COURSE 2
SAMPLE EXAM QUESTIONS

1. Suppose that there are two items in the world, meat and broccoli. Knowing your income and the prices of meat and broccoli, you determine your budget line, and determine that it is tangent to an indifference curve. The formula for the indifference curve is:
$$(x + 1)(y + 1) = 100$$

    where: x = units of meat
    y = units of broccoli

    If a unit of meat costs 4 times as much as a unit of broccoli, how many units of meat will you purchase?

    A. 3
    B. 4
    C. 5
    D. 6
    E. 7

2. The total benefits and marginal costs of car ownership are given in the table below.

Number of Cars Owned	Total Benefit	Marginal Cost
1	6	4
2	11	4
3	15	4
4	18	4
5	20	4

    Assume there are no fixed costs.

    Calculate the net gain from car ownership at the optimal number of cars owned.

    A. 0
    B. 1
    C. 2
    D. 3
    E. 4

3. Assume the following for the first two quarters of Year 19XX:

	Quarter 1	Quarter 2
Seasonally adjusted Gross Domestic Product (in Billions)	1460.2	1495.2
Implicit price deflators	125.1	127.2

What was the annual rate of change in real Gross Domestic Product between the two quarters?

A. Less than 0.0%
B. At least 0.0%, but less than 2.5%
C. At least 2.5%, but less than 5.0%
D. At least 5.0%, but less than 7.5%
E. At least 7.5%

4. The following statements describe three distinct versions of the Phillips Curve which models the relationship between unemployment and inflation:

1. The original Phillips Curve, in which expectations of inflation played no part.
2. The expectations augmented Phillips Curve, in which inflation expectations have a partial impact.
3. The expectations augmented Phillips Curve, in which inflation expectations have a full impact.

Rank these three models in terms of their predicted long-term increase in inflation if the federal government adopts an expansionary policy.

A. $1 < 2 < 3$
B. $1 < 3 < 2$
C. $2 < 1 < 3$
D. $3 < 1 < 2$
E. $3 < 2 < 1$

5. You are given the following National Income and Product account data from the Bureau of Economic Analysis of the Department of Commerce:

Account	Billions of nominal dollars
Consumption of fixed capital	426.2
Adjusted corporate profits	842.7
Change in business inventories	389.3
Compensation of employees	9184.7
Gross private domestic investment	855.0
Government purchases of goods and services	2104.7
Personal consumption expenditure	8427.1
Imports	248.3
Exports	1003.2

Calculate the Gross Domestic Product in billions of nominal dollars.

A. 9,777
B. 10,632
C. 11,021
D. 12,142
E. 12,531

6. Given the following expectations augmented Phillips curve:

$$p = -0.4 + 7.6\,(1/U) + 0.85p^e$$

where: p = inflation rate in percentage points
p^e = expected inflation rate in percentage points
U = unemployment rate in percentage points

Assume the current unemployment rate is 6.

In the long run, what is the rate of change in the inflation rate, with respect to a change in the unemployment rate?

A. -8.4
B. -1.4
C. 0.0
D. 1.4
E. 8.4

7. A relationship exists between the price elasticity of demand and the amount of deadweight loss that will result from the imposition of an excise tax. You are given the following assumptions and related illustrations:

(i)   The supply curves for each of the three markets illustrated below are identical.
(ii)   The imposition of an identical excise tax on each market causes each supply curve to shift upwards in a like fashion.
(iii)   The initial equilibrium price and quantity for each market is identical.
(iv) L_i = Deadweight loss for market i

Market 1:
High Price Elasticity

Market 2:
Moderate Price Elasticity

Market 3:
Low Price Elasticity
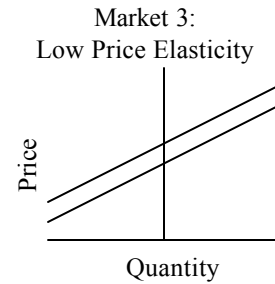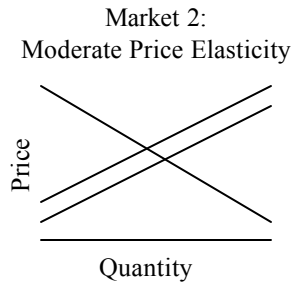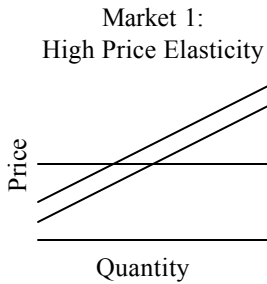
Rank the deadweight loss for these three markets.

A. $L_1 < L_2 < L_3$
B. $L_1 < L_3 < L_2$
C. $L_2 < L_1 < L_3$
D. $L_3 < L_1 < L_2$
E. $L_3 < L_2 < L_1$

8. You are given:

	1997	1998
Income	30,000	40,000
Price	15,000	15,000
Quantity	1,000	1,200

Calculate the income elasticity of demand.

A. 0.60
B. 0.67
C. 0.80
D. 1.50
E. 1.67

9. Prices have advantages over expert panels in conveying information about demand for resources.

Which of the following is NOT an advantage?

A. Prices convey a great deal of information; a panel can only gather a fraction of the information.
B. Prices reveal the most valuable use of the resource.
C. Observing prices is relatively inexpensive, hiring a panel is costly.
D. Prices provide the appropriate incentive to act on the information provided.
E. All the above are advantages.

10. A market for widgets in a large city consists of a dominant firm that controls a substantial share of the market and many competitive firms with horizontal demand curves.

    (i)   Market demand is given by:

$$P = 1000 - 0.00025Q, \text{ where } P \text{ is price and } Q \text{ is quantity}$$

    (ii)   The sum of the marginal cost curves of the competitive firms is given by:

$$MC_C = 200 + 0.001Q$$

    (iii)   The marginal cost of the dominant firm is given by:

$$MC_D = 180 + 0.001Q$$

What is the output of the dominant firm in thousands?

