

Menoufiya University
 Faculty of Engineering
 Shebin El- Kom
 Second Semester Examination
 Academic Year: 2012-2013
 Date: 18/6/2013



Dept.: Mechanical Power
 Year : Third
 Subject: Engineering Economy
 Code : PRE 328
 Time Allowed: 2 hours
 Total Marks : 40 Marks

Examiner: Dr/ Mohamed Hesham Belal

Allowed Tables and Charts: Tables -Interest Factors for Discrete Compounding are included with the Exam.
 This exam measures ILOS no.:(a7, a16, b8 , b9 , b10 , c1).

Answer All The Following Questions:

Question No.(1):

[10 Mark]

- (a)- Determine diagrammatically the elements of costs to state the selling price. [3]
 (b)- Write notes on the Economic Concepts: Sensitivity Analysis – Feasibility Studies – The Inventory and its important. [3]
 (c)- Define the different methods for economical assessment of projects, Stating for these methods the decision rule for a single project. [4]

Question No.(2):

[10 Mark]

- (a)- A special purpose machine was purchased for 300,000 L.E with an expected life of 15 years and a salvage value of 15,000 L.E.
 What will be the depreciation charge and book value at the end of the tenth year?
 Use: 1- Straight line method, 2- Declining balance method, and
 3- Sum-of-years digit method. [5]
- (b)- The construction of a road is cost 12,000,000 L.E. while its maintenance costs are:
 - *Annually* started in end of the first year with amount 25,000 L.E. while it increases by 2,000 L.E. in the next ten years and 50,000 L.E. after that, and
 - *Periodically* by 100,000 L.E. every five years. Note that the rate of compound interest of 9% annually and the road project's has been taken as long live project.
 What is the capital cost and the annual equivalent cost? [5]

Question No.(3):

[10 Mark]

- (a)- If the first cost of equipment is 145,000 L.E. The annual return for this equipment in the first year is 35,000 L.E, while it decreases by amount 3,000 L.E annually. If the MARR is 9% using the present worth value method to indicate the sensitivity of the estimated life which its value fluctuate between 7 and 11 years. Then state the payback period for this equipment and the conditions to have economical feasibility. [4]
- (b)- A company needs to buy a new production line for brick. There are two proposals available to do the same job: A- Automatic production line, B- Half automatic production line. The next table has the cash flow money for the two proposals. [6]

Proposal	First Cost (L.E.)	Annual operation cost (L.E.)	Annual labor cost (L.E.)	Salvage value (L.E.)	Estimated life (years)
A	260,000	25,000	30,000	40,000	14
B	100,000	15,000	60,000	10,000	7

Which one can be chosen to have economical feasibility if the annual rate of return is 9% by using: 1- The Present Worth Value method, 2- The Annual Equivalent Value method.

Question No.(4):

[10 Mark]

(a)- The demand for plastic components for a manufacturing company is 560 units per week. The production manager has estimated that the production cost is 5 L.E/ unit, the setup costs is 215 L.E/ production run and holding cost is estimated at 1.8% of unit cost per month. The production manager stated that the production rate is 700 units/day. Assume 320 days/ year and 52 weeks/ year.

- Calculate:** 1- The optimum production quantity per run,
 2- The optimum number of production runs per year and the cycle time,
 3- The total annual inventory cost,
 4- The reorder point if the lead time is 11 day.
 5- Draw the inventory model showing all the information on it. [5]

(b)- The following table shows the data of annual costs at two levels of tape player production. The sold selling price of a tape player is 40 L.E.

Costs items	Q ₁ = 6,000 unit/year	Q ₂ =10,000 unit/ year
Labor Costs	60,000	100,000
Material Costs	48,000	80,000
Fixed Costs	154,000	154,000

Use the mathematical and graphical methods to:

- Find the break-even point and the profit or loss/year at production quantity 8,000 units,
- Estimate the suitable production quantity for a profit equal 25% of the fixed cost,
- If the selling price is decreased by 15%, what is the break-even point and the profit or loss/year at production quantity 8,000 units. [5]

INTEREST FACTORS FOR INTEREST RATE (9.0%)

n	Single Payment		Equal Payment Series				Gradient Series	
	Compound Amount Factor (F/P,i,n)	Present Worth Factor (P/F,i,n)	Compound Amount Factor (F/A,i,n)	Sinking Fund Factor (A/F,i,n)	Present Worth Factor (P/A,i,n)	Capital Recovery Factor (A/P,i,n)	Gradient Uniform Series (A/G,i,n)	Gradient Present Worth (P/G,i,n)
1	1.0900	0.9174	1.0000	1.0000	0.9174	1.0900	0.0000	0.0000
2	1.1881	0.8417	2.0900	0.4785	1.7591	0.5685	0.4785	0.8417
3	1.2950	0.7722	3.2781	0.3051	2.5313	0.3951	0.9426	2.3860
4	1.4116	0.7084	4.5731	0.2187	3.2397	0.3087	1.3925	4.5113
5	1.5386	0.6499	5.9847	0.1671	3.8897	0.2571	1.8282	7.1110
6	1.6771	0.5963	7.5233	0.1329	4.4859	0.2229	2.2498	10.0024
7	1.8280	0.5470	9.2004	0.1087	5.0330	0.1987	2.6574	13.3746
8	1.9926	0.5019	11.0285	0.0907	5.5348	0.1807	3.0512	16.8877
9	2.1719	0.4604	13.0210	0.0768	5.9952	0.1668	3.4312	20.5710
10	2.3674	0.4224	15.1929	0.0658	6.4177	0.1558	3.7978	24.4728
11	2.5804	0.3875	17.5603	0.0569	6.8052	0.1469	4.1510	28.2488
12	2.8127	0.3555	20.1407	0.0497	7.1607	0.1397	4.4910	32.1590
13	3.0658	0.3262	22.9534	0.0436	7.4869	0.1336	4.8182	36.0751
14	3.3417	0.2992	26.0192	0.0384	7.7862	0.1284	5.1326	39.9633
15	3.6425	0.2745	29.3609	0.0341	8.0607	0.1241	5.4346	43.8049
16	3.9703	0.2519	33.0034	0.0303	8.3126	0.1203	5.7245	47.5849
17	4.3276	0.2311	36.9737	0.0270	8.5436	0.1170	6.0024	51.2825
18	4.7171	0.2120	41.3013	0.0242	8.7556	0.1142	6.2687	54.8850
19	5.1417	0.1945	46.0185	0.0217	8.9501	0.1117	6.5236	58.3888
20	5.6044	0.1784	51.1601	0.0195	9.1285	0.1095	6.7674	61.7770

With my best wishes