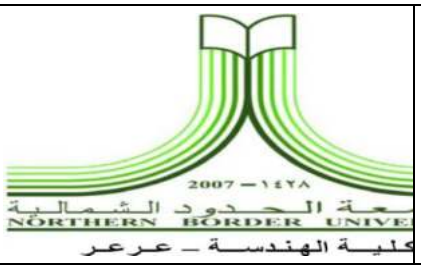
Kingdom of Saudi Arabia Ministry of Education Northern Border University		College of Engineering Industrial Engineering Department

(1405-202) Engineering Economy
Teke home Exam 1 SPRING 1440-1441 H

Student Name: محمد علوم الشمري

Student ID: 201902648

Question	Mark	Full mark
1st		10
2nd		10
3rd		10
Total		30

Each student has their own interest Rate as shown in the table below (Table1):

No.	Student ID	Student Name	Interest rate *i* %
1	201902807	أنور هليل سلمان المطرفي	1
2	201805128	أيمن سيار خزيم المضياني العنزي	2
3	201702405	بنيان كساب بنيان العنزي	3
4	201902768	خالد احمد مطني المنيجل الجميلي	4
5	201902830	خالد فهد مرضي الوريكي الحازمي	5
6	201804434	سلمان منصور ارشيد المجلاد	6
7	201903292	ضاري خليف عامق الدهمشي العنزي	7
8	201903343	عايد بشير عايد الحمد الحازمي	8
9	201902835	عبد السلام عبد الله الطوير العنزي	9
10	201902653	عبدالاله مطر عيد الدرويش الحازمي	10
11	201805023	عبدالعزيز مسيعيد حمدان المسيلمي الرشيدي	11
12	201903242	عبدالعزيز مهدي خلف الشملاني العنزي	12
13	201902721	عبدالله رمضان عبدالله الدهمشي العنزي	13
14	201902725	علي لافي عزام الشرهه الحازمي	14
15	201806221	عوض زيدان عايد المضياني العنزي	15
16	201805691	غالب سرحان سفاح الجميلي	16
17	201902840	فهد مطر عيد العنزي	17
18	201808284	ماجد دحام ناصر الكويكبي الرويلي	18
19	201902778	محمد حمود عبدالعزيز الحمود	19
20	201804597	محمد عايد بطاح الحازمي	20
21	201804965	محمد عبدالله حماد الاحيدب	21
22	201902648	محمد علوم خليف التومي الشمري	22
23	201804433	نايف عبدالعزيز ارشيد التركي المجلاد	23

تنويه : عفواً دكتور في المحاوله الاولى لم انتبه للنسبه المعطاه لي

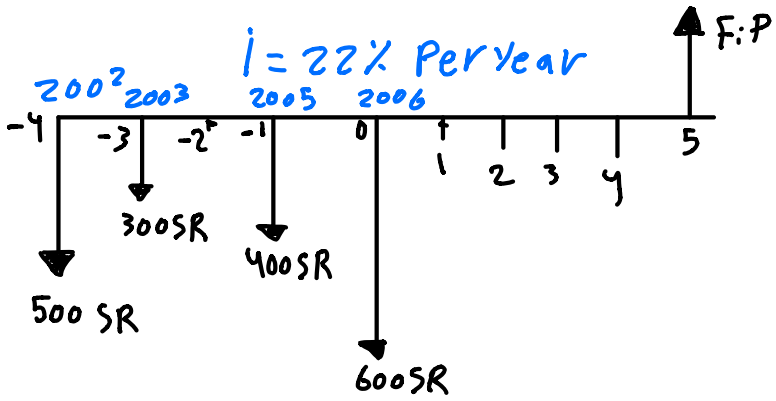
QUESTION 1: (CLO1) **(10 Marks)**

Jamie has become more conscientious about paying off his credit card bill promptly to reduce the amount of interest paid. He was surprised to learn that he paid 600 SR in interest in 2006 and the amounts shown in table 1 over the previous several years. If he made his payments to avoid interest charges, he would have these funds plus earned interest available in the future. What is the equivalent amount 5 years from now that Jamie could have available had he not paid the interest penalties? Let i = …% per year (see the table1).

Table 1: Credit card interest paid over the last 6 years.

