

COURSE 2
INTEREST THEORY, ECONOMICS, AND FINANCE

SAMPLE QUESTIONS

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Interest Theory

1. Jennifer deposits 1000 into a bank account. The bank credits interest at a nominal annual rate of i convertible semi-annually for the first 7 years and a nominal annual rate of $2i$ convertible quarterly for all years thereafter.

The accumulated amount in the account at the end of 5 years is X . The accumulated amount in the account at the end of 10.5 years is 1980.

Calculate X .

- (A) 1200
- (B) 1225
- (C) 1250
- (D) 1275
- (E) 1300

2. A deposit of 100 is made into a fund at time $t=0$. The fund pays interest at a nominal annual rate of discount d compounded quarterly for the first two years. Beginning at time $t=2$, interest is credited at a force of interest $\delta_t = \frac{1}{(t+1)}$. At time $t=5$, the accumulated value of the fund is 260.

Calculate d .

- (A) 12.7%
- (B) 12.9%
- (C) 13.1%
- (D) 13.3%
- (E) 13.5%

3. For an investment account, you are given:

Date	1/1/96	3/1/96	4/1/96	T/96	1/1/97
Account Value (before deposit or withdrawal)	100	104	99	118	130
Deposit	-	-	17	X	-
Withdrawal	-	9	-	-	-

The time-weighted yield rate is 13.75% and the dollar-weighted yield rate is 12.81%.

Calculate T .

- (A) 5/1
 - (B) 6/1
 - (C) 7/1
 - (D) 8/1
 - (E) 9/1
4. Mary purchases an increasing annuity-immediate for 50,000 that makes twenty annual payments as follows:
- (i) $P, 2P, \dots, 10P$ in years 1 through 10; and
 - (ii) $10(1.05)P, 10(1.05^2)P, \dots, 10(1.05^{10})P$ in years 11 through 20.

The annual effective interest rate is 7% for the first 10 years and 5% thereafter.

Calculate P .

- (A) 564
- (B) 574
- (C) 584
- (D) 594
- (E) 604

5. Brian buys a 10-year decreasing annuity-immediate with annual payments of 10, 9, 8, ... 1. On the same date, Jenny buys a perpetuity-immediate with annual payments. For the first 11 years, payments are 1, 2, 3, ... 11. Thereafter, payments remain constant at 11. At an annual effective interest rate of i , both annuities have a present value of X .

Calculate X .

- (A) 26.6
- (B) 27.6
- (C) 28.6
- (D) 29.6
- (E) 30.6

6. Bill purchases an annuity at a price of 10,000. The annuity makes payments of 500 at the beginning of every 6 months for 20 years. The payments are reinvested in a fund which earns interest at an annual effective rate i . Interest payments are received every 6 months and reinvested at a nominal rate of 6% convertible semiannually.

Bill realizes an overall effective annual yield of 7% on his original investment over the 20-year period.

Calculate i .

- (A) 5.90%
- (B) 6.05%
- (C) 6.20%
- (D) 6.35%
- (E) 6.50%

7. Paul lends 8000 to Peter. Peter agrees to pay it back in 10 annual installments at 7% with the first payment due in one year. After making 4 payments, Peter renegotiates to pay off the debt with 4 additional annual payments. The new payments are calculated so that Paul will get a 6.5% annual yield over the entire 8-year period.

Determine how much money Peter saved by renegotiating.

- (A) Less than 550
- (B) At least 550, but less than 600
- (C) At least 600, but less than 650
- (D) At least 650, but less than 700
- (E) At least 700

8. Howard wishes to borrow 1000. Lynn offers a loan at a 10.65% annual effective rate in which Howard would repay the loan with eight equal annual payments made at the end of each year by the amortization method.

Ann offers a loan in which the principal is to be repaid at the end of eight years. In the meantime, 9% annual effective is to be paid on the loan, and Howard is to accumulate the amount necessary to repay the loan by depositing eight annual payments at the end of each year into a sinking fund.