A. 420
B. 440
C. 470
D. 500
E. 550

11. Which of the following statements about the Investment Savings (IS)-Liquidity-Money Supply (LM) Model is true?

   A. Points to the right of the IS curve denote excess demand.
   B. Every point on the LM curve represents real sector equilibrium, where planned aggregate demand equals output.
   C. The slope of the IS curve reflects the extent to which planned aggregate demand responds to changes in interest rates.
   D. The slope of the LM curve reflects the extent to which output responds to changes in income.
   E. The IS curve shifts outward (rightward) when there is an autonomous increase in real money stock.

12. You are given:

   (i) $Q = 50 - 1.25P$, where Q is quantity and P is price.
   (ii)   Supply is given by $Q = 5P$.
   (iii) The government imposes a sales tax of 0.10.

   What proportion of the tax is borne by consumers?

   A. 0.75
   B. 0.80
   C. 0.85
   D. 0.90
   E. 0.95

13. You are given the following demand curve, where P is price and Q is quantity:

   $P = 2.25 - 0.25Q$

   What is the consumer surplus if the price is 1.0?

   A. 0
   B. 1
   C. 2
   D. 3
   E. 4

14. Which of the following is NOT a way that a bank can increase its reserves if it falls short of the regulatory reserve requirement?

   A.   The bank can borrow from the central bank.
   B.   The bank can borrow from other banks that have excess reserves.
   C.   The bank can sell government securities it has in its portfolio.
   D.   The bank can increase interest rates on loans.
   E.   All the statements above are ways that a bank can increase reserves.

15. Your town has a small free community swimming pool. The relationship between crowd size and value of a visit to the pool is given in the following table.

Crowd Size	Value of Visit (Private marginal benefit)
1	10
2	9
3	8
4	7
5	6
6	5
7	4
8	3
9	2
10	1

The alternative to going to the pool is watching TV, which you value at 4. Assume that it doesn't cost the town anything more for each additional swimmer at the pool and that the private marginal benefit schedules are the same for all potential swimmers.

What admission fee would have to be charged for using the pool to ensure the optimal social gain?

   A.   1
   B.   2
   C.   3
   D.   4
   E.   5

16. Which of the following does NOT affect private savings?

    A. Real interest rates
    B. Disposable income
    C. Future income and taxes
    D. Wealth
    E. All the above affect private savings.

17. You are given:

	1993 Price	1994 Price
Cookies	5	3
Crackers	3	2
Canned Fish	2	5

	Quantity of Items in Each Basket		
	Cookies	Crackers	Canned Fish
Basket W	4	3	3
Basket X	3	4	3
Basket Y	3	3	4
Basket Z	3	3	3

Assume that the baskets of goods are listed in decreasing order of preference (W is preferred over X, X over Y, Y over Z), and that each year you will buy the most desirable basket that you can afford. Your income in both 1993 and 1994 is 32.

What is the change in price level according to a Laspeyres price index?

A. -9%
B. -3%
C. 0%
D. 3%
E. 9%

18. You are given the following relationships for Planned Aggregate Demand (PAD):

    $$PAD = C + I + G + NX$$

    where: $C = 0.8\,[Y - T]$
    $T = 0.25Y$
    $I = -100R$
    $M/P = Y^{0.5} - 20R$
    G is government spending
    Y is output
    NX is net exports
    R is interest rate

    Assume further:
    (i)   There is no change in monetary policy (M/P).
    (ii)   Net exports are held constant.
    (iii)   The current output is 625.

    Calculate the multiplier effect of changes in government spending on output.

    A.   0.0
    B.   0.5
    C.   1.0
    D.   1.5
    E.   2.0

19. You are given the following information for a competitive firm:

Quantity	Variable Cost	Fixed Cost
1	9	10
2	14	10
3	18	10
4	21	10
5	25	10
6	30	10
7	36	10
8	44	10

    What is the competitive firm's short-run shutdown price?

    A.   2
    B.   3
    C.   4
    D.   5
    E.   6

20. You are given the following initial conditions:

Income	Consumption Spending	Investment Spending	Aggregate Demand
1400	1240	200	1440
1600	1400	200	1600
1800	1560	200	1760
2000	1720	200	1920
2200	1880	200	2080

Assume further that:
(i) Government expenditures and net exports are equal to zero.
(ii) An autonomous increase of 80 in investment spending occurs, resulting in the following revised conditions:

Income	Consumption Spending	Investment Spending	Aggregate Demand
1400	1240	280	1520
1600	1400	280	1680
1800	1560	280	1840
2000	1720	280	2000
2200	1880	280	2160

Calculate the value of the Planned Aggregate Demand multiplier.

A. 1.00
B. 1.05
C. 1.20
D. 2.50
E. 5.00

21. Suppose that demand for a commodity in the current year depends upon prices in the current and preceding three years as follows:

$$q_t = (0.5)\left(\frac{1000}{p_t}\right) + (0.25)\left(\frac{1000}{p_{t-1}}\right) + (0.125)\left(\frac{1000}{p_{t-2}}\right) + (0.125)\left(\frac{1000}{p_{t-3}}\right)$$

What is the long-run elasticity of demand if price is 100?

A. -1.0
B. -0.5
C. 0.0
D. 0.5
E. 1.0

22. You are given:

    (i)   A competitive industry produces X and Y in fixed proportions of one unit of X to two units of Y.

    (ii)   The average cost is constant at 20 for the joint product of one unit of X and two units of Y.

    (iii)   The demand functions for X and Y are as follows:

$$p_X = 35 - \frac{q_X}{10}$$

$$p_Y = 25 - \frac{q_Y}{20}$$

What is the price of X in the long-run equilibrium?

A.   10
B.   13
C.   15
D.   17
E.   20

23. At time 0, deposits of 10,000 are made into each of Fund X and Fund Y. Fund X accumulates at an annual effective interest rate of 5%. Fund Y accumulates at a simple interest rate of 8%.

At time t, the forces of interest on the two funds are equal.

At time t, the accumulated value of Fund Y is greater than the accumulated value of Fund X by Z.

Determine Z.

