QUESTION 1

PART a **[3 points]**

Three years ago, your company required the purchase of a construction equipment at a cost of $11,000. It can now b 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 can be sold for $900 at the end of the five year period. Use an interest rate of 7%.

P	=	$4,000
O & M	=	$1,800
n	=	5 years
Salvage	=	$900
Rate	=	7%

PW = $4,000 + $1,800 (P/A, 7%, 5) - $900 (P/F, 7%, 5)

= **$10,738.67**

PART b **[2 + 2 points]**

Daryl makes a $150 monthly motorcycle payment, which is based on 9% annual interest, compounded monthly. Dete i. The price of the bike bought if Daryl made down payments of $2,000 and financed the rest of the amount for 4 yea ii. Determine the pay-off at the time of the 31st payment.

i)

i= 0.09/12

= 0.0075 $40.18

price of the bike = $150 (P/A, i, 48) + $2,000

= **$8,027.72**

ii)

Payoff amount at the time of 31st payment

= $150 + $150 (P/A, i, 30) $26.78

= **$4,166.26**

PART C **[2 points]**

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 compou

A	=	$2,000
First cash flow	=	Apr-18
Last Cash Flow	=	Oct-22

Therefore, the number of quarterly periods:

= 4.5 * 4 = 18

Periodic Interest Rate

= 14% / 4 = 3.50%

The single amount in April 2016 is:

= $2,000 (P/A, 3.5%, 18) $13.19

= **$26,379.36**

can now be sold for $4,000. If the machine is kept,

ear period.

nthly. Determine:
t for 4 years.

y compounding.

LECTURE 2
CHAPTER 4

PART a **[4 points]**
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]

Effective Interest Rate for the First Option

Nominal rate	=	6% compunded quarterly		
Periodic rate	=	6%/4	=	1.50%
Effective Interest rate	=	$(1+0.015)^4 - 1$		
	=	**6.14%**		

Effective Interest Rate for the Second Option

Nominal rate	=	12% compunded every six months		
Periodic rate	=	12%/2	=	6.00%
Effective Interest rate	=	$(1+0.06)^2 - 1$		
	=	**12.36%**		

PART b **[2 points]**
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]

In order to solve this problem, we first need to determine the periodic rate and then calculate the effective annual interest rate based on the periodic rate

P	=	$35,000
A	=	$900.00
Periodic rate	=	?

P	=	A(P/A, i,n)
$35,000	=	$900 * (P/A, i, 48)
$38.88889	=	(P/A, i, 48)

NOTE: $(A/P, i, n) = i(1+i)^n / ((1+i)^n - 1)$

Solving for i, we have

$38.89 0.89%

i **=** **0.89% / month**

Now that we have the periodic rate, the effective interest rate can be calculated as follows:

$$i_{eff} = (1 + 0.0089)^{12} - 1$$
$$= \mathbf{11.27\%}$$

LECTURE 3
CHAPTER 5

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 is 9%, calculate the following:

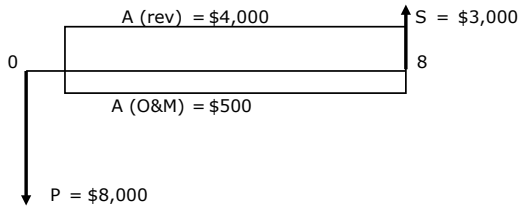
a. Draw the cash flow diagram for the project. [1 point]
b. Calculate the present worth of the project (Do not use AW or FW to calculate PW). [3 points]
c. Calculate the annual worth of the project (Do not use PW or FW to calculate AW). [3 points]
d. Calculate the future worth of the project (Do not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

PART a [1 point]
a. Draw the cash flow diagram for the project. [1 point]

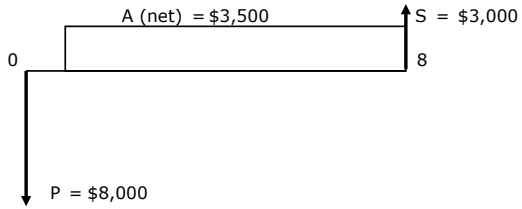
GIVEN:

P	$8,000
A (rev)	$4,000
A (O&M)	$500
S	$3,000
MARR, i	9%
N	8

Solution 1:



Solution 2:



PART b **[3 points]**

b. Calculate the present worth of the project (Do not use AW or FW to calculate PW). [3 points]

PW	=	-P	+	A	x	(P/A,i,N)	+	S	x	(P/F,i,N)
PW	=	-$8,000	+	$3,500	x	(P/A,9%,8)	+	$3,000	x	(P/F,9%, 8)
PW	=	-$8,000	+	$3,500	x	5.5348	+	$3,000	x	0.5019
PW	=	$12,877								

