Multiple Choice: 5 points each

1. You are interested in a corporate bond that has a face value of $15,000. The bond matures in 10 years and does not pay a dividend. You require an interest rate of 5%, compounded semi-annually on any investment you make. Given this information, the most you should pay for the bond is closest to:

   a) $15,000  
   b) $11,752  
   c) $5,654   
   d) $11,718  
   e) $9,155   
   f) $9,209

2. Anna is interested in a corporate bond that has a face value of $10,000. The bond matures in 5 years and pays a dividend rate of 5% (spread out in equal semi-annual payments). You require an interest rate of 6% per year, compounded monthly on any investment you make. Given this information, the most you should pay for the bond is closest to:

   a) $8,526  
   b) $20,346  
   c) $9,542   
   d) $7,414   
   e) $12,128

3. Option A has a ROR of 12.98% and an initial cost of $10,000. Option B has a ROR of 12.38% and an initial cost of $12,000. Given an ∆ROR of 9.31% and an MARR of 10%, the optimal choice is _______________. Note: Do-Nothing is an option.

   a) option A  
   b) option B  
   c) do-nothing  
   d) not enough information given to make a decision
4. Consider the following year-by-year cash flows located in an Excel spreadsheet beginning in cell B1 and continuing through cell B5: -$10,000; $2,000; $4,000; $6,000; $8,000. The Excel code necessary to find the Net Present Worth of the identified cash flows is _______________. Note: MARR = 10%.

   a) =NPV(0.1, B1:B5)
   b) =NPW(0.1, B1:B5)
   c) =PV(0.1, B1:B5)
   d) =NPV(0.1, B2:B5) + B1
   e) =PW(0.1, B1:B5)
   f) none of the above

5. Consider the following year-by-year cash flows located in an Excel spreadsheet beginning in cell B1 and continuing through cell B5: -$10,000; $2,000; $4,000; $6,000; $8,000. The Excel code necessary to find the Rate of Return of the identified cash flows is _______________. Note: MARR = 10%.

   a) =ROR(B1:B5)
   b) =RR(B1:B5)
   c) =RATE(B1:B5)
   d) =IRR(B2:B5) + B1
   e) =IRR(B1:B5)
   f) none of the above

6. Consider the cash flows in the previous question and the MARR of 10%. The NPW of the cash flows necessary to compare to a second alternative with an 8 year life (and an NPW = $14,570) is closest to…

   a) $ 0
   b) $5,097
   c) $3,724
   d) -$2,488
   e) -$1,244
   f) $7,448
   g) $8,578

7. Caps-R-Us has a NPW of $15,590. BottleTops4U has a NPW of $14,750. The optimal choice, given an MARR of 20%, is _______________. Note: Assume Do-Nothing is an option.

   a) Caps-R-Us
   b) BottleTops 4U
   c) Do-Nothing
   d) not enough information to decide
8. An alumnus of Tech donated $1,000,000 to provide for 5 academic scholarships per year, forever. Assuming Tech can earn 3%, compounded quarterly, the value of each scholarship is closest to… Note: The scholarships begin one year after the donation.

   a) $  6,000
   b) $  6,070
   c) $30,340
   d) $30,000
   e) $ 3,333

9. A $500,000 investment returns $15,000 per semi-annual period over an infinite period of time. The annual rate of return for this investment is closest to…

   a)  6.09%
   b)  3.00%
   c)  6.00%
   d) 33.33%
   e) 17.22%

10. Uncle Willie desires to set up a vacation fund for his descendents that provides $25,000 every four years, forever. The first $25,000 is to be available 10 years from today. Assuming a single donation to the fund, the amount Uncle Willie should donate today is closest to… Note: Uncle Willie estimates the fund can earn 5%.

    a) $  86,568
    b) $116,009
    c) $125,000
    d) $ 98,790
    e) $500,000
11. Consider the following year-by-year cash flows: -$5,000; $2,117; $2,117; $2,117; $2,117. The rate of return of the cash flows is closest to…

   a) 25.00%
   b) 42.50%
   c) 18.00%
   d) 20.50%
   e) 70.00%

12. An alternative that has a ROR = MARR will have an EUAB – EUAC ____________.

   a) greater than $0
   b) less than $0
   c) equal to $0

13. Two alternatives are being considered (see below). The range of MARR values over which option “Tops” would be chosen is closest to…