A.   1625
B.   1687
C.   1697
D.   1711
E.   1721

24. At a force of interest $d_t = \dfrac{2}{k+2t}$

      (i)   a deposit of 75 at time $t = 0$ will accumulate to X at time $t = 3$; and

      (ii) the present value at time $t = 3$ of a deposit of 150 at time $t = 5$ is also equal to X.

Calculate X.

A.   105
B.   110
C.   115
D.   120
E.   125

25. Brian and Jennifer each take out a loan of X.

Jennifer will repay her loan by making one payment of 800 at the end of year 10. Brian will repay his loan by making one payment of 1120 at the end of year 10.

The nominal semi-annual rate being charged to Jennifer is exactly one-half the nominal semi-annual rate being charged to Brian.

Calculate X.

A.   562
B.   565
C.   568
D.   571
E.   574

26. Carol and John shared equally in an inheritance.

Using his inheritance, John immediately bought a 10-year annuity-due with an annual payment of 2500 each.

Carol put her inheritance in an investment fund earning an annual effective interest rate of 9%. Two years later, Carol bought a 15-year annuity-immediate with annual payment of Z.

The present value of both annuities was determined using an annual effective interest rate of 8%.

Calculate Z.

A. 2330
B. 2470
C. 2515
D. 2565
E. 2715

27. Susan and Jeff each make deposits of 100 at the end of each year for 40 years.

Starting at the end of the 41st year, Susan makes annual withdrawals of X for 15 years and Jeff makes annual withdrawals of Y for 15 years. Both funds have a balance of 0 after the last withdrawal.

Susan's fund earns an annual effective interest rate of 8%. Jeff's fund earns an annual effective interest rate of 10%.

Calculate $Y - X$.

A. 2792
B. 2824
C. 2859
D. 2893
E. 2925

28. A loan of 10,000 is to be amortized in 10 annual payments beginning 6 months after the date of the loan. The first payment, X, is half as large as the other payments. Interest is calculated at an annual effective rate of 5% for the first 4.5 years and 3% thereafter.

Determine X.

    A.   640
    B.   648
    C.   656
    D.   664
    E.   672

29. Chris makes annual deposits into a bank account at the beginning of each year for 20 years. Chris' initial deposit is equal to 100, with each subsequent deposit k% greater than the previous year's deposit. The bank credits interest at an annual effective rate of 5%.

At the end of 20 years, the accumulated amount in Chris' account is equal to 7276.35.

Given $k > 5$, calculate k.

    A.   8.06
    B.   8.21
    C.   8.36
    D.   8.51
    E.   8.68

30. Scott deposits :

    1 at the beginning of each quarter in year 1;

    2 at the beginning of each quarter in year 2;

    $\vdots$

    8 at the beginning of each quarter in year 8.

    One quarter after the last deposit, Scott withdraws the accumulated value of the fund and uses it to buy a perpetuity-immediate with level payments of X at the end of each year.

    All calculations assume a nominal interest rate of 10% per annum compounded quarterly.

    Calculate X.

    A.   19.4
    B.   19.9
    C.   20.4
    D.   20.9
    E.   21.4

31. Jason deposits 3960 into a bank account at $t = 0$. The bank credits interest at the end of each year at a force of interest $d_t = \dfrac{1}{8+t}$.

    Interest can be reinvested at an annual effective rate of 7%.

    The total accumulated amount at time $t = 3$ is equal to X.

    Calculate X.

    A.   5394
    B.   5465
    C.   5551
    D.   5600
    E.   5685

32. 100 is deposited into an investment account on January 1, 1998. You are given the following information on investment activity that takes place during the year:

	April 19, 1998	October 30, 1998
Value immediately prior to deposit	95	105
Deposit	$2X$	X

The amount in the account on January 1, 1999 is 115.

During 1998, the dollar-weighted return is 0% and the time-weighted return is y.

Calculate y.

A. -1.5%
B. -0.7%
C. 0.0%
D. 0.7%
E. 1.5%

33. Eric deposits 12 into a fund at time 0 and an additional 12 into the same fund at time 10. The fund credits interest at an annual effective rate of i. Interest is payable annually and reinvested at an annual effective rate of $0.75i$.

At time 20, the accumulated amount of the reinvested interest payments is equal to 64.

Calculate i, $i > 0$.

A. 8.8%
B. 9.0%
C. 9.2%
D. 9.4%
E. 9.6%

34. A 10-year loan of 10,000 is to be repaid with payments at the end of each year consisting of interest on the loan and a sinking fund deposit.

Interest on the loan is charged at a 12% annual effective rate. The sinking fund's annual effective interest rate is 8%.

However, beginning in the sixth year, the annual effective interest rate on the sinking fund drops to 6%. As a result, the annual payment to the sinking fund is then increased by X.

Calculate X.

A. 122
B. 132
C. 142
D. 152
E. 162

35. Jason and Margaret each take out a 17-year loan of L.

Jason repays his loan using the amortization method, at an annual effective interest rate of i. He makes an annual payment of 500 at the end of each year.

Margaret repays her loan using the sinking fund method. She pays interest annually, also at an annual effective interest rate of i. In addition, Margaret makes level annual deposits at the end of each year for 17 years into a sinking fund. The annual effective rate on the sinking fund is 4.62%, and she pays off the loan after 17 years.

Margaret's total payment each year is equal to 10% of the original loan amount.

Calculate L.

A. 4840
B. 4940
C. 5040
D. 5140
E. 5240

36. Don takes out a 10-year loan of L, which he repays with annual payments at the end of each year using the amortization method. Interest on the loan is charged at an annual effective rate of i.

Don repays the loan with a decreasing series of payments. He repays 1000 in year one, 900 in year two, 800 in year three, …, and 100 in year ten.

The amount of principal repaid in year three is equal to 600.

Calculate L.

   A.   4070
   B.   4120
   C.   4170
   D.   4220
   E.   4270

37. A loan is being amortized by means of level monthly payments at an annual effective interest rate of 8%. The amount of principal repaid in the 12th payment is 1000 and the amount of principal repaid in the tth payment is 3700.

