

Exam 2 Spring 2008
Engineering Economy

Name _____ ID#(last 4 digits) _____

1. An Engineer wants to have \$50,000 in seven years to purchase a new vehicle. How much must he invest each year if he starts one year from now and he earns 6% per year? Assume the money is available immediately after the last deposit. (Factor Notation only)

Answer: $A = \$50000(A/F, 6\%, 7)$

2. How much should a company which manufactures corrugated pipe be willing to pay a contractor who claims he has a device which will reduce the company's energy bill by at least \$4,000 per year. Assume the company wants to recover its investment in five years at an interest rate of 5% per year. (Factor Notation Only)

Answer: $P = \$4000(P/A, 5\%, 5)$

3. Sun Oil Company (Sunoco) is considering the installation of new magnetic flow meters (magmeters) in one of its pipelines. If the company goes ahead with the project, it will spend \$55,000 each year for five years, starting 1 year from now. What is the present worth of the investment at an interest rate of 5% per year? (Factor Notation Only)

Answer: $P = \$55000(P/A, 5\%, 5)$

4. An engineer working for a DSL provider expects to earn bonuses of \$10,000 per year for 8 years, beginning 1 year from now. If the engineer invests the money at 5% per year, how much will she have in the account immediately after she makes the last deposit? (Factor Notation Only)

Answer: $F = \$10000(F/A, 5\%, 8)$

5. In order to expand its product lines, a manufacturer of personal care products is planning to increase the size of its warehouse. To finance the expansion, the company will borrow \$250,000 two years from now. If the company wants to repay the loan with five equal payments, starting one year after he gets the loan, what must be the size of each one at an interest rate of 5% per year? (Factor Notation only)

Answer: $A = \$250000(A/P, 5\%, 5)$

6. If a person deposits \$5,000 per year for six years beginning one year from now, how much will be in the account 17 years from now if the account earns interest at 5% per year? Factor Notation Only)

Answer: $F = \$5000(F/A, 5\%, 6)(F/P, 5\%, 11)$

7. For the series of deposits shown below, how much would be in the account in year 20 if the account earns 5% per year? (Factor Notation Only)

<u>Years</u>	<u>Deposit/Year</u>
1 - 4	\$2,000
5 - 9	\$0
10-15	\$3,000

Answer: $F = [\$2000(F/A, 5\%, 4)(F/P, 5\%, 11) + \$3000(F/A, 5\%, 6)(F/P, 5\%, 5)](F/P, 5\%, 5)$

8. A series of payments of \$2,000 for three years beginning in year 1 would be equivalent to how much in year 14 at an interest rate of 5% per year? (factor notation only)

Answer: $F = \$2000(F/A, 5\%, 3)(F/P, 5\%, 11)$

9. What is the present worth in year 0 of a uniform series of payments of \$1,000 in year 1 thru 5 and another series of \$2,000 payments in years 8 thru 12 at an interest rate of 5% per year? (Factor Notation Only)

Answer: $P = \$1000(P/A, 5\%, 5) + \$2000(P/A, 5\%, 5)(P/F, 5\%, 7)$

10. The Present Worth of \$430 in year 1 and amounts increasing by \$30 per year thru year 4 at an interest rate of 5% per year is how much? (Factor notation only)

Answer: $P = \$430(P/A, 5\%, 4) + \$30(P/G, 5\%, 4)$

11. Energy costs for a certain process are expected to be \$3000 in year 1, \$3,200 in year 2, and amounts increasing by \$200 per year thru year 10 at an interest rate of 12% per year, compounded monthly, the correct value for the interest is:

Answer: 12.68%

12. A garage door manufacturing company wants to make a single deposit now so that it can replace a small production line in 5 years. If the company wants to have \$1.2 million available and it can earn interest at 14% per year compounded semiannually, the amount of the deposit is **(Factor Notation only)**

Answer: $P = \$1,200,000(P/F, 7\%, 10)$

13. An engineer deposits \$100 per month (beginning one month from now) into an account for 10 years which earns interest at 6% per year compounded semiannually. The amount in the account immediately after the last deposit is closest to: (factor notation only)

Answer: $F = \$600(F/A, 3\%, 20)$

14. What is the effective interest rate when payments of \$1000 per quarter are made for 5 years starting 3 months from now at an interest rate of 12% per year compounded continuously:

Answer: 3.045%

15. For an interest rate of effective 18% per year, compounded monthly, the effective monthly rate is:

Answer: 1.39%

16. How much money will be accumulated in 10 years from a deposit of \$500 every 6 months if the interest rate is 1% per month? (Factor Notation only)

Answer: $F = \$500(F/A, 6.15\%, 20)$

17. A person deposits \$5000 into a money market account which pays interest at a rate of 10% per year. The amount in the account after 10 years is closest to (Factor Notation only):

Answer: $F = \$5000(F/P, 10\%, 10)$

18. A small company wants to make a single deposit now so it will have enough money to purchase a new truck costing \$50,000 five years from now. If the account will earn interest of 10% per year, the amount that must be deposited is nearest to (Factor Notation only):

Answer: $P = \$50000(P/F, 10\%, 5)$

19. A Chemical Engineer believes that by modifying the structure of a certain water treatment polymer, his company would earn an extra \$5000 per year. At an interest rate of 10% per year, how much could the company afford to spend now just to break even over a 5 year project period? (factor notation only)

Answer: $P = \$5000(P/A, 10\%, 5)$

20. An Industrial Engineer made a slight modification to a chip manufacturing process which will save her company \$10,000 per year. At an interest rate of 8 % per year, how much would the savings amount to in 7 years? (Factor notation only)

Answer: $F = \$10000(F/A, 8\%, 7)$