Calculate the interest rate the sinking fund must earn so that Howard is indifferent between the two offers.

- (A) 5.8%
- (B) 7.8%
- (C) 8.3%
- (D) 10.3%
- (E) 12.3%

9. An n -year 1000 par value bond with 4.20% annual coupons is purchased at a price to yield an annual effective rate of i .

You are given:

- i) If the annual coupon rate had been 5.25% instead of 4.20%, the price of the bond would have increased by 100.
- ii) At the time of purchase, the present value of all the coupon payments is equal to the present value of the bond's redemption value of 1000.

Calculate i .

- (A) 5.0%
- (B) 5.5%
- (C) 5.9%
- (D) 6.3%
- (E) 6.5%

10. You are given:

- i) a 10-year 8% semiannual coupon bond is purchased at a discount of X .
- ii) A 10-year 9% semiannual coupon bond is purchased at a premium of Y .
- iii) A 10-year 10% semiannual coupon bond is purchased at a premium of $2X$.
- iv) All bonds were purchased at the same yield rate and have par values of 1000.

Calculate Y .

- (A) $\frac{X}{3}$
- (B) $\frac{2X}{5}$
- (C) $\frac{X}{2}$
- (D) $\frac{2X}{3}$
- (E) X

11. Bryan buys a $2n$ -year 1000 par value bond with 7.2% annual coupons at a price of P . The price assumes an annual effective yield of 12%. At the end of n years, the book value of the bond, X , is 45.24 greater than the purchase price, P .

Assume $v_{12\%}^n < 0.5$.

Calculate X .

- (A) 645
(B) 652
(C) 659
(D) 666
(E) 675
12. A 30-year bond has 10% annual coupons and a par value of 1000. Coupons can be reinvested at a nominal annual rate of 6% convertible semi-annually. X is the highest price that an investor can pay for the bond and obtain an effective yield of at least 10%.

Calculate X .

- (A) 518
(B) 618
(C) 718
(D) 818
(E) 918
13. At time $t = 0$, Paul deposits P into a fund crediting interest at an effective annual interest rate of 8%. At the end of each year in years 6 through 20, Paul withdraws an amount sufficient to purchase an annuity-due of 100 per month for 10 years at a nominal interest rate of 12% compounded monthly. Immediately after the withdrawal at the end of year 20, the fund value is zero.

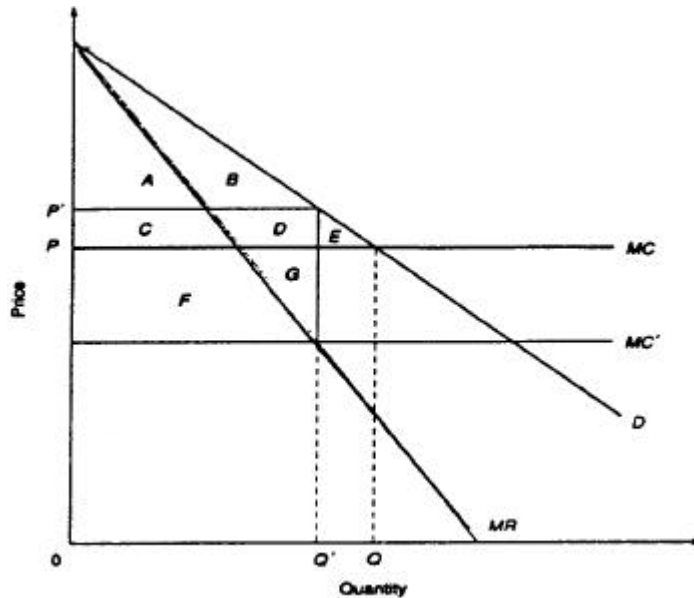
Calculate P .