Calculate t.

   A.   198
   B.   204
   C.   210
   D.   216
   E.   228

38. Laura buys two bonds at time 0. Bond X is a 1000 par value 14-year bond with 10% annual coupons. It is bought at a price to yield an annual effective rate of 8%.

Bond Y is a 14-year par value bond with 6.75% annual coupons and a face amount of F. Laura pays P for the bond to yield an annual effective rate of 8%.

During year 6, the writedown in premium (principal adjustment) on bond X is equal to the writeup in discount (principal adjustment) on bond Y.

Calculate P.

A. 1415
B. 1425
C. 1435
D. 1445
E. 1455

39. A 1000 par value 18-year bond with annual coupons is bought to yield an annual effective rate of 5%.

The amount for amortization of premium in the 10th year is 20.

The book value of the bond at the end of year 10 is X.

Calculate X.

A. 1180
B. 1200
C. 1220
D. 1240
E. 1260

40. Company X has a current stock price of 55 and a book equity per share of 18. Investors expect earnings per share of 2.0 for the year and a 1.2 cash dividend per share at the end of the year. Assume the company's payout ratio and return on equity are constant.

What is the market capitalization rate for Company X?

A. 4.6%
B. 5.6%
C. 6.6%
D. 7.6%
E. 8.6%

41. Company X and Company Y each has the same cost of capital and identical asset portfolios with a market value of 1000.

Company X has zero debt. The expected return on equity for Company X is 15%.

The firm value of Company Y is made up of 50% debt and 50% equity. The expected return on debt for Company Y is 9%.

Assuming no taxes, what is the expected return on equity in Company Y?

A.   9%
B. 15%
C. 21%
D. 27%
E. 33%

42. Which of the following are valid reasons for a stock split, assuming the efficient market theory is correct?

I.   To give shareholders a hedge against inflation.

II.   To allow shareholders to participate in the increase in book value.

III.   To keep the share price in a desirable trading price range.

A. I only
B. III only
C. I and II only
D. I and III only
E. II and III only

43. The continuously compounded annual returns for a company have a variance of 14%.

Use the binomial method for option pricing to determine the six-month downside change in value.

A. -23%
B. -18%
C. -13%
D. -8%
E. -3%

44. You purchased a share of XYZ Corporation at 25, and it has now increased to 45.

You are given:

(i)   the annual risk free rate is 5%;
(ii) the price for a three month call option with an exercise price of 35 is 13;
(iii) XYZ does not pay dividends; and
(iv) you want to lock in a sale price of at least 35 for the next three months.

What is the cost of the option that achieves this result?

A. 1.58
B. 2.58
C. 3.58
D. 4.58
E. 5.58

45. A company is considering an investment in one of two mutually exclusive projects with the cash flows described below.

Cash Flow at time t	Project X	Project Y
0	-500	-900
1	200	150
2	200	150
3	200	900

Assume the opportunity cost of capital is 8%.

What is the profitability index of the incremental investment in Project Y over Project X?

A. 0.97
B. 1.07
C. 1.17
D. 1.27
E. 1.37

46. The market risk premium is 7%. Stock X has a beta of 2.0 and an expected rate of return of 18%. Stock Y has a beta of 0.5.

What is the expected rate of return of Stock Y?

A.   6.0%
B.   6.5%
C.   7.0%
D.   7.5%
E.   8.0%

47. A company invests 10,000 in machinery that is expected to yield net cash flows of 7000 at the end of each of the next two years. The company intends to record depreciation costs of 5000 in each of the next two years. The opportunity cost of capital is 10%.

Determine the excess of the economic rate of return over the book rate of return.

A. −14%
B. −7%
C. 0%
D. 7%
E. 14%

48. The stock of XYZ company has an expected annual return of 10%. The present value of the exercise price of a European call equals the current price of the stock on which the call is written. The value of the call is $\frac{1}{3}$ the value of the stock.

Determine the hedge ratio.

A. $\frac{1}{6}$

B. $\frac{1}{3}$

C. $\frac{1}{2}$

D. $\frac{2}{3}$

E. $\frac{5}{6}$

49. Average historical annual rates of return are as follows:

Investment Type	Nominal	Real
Government bonds	5.5%	1.0%
Corporate bonds	7.5%	3.0%
Common Stocks	11.5%	7.0%

Next year's risk-free interest rate will be 7%. There is a stable risk premium on each investment type.

What is the expected annual nominal rate of return for common stocks next year?

A. 7%
B. 9%
C. 11%
D. 13%
E. 15%

50. Which of the following actions might a company employ to advantageously retire its debt?

A. Exercising the call option on a callable bond when interest rates are relatively high.

B. Exercising the put option in a poison put provision if new equity is issued.

C. Defeasance when interest rates are relatively high.

D. Exercising the repayment provision in a negative pledge clause after a leveraged buyout.

E. Exercising the conversion option on a convertible bond when interest rates are relatively low.

51. You are given:

|	1995
Cash	50
Receivables	900
Inventories	1200
Long-term assets	5000
All other assets	0
Long-term liabilities	2000
Net sales	8500
Costs & expenses	7000
Depreciation	500
Total tax	250
Quick ratio	67%

What is the current ratio for 1995?

A. 1.1
B. 1.2
C. 1.3
D. 1.4
E. 1.5

52. You have determined that Stock X and Stock Y are perfectly negatively correlated. The variance of returns has been 225% for Stock X and 400% for Stock Y. You will invest 100 in a combination of the two stocks.

In order to minimize the risk to your portfolio, how much should be invested in Stock X?

