1. D
    According to the semi-strong version of the efficient market theory, prices accurately
    reflect all publicly available information about a security. Thus, by this theory, actively
    managed portfolios should not be able to consistently outperform the rest of the market.
    All available information has already been incorporated into the current market price.

2. A
    The private market does not usually provide public goods since it is impossible to
    exclude non-paying customers. This often makes it impossible for a private firm to
    collect sufficient revenue to cover the cost.

3. E
    An increase in business inventories indicates that demand is not as high as businesses
    anticipated, resulting in inventory accumulation. The decrease in demand is a reflection
    of the downturn in economic activity.

4. E

    $$X = \frac{20000}{a_{\overline{20}|0.065}} = 1815.13$$

    $$1815.13 = \frac{20,000}{S_{\overline{20}|j}} + (0.08)(20,000)$$

    $$S_{\overline{20}|j} = 92.97$$

    $$j = 14.18\%$$

5. D

    $$B = X\, a_{\overline{n}|} = 0.4 \cdot \frac{X}{i}$$

    $$C = v^{n}\, X a_{\overline{n}|}$$

    $$J = v^{2n}\, \frac{X}{i}$$

    $$a_{\overline{n}|} = \frac{0.4}{i} \Rightarrow v^{n} = 0.6$$

    $$J = 0.36 \frac{X}{i}$$

6.   E
      The licensing fee works the same as an increase in fixed costs; it shifts the market supply
      upward, increasing price and decreasing quantity demanded. At the firm level, however,
      it increases average costs without changing marginal costs; therefore, the representative
      firm increases output. This apparent paradox is resolved by the fact that in the long run
      some firms will go out of business.

7.   D

$$\text{Seth} = 5000\left(\left(1+\frac{0.12}{2}\right)^{10}-1\right) = 8954.24 - 5000 = 3954.24$$

$$\text{Janice} = 5000\,(0.06)(10) = 3000.00$$

$$\text{Lori} = P(10) - 5000 = 1793.40 \text{ where } P = \frac{5000}{a_{\overline{10}|6\%}} = 679.35$$

      The sum is 8747.64.

8.   C
      Additional paid-in capital will be
      \$1,200,000 ((\$3 per share − \$1 par value) × 100,000 shares = \$200,000 increase).

9.   D
      For a normal good, a price decline results in a positive income effect and a quantity
      increase larger than would be the case for a compensated price decline.

10.   C
      Project X:
      Annual cash flows of 749.78 (immediate annuity at 10% with PV = 4000).
      Payback 4000 in 6th year.
      NPV discount rate = 0.025 + 0.50(0.07) = 0.06
      Annuity at 6% of cash flows of −4000, 749.78, …, 749.78 = 655.98
      Project Y:
      Payback in 5th year
      IRR is interest rate such that: $4000 = 6600v^5 \rightarrow$ IRR = 10.5%
      NPV = - 4000 + $6600/(1.06)^5$ = 931.90

11. B

<u>decl bal</u>

$$X(1-d)^{10} = \frac{X}{8}$$

$$(1-d) = (0.125)^{1/10}$$

$$\sum_{1}^{7} \text{Depr} = X - X(0.125)^{7/10}$$

$$= 0.76674X$$

<u>sum of yrs digits</u>

$$\sum_{1}^{10} i = 55$$

first 7 yrs depr $= \dfrac{49}{55}$

$$\sum_{1}^{7} \text{Depr} = \left(Y - \frac{X}{8}\right)\frac{49}{55}$$

$$0.76674X = \frac{49}{55}\left(Y - \frac{X}{8}\right)$$

$$0.9856X = Y$$

12. E

Bruce's interest, year 11:

$$\frac{100}{(1-d)^{10}}\left[\frac{1}{(1-d)} - 1\right] = X$$

Robbie's interest, year 17:

$$\frac{50}{(1-d)^{16}}\left[\frac{1}{\cancel{1-d}} - 1\right] = X = \frac{100}{(1-d)^{10}}\left[\frac{1}{\cancel{1-d}} - 1\right]$$

$$(1-d)^6 = \frac{1}{2} \Rightarrow d = 10.91\%$$

$$X = \frac{100}{(1-0.1091)^{10}} \cdot \left[\frac{1}{1-0.1091} - 1\right] = 38.88$$

13. D

If you assume: Annual repayments of interest and principal – repayments are level.

Year (t + 1) principal repaid $= v^{n-t}$

Year t interest repaid $= i \cdot a_{\overline{n-t+1}|} = 1 - v^{n-t+1}$

Total $= 1 - v^{n-t+1} + v^{n-t} = 1 - v^{n-t}(v-1) = 1 - v^{n-t}(-(1-v)) = 1 + v^{n-t}(d)$

14. B

Real wages can grow only when there is labor productivity growth or labor's share of product increases. The latter has remained relatively constant for long periods so the former is the primary source of real wage growth.

