Name_____ E-mail_____

EM 600 Engineering Economics and Cost Analysis, **Homework #1**

School of Systems & Enterprises, Stevens Institute of Technology

"I PLEDGE MY HONOR THAT I HAVE ABIDED BY THE STEVENS HONOR SYSTEM"

By: _____

QUESTION 1:

a. Three years ago, your company required the purchase of a construction equipment at a cost of $11,000. It can now be sold for $4,000. If the machine is kept, the annual O & M costs will amount to $1,800. If it is kept and operated for the next 5 years, determine the amount at time zero (now) equivalent to the cost of owning and operating the equipment for the next 5 year period. It is anticipated that the item can be sold for $900 at the end of the five year period. Use an interest rate of 7%. **[3 points]**

b. Daryl makes a $150 monthly motorcycle payment, which is based on 9% annual interest, compounded monthly. Determine:

   i. The price of the bike bought if Daryl made down payments of $2,000 and financed the rest of the amount for 4 years. **[2 points]**

   ii. What would be the payoff amount as the time of the 31st payment? **[2 points]**

c. What single amount on April 1, 2018 is equivalent to a series of equal, quarterly cash flows of $2,000, starting with a cash flow on April 1, 2018 and ending on October 1, 2022? Use an interest rate of 14% and quarterly compounding. **[2 points]**

QUESTION 2:

a. Thirteen deposits of $1,500 are made at the end of every quarter at an interest rate of 6% compounded quarterly and another deposit of $3,000 is made every six months at an interest rate of 12% for three years. What are effective interest rates in both the cases? **[2 + 2 points]**

b. You are purchasing a $35,000 automobile, which is to be paid for in 48 monthly installments of $900. What effective annual interest is he paying for this financing arrangement? **[2 points]**

QUESTION 3:
DO NOT USE THE EXCEL PV, PMT AND FV FUNCTIONS FOR THIS QUESTION.

MAXCORP associates purchased a laser cutter for $8,000 in year 0. The useful life of the machine is 8 years, at the end of which, the machine is estimated to have a $3,000 salvage value. With the use of this new machine generates annual revenues of $4,000. The annual operating and maintenance expenses are estimated to be $500. If the organization's MARR is9%, calculate the following:

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a. Draw the cash flow diagram for the project. **[1 point]**
b. Calculate the present worth of the project. [**3 points]**
c. Calculate the annual worth of the project (Do not use PW or FW to calculate AW). **[3 points]**
d. Calculate the future worth of the project (Do not use AW or PW to calculate FW). **[3 points]**

QUESTION 4:
With the same set of data as Question 3, determine the following:

a. **Using the PV function in Excel**, calculate the present worth of the project. **[3 points]**
b. **Using the PMT function in Excel**, calculate the annual worth of the project (Do not use PW or FW to calculate AW). **[3 points]**
c. **Using the FV function in Excel**, calculate the future worth of the project (Do not use AW or PW to calculate FW). **[3 points]**
d. Submit your excel file electronically. **[1 point]**

NOTE:
Sample answer provided. Please show something similar in your submission to receive full credit.

Sample Answer:

PW = $100,000 = B29 + PV (B33,B34,-B35) + PV(B33,B34,,-B32)

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QUESTION 5:
Mola Cabeza Inc. has just purchased a new machine. The machine cost $120,000 and has an estimated service life of 10 years. At that time, the estimated salvage value would be $22,000. The machine is expected to operate 14,000 hours per year. The expected annual operating and maintenance cost would be $8,000. If your firm's interest rate is 10%.

a. Calculate the capital recovery cost for the machine. **[4 points]**
b. Calculate the total EUAC for the machine. **[3 points]**
c. Calculate what the machine costs per hour? **[3 points]**