**EGR 310**

February 2023

**Final Exam**

Email Version

Due by midnight on 2/26/23

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Write your name here:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**1.** One of the major advantages of MACRS is that the "property class lives" are usually less than the "actual useful lives", thus providing a tax advantage early after investment.

Select one (highlight or circle)

**T….F**

**2.** When comparing mutually exclusive investments which all have an IRR above the MARR, economically, the investment with the highest internal rate of return is always preferred over investments with a lower internal rate of return:

Select one (highlight or circle)

**T….F**

**3.** Consider the following cash flows:

|  |  |
| --- | --- |
| Year | Cash Flow |
| 0 | -$10,000 |
| 1 | $1,000 |
| 2 | $2,000 |
| 3 | $3,000 |
| 4 | $4,000 |
| 5 | $5,000 |

Which equation could you use to compute the IRR?

Select one (highlight or circle)

|  |  |  |  |
| --- | --- | --- | --- |
|  | |  |  | | --- | --- | | A) | -$10000 + $1000(P/G, i, 5) = 0 | |
|  | |  |  | | --- | --- | | B) | -$10,000 + $1,000 \* (P/A, i, 5) + $1,000 \* (P/G, i, 5) = 0 | |
|  | |  |  | | --- | --- | | C) | -$10,000 + $1,000 + $1,000 \* (P/G,i,5) = 0 | |
|  | |  |  | | --- | --- | | D) | None of the above | |

**4.** The internal rate of return (IRR) is the most frequently used measure in industry because:

Select one (highlight or circle)

|  |  |  |  |
| --- | --- | --- | --- |
|  | |  |  | | --- | --- | | A) | It is figure of merit that is readily understood | |
|  | |  |  | | --- | --- | | B) | Calculation of the internal rate of return is independent of the minimum attractive rate of return | |
|  | |  |  | | --- | --- | | C) | Both A and B above | |
|  | |  |  | | --- | --- | | D) | Neither A nor B above | |

**5.** The following equation may be used to compute the internal rate of return:

Select one (highlight or circle)

|  |  |  |  |
| --- | --- | --- | --- |
|  | |  |  | | --- | --- | | A) | PW of benefits = PW of costs | |
|  | |  |  | | --- | --- | | B) | Net present worth = 1 | |
|  | |  |  | | --- | --- | | C) | Both A and B above | |
|  | |  |  | | --- | --- | | D) | Neither A nor B above | |

**6.** XYZ company purchased a machine for the manufacture of springs for $24,000. The useful life of the machine is 8 years and the salvage value after 8 years is $4000. If the company uses straight line depreciation, what is the book value at the end of year 3?

Enter your answer:………………..

**7.** A car costs $8000 and has an anticipated $1000 salvage value at the end of its five year depreciable life. Compute the depreciation allowance at the end of year 4 using MACRS (assume a 5 year property class):

Enter your answer:…………………

**8.** A piece of construction machinery costs $9000 and has an anticipated $1000 salvage value at the end of its five year depreciable life. Compute the depreciation allowance for the end of year 2 using straight line depreciation:

Enter your answer:……………..

**9.** In your own words, what is the depreciation of an asset?

 Enter your answer:…………….

**10.** If you bought a bond above face value, you have bought it at a premium:

Select one (highlight or circle)

**T….F**

**11.**For a given set of cash flows, when computingthe present worth, as the interest rate used goes up, the present worth goes down:

Select one (highlight or circle)

**T….F**

**12.** A corporation expects to receive $50,000 each year for 8 years from the sale of a product. There will be an initial investment of $160,000. Manufacturing and sales expenses will be $20,300 per year. Assume straight-line depreciation, a 8-year useful life and no salvage value. Use a 30% income tax rate. Determine the projected after-tax rate of return (use closest rate from table. Do not interpolate.):

Enter your answer:……………………….

**13**. A 10 year bond with face value of $1000 and a nominal interest rate of 10% pays interest semi-annually. An investor buys the bond for $1126.50 with 9 years left until the bond matures and keeps it to maturity. What effective annual IRR did the investor receive?