A. 42
B. 47
C. 52
D. 57
E. 62

53. If a firm uses the company cost of capital to determine which projects to accept, a number of projects that do not have the same beta as the average beta of the firm may be incorrectly accepted or rejected.
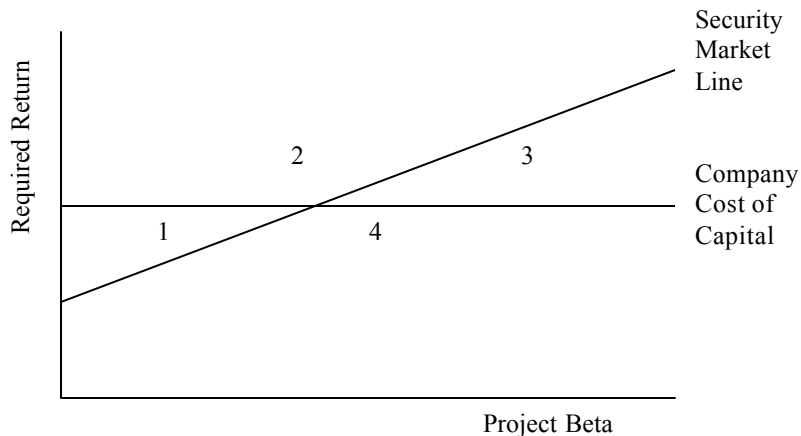
Which sections of the graph above would contain projects that would be incorrectly accepted or rejected using the company cost of capital?

A.   1 and 3 only
B.   1 and 4 only
C.   2 and 3 only
D.   2 and 4 only
E.   3 and 4 only

54. The value of a currently all-equity firm is 700. The firm converts some of its equity to debt at 6%, changing the debt-to-equity ratio of the firm to 0.25. The corporate income tax rate is 35%.

If you ignore personal taxes and any costs of financial distress, what is the new value of the firm after the conversion?

A.   741
B.   745
C.   749
D.   753
E.   757

55. Company XYZ is attempting to fund capital investment.

What is the preference order for the following options (from most preferable to least preferable), using the pecking-order theory?

1. Convertible bonds
2. Equity
3. Internal financing
4. Debt

A. 1, 2, 3, 4
B. 2, 3, 4, 1
C. 3, 2, 1, 4
D. 3, 4, 1, 2
E. 3, 4, 2, 1

END OF EXAMINATION

COURSE 2 SAMPLE EXAM
SOLUTIONS

Question 1: B

The budget line has a slope of $-Px/Py$, which is the ratio of the price of x to the price of y. In this case, the slope of the budget line is -4. The amount of meat and broccoli that is purchased is determined by where the budget line is tangent to the indifference curve. We must therefore find the point on the indifference curve where the slope is equal to -4.

$(x+1)(y+1) = 100$
$y = 100/(x+1) - 1$
$dy/dx = -100(x+1)^{-2} = -4$
$25 = (x+1)^2$
$5 = x+1$
$x = 4$ units of meat

Question 2: D

No. of Cars Owned	Total Benefit	Marginal Cost	Total Cost	Net Gain
1	6	4	4	2
2	11	4	8	3
3	15	4	12	3
4	18	4	16	2
5	20	4	20	0

Question 3: C

GDP in constant units:
Quarter 1 = 1460.2/125.1 = 1167.2
Quarter 2 = 1495.2/127.2 = 1175.5
Change for the quarter = 1175.5/1167.2 = 1.007
Annual change = [(1.007) ^ 4] – 1 = 2.8%

Question 4: A

The original Phillips curve assumed that unemployment could be reduced with little additional inflation. The expectations augmented Phillips curve (i.e. $<1) indicated that unemployment could be reduced, but at the cost of a larger increase in inflation. When there is full impact of expectations on inflation ($=1), the Phillips curve is vertical, leading to the largest inflation increase (with no effect on unemployment).

Question 5: D

Personal consumption expenditure		8427.1
Gross private domestic investment	+	855.0
Exports	+	1003.2
Imports	-	248.3
Government purchases of goods and services	+	2104.7
Total		**12,141.7**

Question 6: B

In the long run, $p^e = p$ so:

$$0.15p = -0.4 + 7.6(1/U)$$

$$0.15\frac{dp}{dU} = \frac{-7.6}{U^2}$$

$$\frac{dp}{dU} = \frac{-7.6}{0.15U^2} = \frac{-7.6}{0.15(36)} = -1.4$$

Question 7: E

Deadweight loss is the area above the original supply curve and below the demand curve and bounded by the old and new equilibrium quantities. For market 3, deadweight loss is zero since the equilibrium quantity does not change. For market 2, the loss (by geometry) is smaller than for market 1.

Question 8: A

Income elasticity   =[I * change in Q] / [Q * change in I]
                     =[30,000 * 200] / [1,000 * 10,000]
                     =0.6

Question 9: B

A,C and D are true. B is false.

Question 10: C

To get the competitive firms' supply, set price equal to their marginal cost:
    $200 + .001Q = P$ $Q = -200,000 + 1,000P$

The demand facing the dominant firm at any price is the market demand less the competitive supply:
    $Q = 4,000,000 - 4,000P - (-200,000 + 1,000P) = 4,200,000 - 5000P$
    $P = 840 - .0002Q$

Determine marginal revenue by differentiating total revenue (P x Q) by dQ:

Total revenue (P x Q) = $840Q - .0002Q^2$ $MR = 840 - .0004Q$

Set *MC* and *MR* equal for the dominant firm
              $840 - .0004Q = 180 + .001Q$ $Q = 471,429$ for the dominant firm

Question 11: C

  A. False—excess supply
  B. False—IS curve
  C. True
  D. False—depends on income and interest effects or elasticity of money demand
  E. False—LM curve

Question 12: B

Original Equilibrium

$$5P = 50 - 1.25P$$

$$25P = 200$$

$$P = 8$$

$$Q = 40$$

New Equilibrium

$$5P = 50 - 1.25(P + 0.10)$$

$$P = 7.98 = \text{Producer Price}$$

$$Q = 39.9$$

$$P + 0.10 = \text{Consumer Price}$$

$$= 8.08$$

$$\text{Consumers pay } \frac{0.08}{0.10} = 80\%$$

Question 13: D

The consumer's surplus is the area under the demand curve down to the price paid. With a linear demand curve, the area is the triangle from price equal to 1.00 and 2.25 and the quantity from 0 to 5 (the demand when the price is 1.00). Therefore the consumer surplus is 3.125.