- (A) 41,000
(B) 42,000
(C) 43,000
(D) 44,000
(E) 45,000

Microeconomics

14. Identify which of the following items is not an example of moral hazard.
- (A) A baseball player with a long term contract elects to stop taking extra batting practice.
 - (B) A student in his graduating year who has secured a good job elects to not study for his last exam.
 - (C) An insurance company offers a discount to young drivers who do not drive the car after 9:00 p.m.
 - (D) A person receiving unemployment insurance ceases looking for a job.
15. A horizontal merger can be depicted by the following chart where:

- P = price before merger
 P¹ = price after merger
 Q = quantity produced before merger
 Q¹ = quantity produced after merger
 MC = marginal cost before merger
 MC¹ = marginal cost after merger



Identify the Social Gain before and after the merger.

- | <u>Before</u> | <u>After</u> |
|-----------------------|-----------------------|
| (A) A + B | A + B + C + D |
| (B) A + B + C + D | A + B |
| (C) A + B + C + D | A + B + F + G |
| (D) A + B + C + D + E | A + B + C + D |
| (E) A + B + C + D + E | A + B + C + D + F + G |

16. You are given:

- i) Widgets are a normal good.
- ii) Q = quantity demanded
- iii) P = Price

Identify which of the following functions may NOT be used to represent a demand curve for widgets.

- (A) $Q = 200 - 2.5P$ $\{ 0 \leq P \leq 80 \}$
- (B) $Q = 1000 \wedge (1/P) + 500$ $\{ P > 0 \}$
- (C) $Q = 10 + (P-5)^2$ $\{ 0 \leq P \leq 5 \}$
- (D) $Q = (P^2 - 10P + 2) / P$ $\{ 0 < P < 10,000 \}$
- (E) All of the above are candidates for the demand curve for widgets.

17. Identify which of the following statements about normal goods, inferior goods, and Giffen goods is true.

- (A) For inferior goods, Marginal Revenue $>$ Marginal Cost for all units produced.
- (B) For normal goods, quantity demanded is an increasing function of income.
- (C) For Giffen goods, the substitution effect is stronger than the income effect.
- (D) Individuals tend to increase their spending on Giffen goods as their incomes increase.
- (E) None of the above are true.

18. Smallcomp Inc. produces Thing-a-ma-bobs at a rented location in Nowheresville. Currently, Smallcomp pays 5,000 per month in rent and produces 500 Thing-a-ma-bobs per month. Smallcomp is currently producing at its maximum profit potential.

Next month, Smallcomp will relocate its operation to another identical building where the rent will be 4,500 per month. Smallcomp will employ the same production personnel and machinery at the new location, and all other costs of production will remain unchanged.

Identify which of the following will be true at the new location.

- (A) If the price for Thing-a-ma-bobs remains unchanged, Smallcomp will produce between 550 and 560 each month at the new location.
 - (B) Smallcomp will reduce the price of Thing-a-ma-bobs by 10%.
 - (C) The marginal cost of the 500th Thing-a-ma-bob is decreased by 1.
 - (D) If Smallcomp continues to produce 500 Thing-a-ma-bobs each month, and the price of Thing-a-ma-bobs is unchanged, then total revenues for Smallcomp will increase by 500 per month.
 - (E) None of the above are true.
19. The government reduces the sales tax on automobiles from 8% of the sales price to 5% of the sales price.

Identify which of the following describes the resulting impact on the Supply and Demand Equilibrium for automobiles.

- (A) The Demand curve shifts upward by 3% of the sales price.
- (B) The Supply curve shifts downward by 3% of the sales price.
- (C) The Demand curve shifts downward by 3% of the sales price.
- (D) The Demand curve shifts upward by 5% of the sales price.
- (E) The Demand curve shifts downward by 5% of the sales price.

20. Identify which of the following are properties of indifference curves.

- (A) Slope upward, concave, curves cross.
- (B) Slope downward, convex, curves cross.
- (C) Slope downward, convex, curves do not cross.
- (D) Slope downward, concave, curves do not cross.
- (E) Slope upward, convex, curves do not cross.