PART c **[3 points]**

c. Calculate the annual worth of the project (Do not use PW or FW to calculate AW). [3 points]

AW	=	-P	x	(A/P,i,N)	+	A	+	S	x	(A/F,i,N)
AW	=	-$8,000	x	(A/P,9%,8)	+	$3,500	+	$3,000	x	(A/F,9%,8)
AW	=	-$8,000	x	0.1807	+	$3,500	+	$3,000	x	0.0907
AW	=	$2,327								

PART d **[3 points]**

d. Calculate the future worth of the project (Do not use AW or PW to calculate FW). [3 points]

FW	=	-P	x	(F/P,i,N)	+	A	x	(F/A,i,N)	+	S
FW	=	-$8,000	x	(F/P,9%,8)	+	$3,500	x	(F/A,9%,8)	+	$3,000
FW	=	-$8,000	x	1.9926	+	$3,500	x	11.0285	+	$3,000
FW	=	$25,659								

LECTURE 3
CHAPTER 5

Using the same set of data from question 3, calculate the following:

a. Using the PV function in Excel, calculate the present worth of the project.
(Do not use AW or FW to calculate PW). [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)

GIVEN:

P	$8,000
A (rev)	$4,000
A (O&M)	$500
S	$3,000
MARR, i	0.09
N	8

PART a [3 points]

a. Using the PV function in Excel, calculate the present worth of the project.

PW	=	-P	+	A	x	(P/A,i,N)	+	S	x	(P/F,i,N)
PW	=	-$8,000	+	$3,500	x	(P/A,9%,8)	+	$3,000	x	(P/F,9%,8)
PW	=	-$8,000	+	$3,500	x	5.5348	+	$3,000	x	0.5019
PW	=	$12,877								

Using PV function:

PW	=	$12,877	=C41+PV(B29,B30,-E41)+PV(B29,B30,,-I41)

PART b [3 points]

b. Using the PMT function in Excel, calculate the annual worth of the project.

AW	=	-P	x	(A/P,i,N)	+	A	+	S	x	(A/F,i,N)
AW	=	-$8,000	x	(A/P,9%,8)	+	$3,500	+	$3,000	x	(A/F,9%,N)
AW	=	-$8,000	x	0.1807	+	$3,500	+	$3,000	x	0.0907
AW	=	$2,327								

Using PMT function:

AW	=	$2,327	=G59+PMT(B29,B30,-C59)+PMT(B29,B30,,-I59)

PART c [3 points]

c. Using the FV function in Excel, calculate the future worth of the project.

FW	=	-P	x	(F/P,i,N)	+	A	x	(F/A,i,N)	+	S
FW	=	-$8,000	x	(F/P,9%,8)	+	$3,500	x	(F/A,9%,8)	+	$3,000
FW	=	-$8,000	x	1.9926	+	$3,500	x	11.0285	+	$3,000
FW	=	$25,659								

Using FV function:

FW	=	$25,659	=K76-FV(B29,B30,,C76)-FV(B29,B30,G76)

PART d [1 point]

d. Submit your excel file electronically. [1 point]

LECTURE 3
CHAPTER 6

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]

Mola Cabeza Inc. has just purchased a new machine The machine cost $120,000 and has an estimated service life of 10 years.

GIVEN:

I	$120,000
S	$22,000
A (O&M)	$8,000
i	10%
N	10
Hours/year	14000

PART a [4 points]
a. Calculate the capital recovery cost for the machine. [4 points]

$$CR(i) = (I - S)(A/P,i,N) + iS$$

CR (i)	=	(	I	-	S	) x	(A/P,i,N)	+	i	x	S
CR (i)	=	(	$120,000	-	$22,000	) x	(A/P,10%,10)	+	10%	x	$22,000
CR (i)	=	(	$120,000	-	$22,000	) x	0.1627	+	10%	x	$22,000
CR (i)	=	**$18,149**									

PART b [3 points]
b. Calculate the total EUAC for the machine. [3 points]

$$EUAC(i) = CR(i) + [O + M](i)$$

CR (i)	=	$18,149
[O & M](i)	=	$8,000
EUAC (i)	=	**$26,149**

PART c [3 points]
c. Calculate what the machine costs per hour? [3 points]

EUAC (i)	=	$26,149
Hours/year	=	14000
Cost/hour	=	**$1.87**

vice life of 10 years. Atthat time, the estimated salvage value would be $22,000. The machine isexpected to operate 14,000 hours per year. The expected annual operatingand maintenance cost would be $8,000. If your firm’s interest rate is 10%.