Question 14: D

1. It can borrow from the Fed. Pays the Discount Rate
2. It can borrow from other banks that have excess reserves. Pays the Federal Funds rate.
3. It can sell government securities that it has in its portfolio. Forgoes the interest it would have received on those securities.

Question 15: C

	Value of Visit (Private marginal benefit)	Total Value of Visits	Social Marginal Benefit	Total Opportunity Cost	Total Social Gain
1	10	10	10	4	6
2	9	18	8	8	10
3	8	24	6	12	12
4	7	28	4	16	12
5	6	30	2	20	10
6	5	30	0	24	6
7	4	28	-2	28	0
8	3	24	-4	32	-8
9	2	18	-6	36	-18
10	1	10	-8	40	-30

The social optimum is achieved when the social marginal benefit is equal to the marginal cost (i.e. 4) which occurs at a crowd size of 4. To ensure 4 attendees, the admission fee needs to be set at the difference between the private marginal benefit and the social marginal benefit (or private marginal cost), that is at $7 - 4 = 3$.

Question 16: E

Question 17: E

	1993 Price	1994 Price
Basket W	35	35
Basket X	33	32
Basket Y	32	35
Basket Z	30	30

Basket Y purchased in 1993. Change in price of Basket Y is $35/32 - 1 = 9.4\%$

Question 18: E

Find dY/dG, given $Y=625$, $d(M/P) = 0$, $d(NX) =0$
Equilibrium exists where $Y=PAD$
$Y=0.8[Y-.25Y] - 100R + G + NX$
$0.4Y = -100R + G + NX$
$Y = -250R + 2.5G + 2.5NX$
$dY = -250dR + 2.5G + 2.5(0)$
$dY = -250dR + 2.5dG$

LM: $M/P = Y^{0.5} - 20R$
$\quad d(M/P) = 0 = 0.5Y^{-0.5}dY - 20dR$
$\qquad 0 = 0.5(625)^{-0.5}dY\text{-}20dR$
$\qquad 102dY = 20dR$
$\qquad dR = .001dY$
$dY = -250\,(.001dY) + 2.5dG$
$1.25dY = 2.5dG$

$dY/dG = 2.0$

Question 19: D

Quantity	Average Variable Cost	Marginal Cost
1	9	--
2	7	5
3	6	4
4	5.25	3
5	5	4
6	5	5
7	5.1	6
8	5.5	8

MC = Avg. Var. Cost at Q=6. This is the minimum for Avg. Var. Cost. At this point,
MC = 5 which is the shutdown price.

Question 20: E

Initial equilibrium at PAD = 1600
Revised equilibrium at PAD = 2000
80 increase in investment leads to 400 increase in PAD
Multiplier is 400/80 = 5

Question 21: A

In long-run, $p_t = p_{t-1} = p_{t-2} = p_{t-3} = 100$

$$q = .5\left(\frac{1000}{100}\right) + .25\left(\frac{1000}{100}\right) + .125\left(\frac{1000}{100}\right) + .125\left(\frac{1000}{100}\right)$$

$$= (.5 + .25 + .125 + .125)\left(\frac{1000}{p}\right) = \frac{1000}{p}$$

$q = 10$ when $p = 100$ in long-run

$$\frac{dq}{dp} = \frac{-1000}{p^2}$$

$$\text{long - run elasticity} = \left(\frac{dq}{dp}\right)\left(\frac{p}{q}\right) = \left(\frac{-1000}{100^2}\right)\left(\frac{100}{10}\right) = -1$$

Question 22: B

$2Q_X = Q_Y$
$P_Y = 25 - 2Q_X/20 = 25 - Q_X/10$

In long-run equilibrium $P = AC = 20 = P_X + 2P_Y$
$20 = 35 - Q_X/10 + 2\{25 - Q_X/10]$
$.3Q_X = 65$
$Q_X = 650/3$
$P_X = 35 - (650/3)/10 = 40/3 = 13.33$

Question 23: A

$AV{:}10{,}000(1.05)^t = x \quad 10{,}000(1+.08t) = y$

$$\ln(1.05) = \frac{0.08}{1+0.08t}$$

$t = 8$ years

$x = 14{,}775$

$y = 16{,}400$

$\Delta = 1625$

Question 24: D

i. $x = 75e^{\int_0^3 dt\,dt} = 75e^{\int_0^3 \frac{2}{k+2t}dt}$

$$= 75e^{\ell n(2t+k)\big|_0^3}$$

$$= 75\frac{(6+k)}{k}$$

ii.

$$x = \frac{150}{e^{\int_3^5 \frac{2}{2t+k}dt}}$$

$$= \frac{150}{e^{\ell n(2t+k)\big|_3^5}}$$

$$= \frac{150(6+k)}{10+k}$$

i = ii

$$\frac{75(6+k)}{k} = \frac{150(6+k)}{10+k}$$

$$k = 10$$

$$x = 75\left(\frac{16}{10}\right) = 120$$

Question 25: C

$$x(1+i)^{20} = 800$$

$$1+i = \frac{800^{1/20}}{x^{1/20}} \Rightarrow i = \frac{1.3968}{x^{1/20}} - 1$$

$$x(1+2i)^{20} = 1120$$

$$1+2i = \frac{1120^{1/20}}{x^{1/20}} \Rightarrow i = \frac{.7103}{x^{1/20}} - \frac{1}{2}$$

$$\frac{1.3969}{x^{1/20}} - 1 = \frac{.7103}{x^{1/20}} - \frac{1}{2}$$

$$x^{1/20} = 1.3732$$

$$x = 568.42$$

Question 26: C

$$2500\, \ddot{a}_{\overline{10}|\,8\%}(1.09)^2 = 7a_{\overline{15}|\,8\%}$$

$$z = \frac{21{,}525.07}{8.55948} = 2514.76$$

Question 27: A

$$100\, s_{\overline{40}|\,8\%} = xa_{\overline{15}|\,8\%}$$

$$100(259.05) = 8.559\,x$$

$$x = 3026.55$$

$$100\, s_{\overline{40}|\,10\%} = ya_{\overline{15}|\,10\%}$$

$$100(442.59) = y(7.607)$$

$$y = 5818.93$$

$$y - x = 2792.38$$

Question 28: C

$$10000\Big[2xa_{\overline{5}|\,5\%} - xv\Big](1.05)^{1/2} + 2xa_{\overline{5}|\,3\%}\, v^{4.5}$$