<table>
<thead>
<tr>
<th>EOY</th>
<th>Tops</th>
<th>Xcel</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>-4000</td>
<td>-5000</td>
</tr>
<tr>
<td>1</td>
<td>2499</td>
<td>3075</td>
</tr>
<tr>
<td>2</td>
<td>2499</td>
<td>3075</td>
</tr>
<tr>
<td>ROR</td>
<td>16.23%</td>
<td>14.99%</td>
</tr>
</tbody>
</table>

   a) 0% to 16.23%
   b) 14.99% to 16.23%
   c) 0% to 10%
   d) 10% to 14.99%
   e) 10% to 16.23%
   f) greater than 14.99%
   g) greater than 16.23%
   h) none of the above
14. Marianna purchased a house 5 years ago using a 15 year, $200,000 mortgage at an interest rate of 6%, compounded monthly. This loan situation resulted in monthly payments of $1,688. Currently, Marianna has the option to refinance the remaining balance of the loan at an interest rate of 4.8%, compounded monthly. The current remaining balance on the loan is closest to...

   a) Remaining Principal = $200,000 – $1,688(P/A, 0.5%, 120)
   b) Remaining Principal = $200,000 – $1,688(P/A, 0.5%, 60)
   c) Remaining Principal = $200,000 – $1,688(P/A, 0.4%, 60)
   d) Remaining Principal = $200,000(F/P, 0.4%, 60) – $1,688(F/A, 0.4%, 60)
   e) Remaining Principal = $200,000 – $1,688(60)
   f) none of the above

15. An engineering freshman wants to purchase a laptop computer for use during the 5 years that she plans to study engineering at Louisiana Tech University. After looking around a bit, she finds that a well-equipped laptop with software can be purchased for $2,000 and that it should have a market value of approximately $300 if she wants to sell it when she graduates after 5 years. Using an interest rate of 12%, compounded monthly, the equivalent uniform monthly cost of owning the computer is closest to...

   a) $171
   b) $154
   c) $  58
   d) $  41
   e) $  44
   f) $  28
   g) $ 33

16. The average age of engineering students at graduation is a little over 23 years. This means that the working career of most engineers is almost exactly 500 months. The amount of money an engineer would need to save each month to become a millionaire by the end of his/her working career is closest to… Assume interest is 12% per year, compounded monthly.

   a) $50
   b) $60
   c) $70
   d) $80
   e) $90

17. You are trying to decide between two alternatives that have different expected life-spans. The analysis technique is Rate of Return Analysis (using Present Worth equations). Assume there is no dominance and both alternatives are good. Would it be necessary to perform the calculations using a least common multiple?

   a) yes
   b) no
   c) not enough information to determine
Instructions: Use the following information to answer questions 18 and 19.

You have identified two potential alternatives to purchase for your organization. Before deciding between the two, you must show economic justification. Your company requires the use of Annual Cash Flow Analysis. NOTE: The first alternative (which has an expected life of eight (8) years) has already been calculated for you. It was found to have $EUAB - EUAC = $11,750 based on an MARR = 7%.

<table>
<thead>
<tr>
<th>Alternative #2</th>
<th></th>
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<tbody>
<tr>
<td>Initial Cost</td>
<td>$20,000</td>
</tr>
<tr>
<td>Benefits</td>
<td>$18,000 in years 1 and 2, $12,000 in years 3 and 4</td>
</tr>
<tr>
<td>O&amp;M Costs</td>
<td>$1,000 per year</td>
</tr>
<tr>
<td>Salvage</td>
<td>$5,000</td>
</tr>
<tr>
<td>Life (in years)</td>
<td>4</td>
</tr>
</tbody>
</table>

18. The EUAB for Alternative #2 is closest to…(Note: Treat salvage values using the standard methodology discussed in class).
   a) $15,202
   b) $16,328
   c) $15,000
   d) $12,000
   e) $18,000

19. The EUAC of Alternative #2 is closest to…(Note: Treat salvage values using the standard methodology discussed in class).
   a) $5,904
   b) $6,904
   c) $5,778
   d) $6,000
   e) $7,548

20. Luke is considering investing in one of two competing alternatives. The problem Luke faces is that he cannot decide whether to use NPW Analysis, Annual Cash Flow Analysis, or ROR Analysis. Luke wants to make sure and use the correct economic analysis technique to ensure that he chooses the investment alternative that maximizes his gain. Luke’s dad came along and noticed the concern on his son’s face. After listening to Luke describe his concern, Luke’s dad explained the theory behind the techniques and assured him that each of the techniques would lead him to the correct investment choice. Is Luke’s dad correct?
   a) yes
   b) no
   c) not enough information to determine