed costs are paid at the end of each half-year. Assume that fixed costs are not required for zero units of production, the useful life of either machine is 4 years, and the cost of capital is 1% compounded monthly. Specific costs for each machine are shown below.

	Machine A	Machine B
Operating cost (per unit)	\$0.70	\$0.50
Fixed cost (every 6 months)	\$800	\$1300

- (a) Find the break-even production level at which machines A and B are equally attractive. (4 marks)
- (b) If the two machines have already been purchased, determine which machine should be used at different levels of production for greatest economy. (4 marks)
- Q 2. An investment is being considered that requires \$ 1 million and commits the money for 10 years. During that period, it is equally likely that the annual returns from the investment will be \$100,000, \$150,000, and \$200,000. The probability is 0.75 that the salvage value will be \$300,000, but there is 1 chance in 4 that it will be zero. A minimum rate of return of 10% is expected. Construct an investment risk profile for the proposal on a chart in which the horizontal axis registers the net PW and the vertical axis is a probability scale ranging from 0 to 1. Draw the curve to show the probability of returns equal or less than the scaled PWs. (6 marks)
- Q 3. Assess the replacement age of a delivery truck assuming that the resale value will remain high and it will operate efficiently for 20 years or more. The initial cost of the equipment is \$15,000. The operating cost of the plant is \$500 in the 1st year when manufactures warrantees operate and \$1,000 in the second year increasing by \$300 per annum thereafter. The resale value is determined to decrease by 12.5% per annum compound. The cost of capital is 12%. (6 marks)

8-year.



12% interest factors for discrete compounding periods

n	F/P, I, n	P/F, I, n	F/A, I, n	A/F, I, n	P/A, I, n	A/P, I, n	A/G, I, n
1	1.120	0.8929	1.000	1.0000			
2	1.254	0.7972	2.120	0.4717	0.8929	1.1200	0.0000
3	1.405	0.7118	3.374	0.2963	1.6901	0.5917	0.4717
4	1.574	0.6355	4.779	0.2092	2.4018	0.4163	0.9246
5	1.762	0.5674	6.353	0.1574	3.0373	0.3292	1.3589
6	1.974	0.5066	8.115	0.1232	3.6048	0.2774	1.7746
6	1.974	0.5066	8.115	0.1232	4.1114	0.2432	2.1720
7	2.211	0.4523	10.089	0.0991	4.1114	0.2432	2.1720
8	2.476	0.4039	12.300	0.0813	4.5638	0.2191	2.5515
9	2.773	0.3606	14.776	0.0677	4.9676	0.2013	2.9131
10	3.106	0.3220	17.549	0.0570	5.3282	0.1877	3.2574
11	3.479	0.2875	20.655	0.0484	5.6502	0.1770	3.5847
12	3.896	0.2567	24.133	0.0414	5.9377	0.1684	3.8953
13	4.363	0.2292	28.029	0.0357	6.1944	0.1614	4.1897
14	4.887	0.2046	32.393	0.0309	6.4235	0.1557	4.4683
15	5.474	0.1827	37.280	0.0268	6.6282	0.1509	4.7317
16	6.130	0.1631	42.753	0.0234	6.8109	0.1468	4.9803
17	6.866	0.1456	48.884	0.0205	6.9740	0.1434	5.2147
18	7.690	0.1300	55.750	0.0179	7.1196	0.1405	5.4353
19	8.613	0.1161	63.440	0.0158	7.2497	0.1379	5.6427
20	9.646	0.1037	72.052	0.0139	7.3658	0.1358	5.8375
21	10.804	0.0926	81.699	0.0122	7.4694	0.1339	6.0202
22	12.100	0.0826	92.503	0.0108	7.5620	0.1322	6.1913
23	13.552	0.0738	104.603	0.0096	7.6446	0.1308	6.3514
24	15.179	0.0659	118.155	0.0085	7.7184	0.1296	6.5010
25	17.000	0.0588	133.334	0.0075	7.7843	0.1285	6.6406
30	29.960	0.0334	241.333	0.0041	7.8431	0.1275	6.7708
35	52.800	0.0189	431.663	0.0023	8.0552	0.1241	7.2974
40	93.051	0.0107	767.091	0.0013	8.1755	0.1223	7.6577
45	163.988	0.0061	1358.230	0.0007	8.2438	0.1213	7.8988
50	289.002	0.0035	2400.018	0.0004	8.2825	0.1207	8.0572
55	509.321	0.0020	4236.005	0.0002	8.3045	0.1204	8.1597
60	897.597	0.0011	7471.641	0.0001	8.3170	0.1202	8.2251
65	1581.872	0.0006	13173.937	0.0001	8.3240	0.1201	8.2664
70	2787.800	0.0004	23223.332	0.0000	8.3281	0.1201	8.2922
75	4913.056	0.0002	40933.799	0.0000	8.3303	0.1200	8.3082
80	8658.483	0.0001	72145.693	0.0000	8.3316	0.1200	8.3181
85	15259.206	0.0001	127151.714	0.0000	8.3324	0.1200	8.3241
90	26891.934	0.0000	224091.119	0.0000	8.3328	0.1200	8.3278
95	47392.777	0.0000	394931.472	0.0000	8.3330	0.1200	8.3300
100	83522.266	0.0000	696010.548	0.0000	8.3332	0.1200	8.3313
					8.3332	0.1200	8.3321