Year	2002	2003	2004	2005	2006
Interest paid SR	500	300		400	600

Draw the cash flow diagram



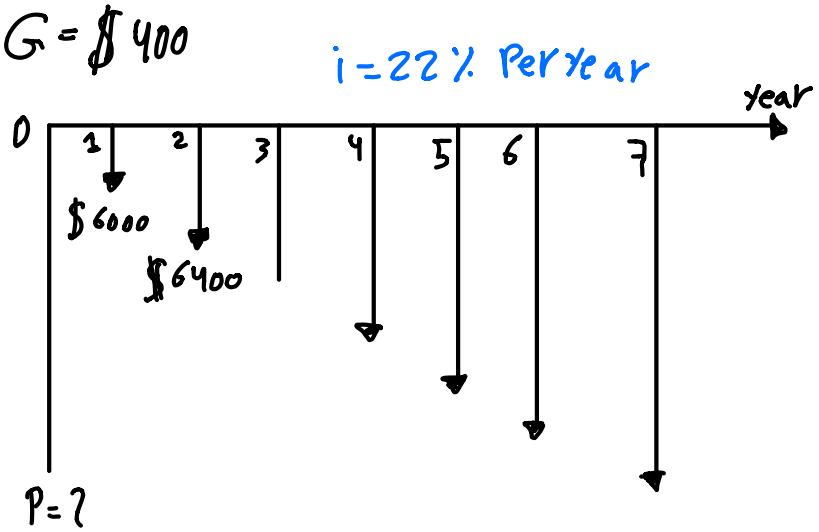
$$FW = 600\,(f/P, 22\%, 5) + 400\,(F/P, 22\%, 6) + 300\,(f/P, 22\%, 8) + 500\,(F/P, 22\%, 9)$$

$$FW = 600(2.7027) + 400(3.2973) + 300(4.9077) + 500(5.9874)$$

$$= 7406.55 \text{ SR}$$

QUESTION 2 **(10 Marks)**

The Highway Department expects the cost of maintenance for a piece of heavy construction equipment to be \$6000 in year 1, to be \$6400 in year 2, and to increase annually by \$400 through year 7. At an interest rate of …% per year (see the table1)., determine the present worth of 7 years of maintenance costs. **Draw the cash flow diagram.**



$$PW = 6000(P/A, 22\%, 7) + 400(P/G, 22\%, 7)$$

$$PW = 6000(3.4155) + 400(7.6154)$$

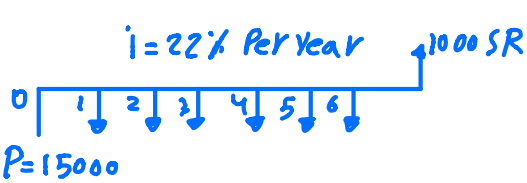
$$= \$23539.16$$

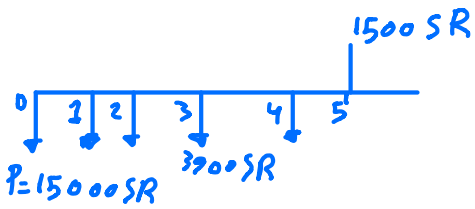
QUESTION #2 (CLO2): **(10 Marks)**

A project engineer with EnvCare is assigned to start up a new office in a city where a contract has been finalized to collect and analyze ozone-level readings. Two lease options are available, each with a first cost, annual lease cost, and deposit-return estimates shown below. The MARR is …% per year (see the table1).

	Location #1	Location #2
First cost, SR	-15000	-15000
Annual operating cost (AOC), SR/year	-3500	-3900
Salvage value, SR	1000	1500
Life, years	7	5

a) Determine which lease option should be selected based on the **annual worth**. (**Draw the cash flow diagram for the two life alternatives**)





$AW(1) = -15000(A/P.22\%.7) - 3500 + 1000(A/F.22\%.7)$

$= -15000(0.29278) - 3500 + 1000(0.12921) = \boxed{-8944.335\ SR}$

$AW(2) = -15000(A/P.22\%.5) - 3900 + 1500(A/F.22\%.5)$

$= -15000(0.34921) - 3900 + 1500(0.12921) = \boxed{-8944.335\ SR}$

location (1) should be selected

b) What is a selected location? location (1) is the selected location

c) Why?

because the cost of location (1) is less than the cost of the location (2)

QUESTION #2 (CLO2):

d) Calculate the **Future Worth** for location #1

$$FW = -7818.92(F/A, 22\%, 7) = -7818.92(13.7396)$$

$$= -107428.83 \text{ SR}$$