15. D
Currently Tom is making a profit of 5 a day. If he outsources delivery, Tom could double output and earn a profit of 50 excluding the delivery cost. Hence Tom could pay the delivery service up to 45 without decreasing his profit.

16. B
An increase in market interest rates will result in banks lending out excess reserves which lowers free reserves and increases the money supply.

17. B

$$v^3 \cdot \frac{10}{(1+i)^3 - 1} = 32; \quad 10v^3 = 32(1+i)^3 - 32$$

$$32(1+i)^6 - 32(1+i)^3 - 10 = 0$$

$$(1+i)^3 = \frac{32 \pm \sqrt{2304}}{64} = 1.25$$

$$\therefore i = 7.72\%$$

$$X = \frac{1}{(1+i)^{1/3} - 1} = \frac{1}{(1.0772)^{\frac{1}{3}} - 1} = 39.84$$

18. A
At the competitive price, a natural monopoly cannot cover its costs because price is below average cost at this point.

19. A
Economic income = Cash flow plus change in NPV
$NPV_1 = 628.4/1.2 + 628.4/(1.2)^2 = 960.1$
$NPV_2 = 628.4/1.2 = 523.7$
Economic income $= 628.4 - (960.1 - 523.7) = 192$

20. B
The relationship between money, velocity, prices, and real output is such that if real output is rowing at 2.75% per year, and velocity is increasing at 1.00% per year, and the inflation target is 0 to 1.00%, then in order to maintain the identity $M + v = P + Y$, where each variable is a growth rate, then it must be that money growth is between 1.75% and 2.75%.

21. E
   The increase in the price of an input, in this case labor, drives up the marginal cost of producing chips; therefore, it leads to a decrease in the supply of chips and an increase in the price of chips. Similarly, since chips are used to make computers, the supply of computers falls, the equilibrium price of computers increases, and the quantity exchanged decreases.

22. E
   Let i = after-tax WACC
   $3000 \cdot a_{\overline{15}|i} - 20,000 = 2496.27 \therefore a_{\overline{15}|i} = 7.49876 \Rightarrow i = 10.25\%$.
   After-tax WACC $= 10.25 = r_E(0.4) + r_D(1 - T_x)(0.6) = 0.4 \cdot r_E + \frac{1}{2} r_E (1 - 0.25)(0.6)$
   $= 0.4r_E + 0.225r_E \therefore r_E = 16.4\%$.

23. D
   An increase in government spending shifts the IS curve to the right and increases both income and interest rates.

24. C

	Year 1	Year 2	Year 3	Year 4
Dollar deductions	33,330	44,450	14,810	7,410
Tax shields	11,666	15,558	5,184	2,594

   After tax rate $= 0.12(0.65) = 0.078$
   Present value $= 11,666/1.078 + 15,558/1.078^2 + 5,184/1.078^3 + 2,594/1.078^4 = 30,267$.

25. C
   II is not true – A firm will not shut down unless Marginal Costs are less than Average VARIABLE costs.

26. C
   $Z = 100$

   Accumulated Value $= X = 100(7 + 0.05(Is)_{\overline{6}|6\%}) = 700 + 5\left(\dfrac{\ddot{s}_{\overline{6}|6\%} - 6}{0.06} \right)$

   $= 700 + 5 (23.23) = 816.15$.

   $Y = 100(14 + 0.025 (Is)_{\overline{13}|3\%}) = 1400 + 0.025\left(\dfrac{\ddot{s}_{\overline{13}|3\%} - 13}{0.03} \right)$

   $1400 + 2.5 (102.877) = 1657.19$

   $Y/X = 2.03$.

27.   B

Chris's return $= \dfrac{(P_0 - 760) + 0.5 P_0(0.06)}{0.5 P_0} = \dfrac{1.03 P_0 - 760}{0.5 P_0}$

Jose's return $= \dfrac{(P_0 - 760) + 0.5 \cdot P_0(0.06) - 32}{0.5 P_0} = \dfrac{1.03 P_0 - 792}{0.5 P_0}$

Chris's return $= 2 \cdot$ [Jose's return]

$\dfrac{1.03 P_0 - 760}{0.5 P_0} = \dfrac{2[1.03 P_0 - 792]}{0.5 P_0}$

$1.03 P_0 = 824 \Rightarrow P_0 = 800$

$i = \dfrac{1.03 P_0 - 760}{0.5 P_0} = \dfrac{1.03(800) - 760}{0.5(800)} = 64/400 = 16\%$.