Enter your answer:…………………..

**14.** A company is considering investing in a new piece of equipment to reduce the annual costs of producing its products. The new piece of equipment may operate 4 or 5 years. The annual savings may be $40,000, $50,000, or $60,000. The probabilities for each scenario is given in the following table:

|  |  |  |  |
| --- | --- | --- | --- |
| Savings | Probability | Useful Life | Probability |
| $40,000 | 0.2 | 4 yrs | 0.8 |
| $50,000 | 0.7 | 5 yrs | 0.2 |
| $60,000 | 0.1 |  |  |

What is the joint probability of the investment saving $50,000 for 4 yrs?

Enter your answer:…………….

**15.** A company is considering an investment with the following annual benefits and annual costs with the probability of each:

|  |  |  |  |
| --- | --- | --- | --- |
| Annual Benefit | Probability | Annual Cost | Probability |
| $6,000 | 70% | $4000 | 50% |
| $10,000 | 30% | $6,000 | 30% |
|  |  | $8,000 | 20% |

a. What is the most likely benefit – cost

Enter your answer:…………….

b. What is the expected value of Annual Benefit - Annual Cost?

Enter your answer:…………………

**16.** You are evaluating 2 machines the investment of 2 mutually exclusive machines. Each machine has an eight year life and you plan to keep whichever machine you pick for the full 8 years. The cash flows for each machine are summarized in the following table:

|  |  |  |
| --- | --- | --- |
|  | A | B |
| Initial Cost | $4000 | $3000 |
| Annual Benefit | $800 | $600 |
| Annual Cost | $100 | $50 |
| Salvage Value | $1500 | $1000 |

Assuming a 10% MARR and using Incremental Replacement Analysis, which investment should be chosen?

Enter your answer:………………..

**17.** Compute the rate of return for the investment represented by the following cash flow (pick closest rate from appendix C. Do not interpolate) (show equation used in book format in your notes):

|  |  |
| --- | --- |
| Year | Cash Flow |
| 0 | -$2,275 |
| 1 | +$300 |
| 2 | +$400 |
| 3 | +$500 |
| 4 | +$600 |
| 5 | +$700 |
| 6 | +$800 |

Enter your answer:………………

**18**. What is the internal rate of return (IRR) of a $10,000 investment that returns $2,504 per year for 5 years?

Enter your answer:……………..

**19.** A piece of construction machinery costs $8000 and has an anticipated $1500 salvage value at the end of its five year depreciable life. Compute the depreciation allowance for the end of year 4 using double declining balance depreciation:

Enter your answer:…………………..

**20.** A company is considering purchasing a machine for manufacturing that costs $30,000. The salvage value and O&M costs for the next 7 years is given in the following table. The Equivalent Uniform Annual Cost (EUAC) is computed for each year assuming the equipment was sold at the end of that year and a MARR of 6%.  What is the optimal economic life of the machine?

|  |  |  |  |
| --- | --- | --- | --- |
| Yr | Salvage Value | O&M Costs | EUAC |
| 1 | $15,000 | $1,200 | $18,000 |
| 2 | $14,400 | $2,100 | $11,909 |
| 3 | $13,800 | $3,000 | $10,753 |
| 4 | $13,200 | $3,900 | $10.825 |
| 5 | $12,600 | $4,800 | $11,382 |
| 6 | $12,000 | $5,700 | $12,178 |
| 7 | $11,400 | $6,600 | $13,106 |

Enter your answer:………………….

**21**. Economic life identifies when an asset maximizes its Equivalent Uniform Annual Cost (EUAC):

Select one (highlight or circle)

**T….F**

 **22.** Probabilities are used to better estimate uncertain future cash flows:

Select one (highlight or circle)

**T….F**

**23.** The Tax Cuts and Jobs Act (TCJA) of 2018 reduced the corporate tax rate to a 21% flat rate:

Select one (highlight or circle)

**T….F**

**24**. Salvage value always equals the book value:

Select one (highlight or circle)

**T….F**