$$= \left(8.66x - \frac{x}{1.05}\right)(1.0247) + 7.354x$$

$$= 15.254x$$

$$x = 655.56$$

Question 29: C

$$7276.35 = 100\left[(1.05)^{20} + (1+k)(1.05)^{19} + \cdots (1+k)^{19}(1.05)\right]$$

$$= (1.05)^{20} \times 100\left[1 + \frac{1+k}{1+.05} + \cdots + \left(\frac{1+k}{1.05}\right)^{19}\right]$$

$$= 265.33 \sum_{1}^{20} \frac{1+k^{t-1}}{1.05}$$

$$= 265.33 \, s_{\overline{20}|\,i'}$$

$s_{\overline{20}|\,i'} \quad = 27.424$

$\boldsymbol{i'} \quad = 3.2$

$$= \frac{1+k}{1.05} - 1$$

$k = 8.36$

Question 30: C

$$\left(1 + \frac{.10}{4}\right)^4 = 1.103813$$

$\ddot{s}_{\overline{4}|\,2.5\%} = 4.256329$

$$(Is)_{\overline{8}|\,10.3813} = \frac{s_{\overline{9}|} - 9}{.103813} = 46.22937$$

$$\ddot{s}_{\overline{4}|\,2.5}(Is)_{\overline{8}|\,10.3813} = \frac{x}{.103813}$$

$x = 20.4$

Question 31: A

$$1+i = e^{\int_t^{t+1} d n\, dn} = e^{\int_t^{t+1} \frac{1}{8+n} dn}$$

$$= e^{\ell n(8+n)\big|_t^{t+1}}$$

$$= \frac{9+t}{8+t}$$

YR Interest Earned   AV end year 3

$$3960\left(\frac{9}{8}-1\right)=495 \qquad 495(1.07)^2 = 566.73$$

$$3960\left(\frac{10}{9}-1\right)=440 \qquad 440(1.07)=470.80$$

$$3960\left(\frac{11}{10}-1\right)=396 \qquad 396$$

$$AV = 3960+566.73+470.80+396$$
$$= 5393.53$$

Question 32: B

Dollar weighted = 0%

$$I = 115 - x - 2x - 100 = 0$$
$$x = 5$$
$$y = \frac{95}{100}\frac{105}{105}\frac{115}{110}-1=-0.7\%$$

Question 33: E

$$j = .75i \qquad i = \frac{4}{3}j$$

$$12\left(\frac{4}{3}j\right)s_{\overline{20}|\,j} +12\left(\frac{4}{3}j\right)s_{\overline{10}|\,j} = 64$$

$$j\left(s_{\overline{20}|\,j} + s_{\overline{10}|\,j}\right)=4$$

$$(1+j)^{20} - 1 + (1+j)^{10} - 1 = 4$$

$$(1+j)^{10} = 2$$

$$j = .071773 \qquad i = .0957$$

Question 34: A

$S = $ SF payment and $S' = $ New SF payment

$S\, s_{\overline{10}|\, 5\%} = 10{,}000$

$S = 690.29$

$690.29 s_{\overline{5}|\, 8\%}(1.06)^5 + S' s_{\overline{5}|\, 6\%} = 10000$

$5419.35 + 5.6371 S' = 10000$

$S' = 812.59 - 690.29 = 122.30$

Question 35: E

$L a_{\overline{17}|}\, i$

$.1L = iL + \dfrac{L}{s_{\overline{17}|\, 4.62\%}}$

$.1 = i + \dfrac{1}{s_{\overline{17}|\, 4.62}} = i + \dfrac{1}{25}$

$i = .06$

$L = 500 a_{\overline{17}|\, 6\%} = 5238$

Question 36: E

$100\left(Da_{\overline{8}|} - Da_{\overline{7}|}\right) = 600$

$Da_{\overline{8}|} - Da_{\overline{7}|} = 6$

$a_{\overline{8}|} = 6 \qquad i = .6858$

$L = 100 Da_{\overline{10}|} = 4272$

Question 37: D

$1000(1.08)^{\frac{t-12}{12}} = 3700$

$(1.08)^{\frac{t-12}{12}} = 3.7$

$\dfrac{t-12}{12} = 17$

$t = 216$

Question 38: C

$$1000(.01)\left(a_{\overline{n}|8\%} - a_{\overline{n-1}|8\%}\right) + 1000 v_{8\%}^n - 1000 v_{8\%}^{n-1}$$

$$-\left[y(.0675)\left(a_{\overline{n}|8\%} - a_{\overline{n-1}|8\%}\right) + y\left(v_{8\%}^n - v_{8\%}^{n-1}\right)\right]$$

$$= 100\left(\frac{1-v^n}{i} - \frac{1-v^{n-1}}{i}\right) + 1000\left(v^n - v^{n-1}\right)$$

$$= -\left[y(.0675)\left(\frac{1-v^n}{i} - \frac{1-v^{n-1}}{i}\right) - y\left(v^n - v^{n-1}\right)\right]$$

$$1000i - 100 = .0675y - yi$$

$$y = \frac{1000i - 100}{.0675i} \Rightarrow 1600$$

$$P = 1600(.0675)a_{\overline{14}|8\%} + 1600 v_{8\%}^{14} = 1435$$

Question 39: B

$$20 = 1000(g-i)v^{n-t+1}$$

$$= 1000(g-i)v_{.05}^9$$

$$g - i = .0310266$$

$$BV_{10} = 1000\left(1 + (.0310266)a_{\overline{8}|5\%}\right)$$

$$= 1200.53$$

Question 40: C

$$r = \frac{Div}{p} + g$$

$$= \frac{1.20}{55} + (plowbackratio)(ROE)$$

$$= \frac{1.20}{55} + \left(1 - \frac{Div}{EPS}\right)\left(\frac{EPS}{BookEquity}\right)$$

$$= \frac{1.20}{55} + \left(1 - \frac{1.20}{2.00}\right)\left(\frac{2.00}{18}\right) = .066$$