28.   C

Set up table:

Q	P	TR	MR	MC
1	9	9	9	2
2	8	16	7	3
3	7	21	5	4
4	6	24	3	5

Monopolist will produce the largest quantity such that MR $\geq$ MC.
At a quantity of 3, the demand curve produces a price of 7 .
Solution is the same if you assume Q is continuous.

29.   B

With net exports set to zero, the government expenditure multiplier is equal to

$$\frac{1}{1 - C^y(1 - T)} = \frac{1}{1 - 0.7(1 - 0.3)} = \frac{1}{1 - 0.7(0.7)} = \frac{1}{1 - 0.49} = \frac{1}{0.51} = 1.96$$

30.   B

$(p \times 20) + (1 - p) \times (-15) = 11.25 \rightarrow p = 0.75$
Put value if exercised now $= 78.26 - X$

Put value if not exercised now $= \dfrac{0.75 \times 0 + 0.25 \times (78.26 - 0.85X)}{1.1125}$

Equate the above two, we get X = 75 .

31.   A
       Time-weighted return = 0% means:

       $$\frac{12}{10} \cdot \frac{X}{(12+X)} = 1 \Rightarrow 12X = 120 + 10X$$

       $$\therefore X = 60$$

       Dollar-weighted return:

       $$I = X - X - 10 = -10$$

       $$Y = \frac{-10}{10 + \frac{1}{2}(60)} = \frac{-10}{40} = -25\%$$

32.   E
       As a result of the factor-price effect, the marginal cost curves of the firms do not shift
       down but up.

33.   E
       Assets = Liabilities + Shareholder Equity = 300 + 700 + 1400 = 2400 .
       Net income = EBIT – Interest – Taxes = 400 – 50 – 60 = 290 .
       (Note depreciation has already been subtracted to get EBIT)

       $$\text{Payout Ratio} = 0.10 = \frac{\text{dividends}}{\text{net income}} = \frac{\text{dividends}}{290}$$

       Dividends = 29 .
       Retained Earnings = Net Income – dividends = 290 – 29 – 261 .

       $$\text{Internal Growth Rate} = \frac{\text{Retained Earnings}}{\text{Assets}} = \frac{261}{2400} = 10.875\% .$$

34.   D
       Competitive equilibrium occurs at Q = 10, P = 2
       Consumer surplus = ½ (4 – 2) 10 = 10
       Producer surplus = ½ (2 – 0) 10 = 10
       Total surplus = 20
       At constrained P = 1 producers will only supply Q = 5
       so producer surplus = ½ (1 – 0) 5 = 2.5
       The full price to consumer (including waiting time, etc.) will be bid up to P = 3
       to eliminate excess demand. So consumer surplus = ½ (4 – 3) 5 = 2.5
       Total surplus = 5
       Deadweight loss = 20 – 5 = 15 .

35. A
    I.   Only if correlations are zero.
    II.   Beta doesn't measure correlation, it is an estimated first derivative.
    III.   Flatter

36. C
The change in the real exchange rate is equal to the change in the nominal rate times the ratio of the inflation rates. $[1.5/1.25 \times 1.03/1.02] - 1 = 21\%$.

37. A

$$B_3 = 559.12 = Pa_{\overline{1}|} = P\frac{1}{1.08}$$

$P = 603.8496$

$X = Pa_{\overline{4}|0.08}$

$X = 2000.0265$

$PR_1 = 603.8496\, v^4 = 443.85$.

38. B

		Year 1	2	3	4	5
Starting	Book equity	1000	1200	1440	1548	1664.1
	ROE	20%	20%	15%	15%	15% →
	Earnings	200	240	216	232.2	249.62
	Dividends	0	0	108	116.1	124.81
	Plowback	200	240	108	116.1	124.81
	Free C-F	0	0	108	116.1	124.81

<u>Starting in year 3</u>

Dividend growth rate $g = $ Plowback $\times$ ROE $= (0.5)(0.15) = 0.075$

PV @ t = 2 of future dividends = PV @ t = 2 of free cash-flow

$= 108/(0.15 - 0.075) = 1440$

PV @ t = 0 of free cash-flow $= 1440(1.15)^{-2} \approx 1089$.

39. C
Since the project is to expand the firm's existing operations, the risk of the new project is the same as that of the firm's existing operations. According to MM capital structure theory, to compute the asset beta, which measures the risk of the firm's existing assets in place, we add the equity beta and the debt beta, each weighted by its proportion in the firm's capital structure.

$\beta_{project} = 0.60\ \beta_E + 0.40\ \beta_D = 0.60(1.5) + 0.40(0.75) = 1.2$.

