Name: **Id#**

ISE 307, Term 173
ENGINEERING ECONOMIC ANALYSIS

Quiz# 2 Solution

Date: Sunday, July 16, 2018

Q1. How many years will it take for the dollar's purchasing power to be half what it is now, if the general inflation rate is expected to continue at the rate of 5% for an indefinite period?

(a) About 10 years
(b) About 12 years
(c) About 14 years
(d) About 16 years

N = log 2 / log 1.05 = 14.21

Q2. Suppose that you borrow $100,000 at 12% compounded monthly over five years. Knowing that the 12% represents the market interest rate, you compute the monthly payment in actual dollars as $2224.44. If the average monthly general inflation rate is expected to be 0.5%, determine the equivalent equal monthly payment series in constant dollars.

(a) $1931.89
(b) $1996.62
(c) $2224.44
(d) $2169.65

$i'_m = (i_m - f_m')/(1+f_m') = (0.01-0.005)/(1.005) = 0.004975$
A = 100,000 (A/P, i'_m, 60) = 100,000*0.0193189 = $1931.89

Q3. You just signed a business consulting contract with one of your clients. The client will pay you \$80,000 a year for five years for the service you will provide over this period. You anticipate the general inflation rate over this period to be 5%. If your desired inflation-free interest rate (real interest rate) is to be 3%, what is the worth of the fifth payment in present dollars? The client will pay the consulting fee at the end of each year.

(a) \$53,506
(b) \$54,070
(c) \$59,498
(d) \$59,320

$$i = i' + \bar{f} + i'\bar{f}$$
$$= 0.03 + 0.05 + 0.03 \times 0.05 = 0.0815 = 8.15\%$$
$$\text{PW of fifth payment} = 80{,}000\left(\frac{1}{1 + 0.0815}\right)^5 = \$54{,}070.12$$

Q4. A series of five constant-dollar (or real-dollar) payments, beginning with \$8,000 at the end of the first year, are increasing at the rate of 5% per year. Assume that the average general inflation rate is 5% and the market interest rate is 12% during this inflationary period. What is the equivalent present worth of the series?

(a) \$24,259
(b) \$25,892
(c) \$29,406
(d) \$36,413

$$i' = \frac{i - \bar{f}}{1 + \bar{f}} = \frac{0.12 - 0.05}{1 + 0.05} = 0.0666$$
$$P = A\left\{\frac{1 - (1 + g)^n(1 + i')^{-n}}{i' - g}\right\}$$
$$= 8{,}000\left\{\frac{1 - (1 + 0.05)^5(1 + 0.066)^{-5}}{0.066 - 0.05}\right\}$$
$$= \$36{,}413.62$$