Question 41: C

We use the basic COC formula:

$$r^* = r_D(1-T_C)\frac{D}{V} + r_E * \frac{E}{V}$$

We're told: $r^* = .15 \quad r_D = .09 \quad T_C = 0 \quad \frac{D}{V} = \frac{E}{V} = .5$

Hence: $r_E = .21 = 2*(.15) - .09$

Question 42: B

Efficient market theory says investors are concerned with future cash flows. Certainly that precludes 2. Also, since value isn't changed, it wouldn't act as a hedge against inflation. On the other hand, "infinite divisibility" is a necessary assumption for some application of efficient market theory; hence 3 is a genuine reason.

Question 43: A

Using the formula: $1 + \text{downside change} = \frac{1}{m} = \ell^{-s\sqrt{h}}$

Hence $s = \sqrt{.14}$ and $h = .5$

Hence "downside change" $= \ell^{-\sqrt{.07}} - 1 = -.23$

Question 44: B

$$C - P = S - PVE$$

$$\Rightarrow P = C - S + PVE = .13 - 45 + \frac{35}{(1.05)^{.25}}$$

$$\doteq 2.58$$

Question 45: C

$$\frac{NPV \text{ of } Y - NPV \text{ of } X}{\text{Extra Investment}}$$

$$= \frac{981.94 - 515.42}{400}$$

$$\doteq 1.17$$

Question 46: D

$$r = r_r + b\left(r_m - r_r\right)$$

We're told: $r_m - r_r = .07$ and $r = .18$ when $b = 2$

Hence $r_r = .04$

So when $b = .5, r = .04 + .5(.07) = .075$

Question 47: E

	Economic YI	Book YI
C Flow EOY	7	7
PV BOY	10	10
PV EOY	$\frac{7}{1.1} = 6.36$	5 (book)
Economic Income	7-(10-6.36) = 3.36	7 - (10-5) = 2
Return	$\frac{3.36}{10} = 33.6\%$	$\frac{2}{10} = 20\%$

Question 48: D

$$d_1 = \frac{\ell n\left(\dfrac{P}{PV(EX)}\right)}{s\sqrt{t}} + \frac{s\sqrt{t}}{2}$$

$$d_2 = d_1 - s\sqrt{t}$$

Hence: $C = N(d_1)P - N(-d_1)P$

$$= N(d_1)P - \left(1 - N(d_1)\right)P$$

$$\Rightarrow \frac{1}{3}P = \left(2N(d_1) - 1\right)P$$

$$\Rightarrow \frac{1}{3} = 2N(d_1) - 1 \Rightarrow \frac{2}{3} = N(d_1);\ \text{the hedge ratio.}$$

Question 49: D

Government bonds represent risk free. As 5.5 – 1.0 = 4.5 is premium, this is inflation rate. If risk free rate is 7%, Real risk free rate is 2.5%. So Real Stock rate is 8.5% and Nominal Rate = 13%.

Question 50: C

B and D are techniques by which bond purchasers may defend themselves. They are not actions the company can take. Companies tend to exercise call options when interest rate are low. On the other hand, they might use defeasance when interest rates are high.

Question 51: E

$$\text{Quick Ratio} = \frac{\text{Cash} + \text{Receivables}}{\text{Current Liabilities}} = 0.67$$

$$\text{Current Liabilities} = \frac{950}{0.67} = 1418$$

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

$$= \frac{(50 + 900 + 1200)}{1418} = 152$$

Question 52: D

$$V(aX + bY) = a^2 V(X) + b^2 V(Y) + 2ab r_{XY} s_X s_Y$$
$$V(X) = 2.25 \quad V(Y) = 4 \quad r = -1 \Rightarrow s_X = 1.5 \quad s_Y = 2$$
$$a + b = 100. \quad \text{So:}$$
$$f(a) = a^2 2.25 + 4(100 \text{-} a)^2 - 2ab(1.5) \times 2$$
$$f'(a) = 4.5a + -8(100 - a) - 6(100 - a) + 6a = 0$$
$$\Rightarrow 24.5a - 1400 = 0 \Rightarrow a = \frac{1400}{24.5} = 57.14$$

Question 53: A

Region 3 contains projects whose return is higher than the COC, but are not as good on a "risk adjusted" basis since they are below the SML. Region 1 contains projects that have a lower return than the COC, but are <u>better</u> on a risk adjusted basis since they lie above the SML.

Question 54: D

Value of firm $= D + E =$ Value at all equity

$+T_c D \quad T_c = .35$

and $E = 4D$ $\left(as \; \dfrac{D}{E} = .25 \right)$ So:

$5D = 700 + .35D$

$\Rightarrow 4.65D = 700 \Rightarrow D = \dfrac{5}{4.65} 700 = 752.69$

Question 55: D

3, 4, 2 is just the basic pecking order theory of asymmetric information. As a convertible bond is a mix of debt and equity, it fits between 4 and 2.

ANSWER KEY

1.	B	29.	C
2.	D	30.	C
3.	C	31.	A
4.	A	32.	B
5.	D	33.	E
6.	B	34.	A
7.	E	35.	E
8.	A	36.	E
9.	B	37.	D
10.	C	38.	C
11.	C	39.	B
12.	B	40.	C
13.	D	41.	C
14.	D	42.	B
15.	C	43.	A
16.	E	44.	B
17.	E	45.	C
18.	E	46.	D
19.	D	47.	E
20.	E	48.	D
21.	A	49.	D
22.	B	50.	C
23.	A	51.	E
24.	D	52.	D
25.	C	53.	A
26.	C	54.	D
27.	A	55.	D
28.	C		