Then, the CAPM may be applied to find the cost of capital:

$R = 0.05 + 1.2(0.11 - 0.05) = 0.05 + 0.072 = 0.122$

40. E
1st, calculate Present value(Exercise Price) (or PV[EX]):

Since $\ln\left(\dfrac{\text{Current Share Price}}{\text{Present Value of the Exercise Price}}\right) = -0.08$, at the risk-free rate,

and the Current Share Price = 100, the PV(EX) = 108.33.

In addition: t = 0.25, and $\sigma = 0.4$. Note that [σ * Square Root (t)] = 0.2

Based on these inputs, it is easy to calculate d_1 and d_2: $d_1 = -0.3$, and $d_2 = -0.5$ (Exactly)

Black-Scholes:

N(d1)*(Current Price) – N(d2)*(PV[EX]) =

N(−0.3)*100 – N(−0.5)*108.33 = 100(0.3821) – 108.33(0.3085) = 4.79

41. B

Price of bond $= 1000$

$$1000(1.07)^{10} = 30 \cdot S_{\overline{20}|(1+i)^{1/2}-1} + 1000$$

$$S_{\overline{20}|(1+i)^{1/2}-1} = 32.2384$$

$$(1+i)^{1/2} - 1 = 0.047596$$

$$\therefore i = 9.75\%$$

42. A
The correct answer follows from the definition of the price elasticity of demand. The percentage change in price from the initial equilibrium is 1/9, and the percentage change in quantity demanded is −1/3; hence the price elasticity of demand is −3.00 . One can also solve the problem directly using the differential calculus: elasticity = (dQ/dP)(P/Q) .

43. C

    I.   Cost of capital remains at 14% $\Rightarrow$ false.

    II. $\beta_C = D/V\ \beta_D + E/V\ \beta_E = 1/3\ (0.3) + 2/3\ (1.65) = 1.2$.
           $\beta_C = 1.20 > 1.05 \Rightarrow$ Project is less risky $\Rightarrow$ false.

    III. $r_c = r_f + \beta_C(r_m - r_f)$
           $0.14 = 0.08 + 1.2X \Rightarrow X = 0.05 = 5\% \Rightarrow$ true.

44. D

EBIT	11,560	
−Int	6,000	$= 100,000 \times 0.06$
	5,560	
−Tax	1,946	$=\ 5,560 \times 0.35$
	3,614	= Amount available to shareholders

$$ROE = \frac{3,614}{20,912} \approx 0.173\ .$$

45. B

$$e^{\int_0^5 \frac{t^2}{k} dt} = \left(1 - \frac{0.08}{2}\right)^{-10}$$

$$e^{\frac{t^3}{3k}\big|_0^5} = 1.50414$$

$$e^{\frac{125}{3k}} = 1.50414$$

$$\frac{125}{3k} = 0.40822$$

$$k = 102.07$$

46. B

Slope of indifference curve is $dY/dX = -Y/X$

Budget line is of form $5X + 3Y = I$	$Y = (1/3)I - (5/3)X$
Slope of budget line $= -5/3 = -Y/X$	$Y = (5/3)X$
	$(5/3)X*X = 12$
	$X^2 = 7.2$
	$X = 2.7$

47. A

Monetarists believe that in the long run, real output is not affected by monetary growth, but is affected by technology and the growth of inputs.

48.   A
Current capitalization rate is:
$P_0 = DIV_1/(r - g)$
$28.50 = 0.50/(r - 0.075)$
$r - 0.075 = 0.50/28.50 = 0.0175$
$r = 0.0925$
When the long-run growth rate changes, current price should adjust to reflect this change, and to keep the expected rate of return constant.
$P_0 = 0.50/(0.0925 - 0.07) = 22.22$.

49.   B

$i^{\text{ann eff}} = (1.05)^2 - 1 = 0.1025$

Tawny: $\delta = \ln(1.1025) = 0.0975803$

At $t = 5$, $0.0975803 = \delta_{t=5} = \dfrac{Y}{1+5Y} \Rightarrow Y = 0.19055$

$Z = 1000\left[1 + 5(0.19055)\right] = 1953$

50.   A

$\dfrac{1}{0.0725} = a_{\overline{50}|j} = a_{\overline{n}|j-1}$

$13.793 \Rightarrow j = 7.00\%,\ so\ a_{\overline{n}|6\%} = 13.793$

$n = 30.2$

Course 2
May 2001
Answer Key

1	D	26	C
2	A	27	B
3	E	28	C
4	E	29	B
5	D	30	B
6	E	31	A
7	D	32	E
8	C	33	E
9	D	34	D
10	C	35	A
11	B	36	C
12	E	37	A
13	D	38	B
14	B	39	C
15	D	40	E
16	B	41	B
17	B	42	A
18	A	43	C
19	A	44	D
20	B	45	B
21	E	46	B
22	E	47	A
23	D	48	A
24	C	49	B
25	C	50	A