21. Match the form of price discrimination in Column A with the pricing strategy in Column B.

<u>Form of Price Discrimination</u>		<u>Pricing Strategy</u>	
1.	First Degree	a)	Higher price for consumer in New York City
2.	Second Degree	b)	25% off second purchase
3.	Third Degree	c)	Barter

- (A) 1 and c, 2 and b, 3 and a
- (B) 1 and a, 2 and b, 3 and c
- (C) 1 and b, 2 and a, 3 and c
- (D) 1 and c, 2 and a, 3 and b
- (E) 1 and a, 2 and c, 3 and b

22. Identify which one of the following is NOT a characteristic of a perfectly competitive firm.

- (A) Production is at point where marginal cost equals marginal revenue.
- (B) Operates in short run only if revenue exceeds variable costs.
- (C) Demand curve for product is horizontal.
- (D) Operates in long run if price is equal to long run marginal cost.
- (E) Short run supply curve is that portion of its marginal cost curve that lies below average variable cost.

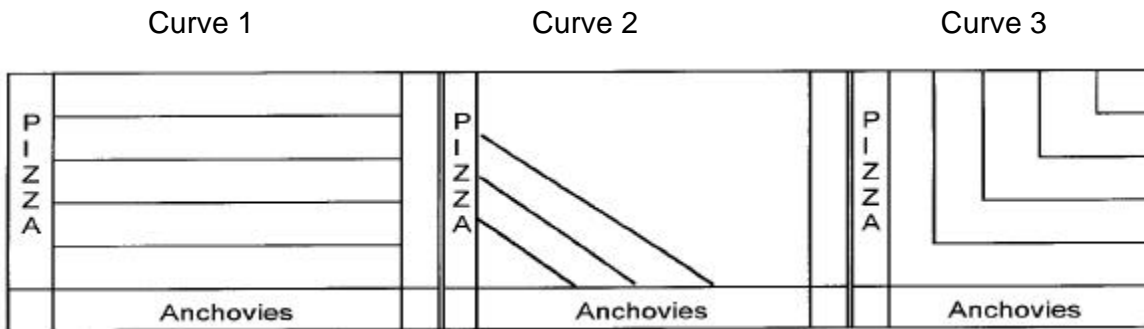
23. Identify which of the following changes would not cause a shift in the market demand curve.

- (A) Income of the buyers
- (B) Price of the good
- (C) Personal preferences
- (D) Price of other goods
- (E) Sales Tax

24. Match the following preference systems:

- X. A consumer who likes pizza but gets no satisfaction from anchovies.
- Y. A consumer who sees no difference between pizza and anchovies.
- Z. A consumer who only finds a pizza useful if he/she has anchovies

with the following indifference curves:



- (A) X-1, Y-3, Z-2
- (B) X-1, Y-2, Z-3
- (C) X-2, Y-1, Z-3
- (D) X-3, Y-2, Z-1
- (E) X-3, Y-1, Z-2

25. Identify which of the following statements is true.
- (A) In a competitive equilibrium, the marginal costs of larger firms are lower than the marginal costs of smaller firms.
 - (B) If the marginal cost of a product exceeds its price, other more valuable products are being sacrificed to produce this product.
 - (C) For the competitive firm, the demand curve is a horizontal line.
 - (D) In a competitive market, the elasticity of a firm's demand curve is equal to the elasticity of the market demand curve.

26. The individual demand curves for two consumers who make up the total market are:

Consumer 1: $q_1 = 75 - p$

Consumer 2: $q_2 = 60 - \frac{p}{3}$

Determine the elasticity of demand for each consumer and the market at $p = 30$.

- (A) $\frac{9}{19}$
- (B) $\frac{8}{19}$
- (C) $-\frac{1}{5}$
- (D) $-\frac{9}{19}$
- (E) $-\frac{8}{19}$

Macroeconomics

27. Suppose that the US Government increases spending on highway construction by \$1 Billion. As a result, GNP is increased by \$1.5 Billion. Assume no changes in interest rates.

Identify which of the following statements is true.

- (A) The additional \$0.5 Billion increase in GNP is the result of cost over-runs which are not included in the government spending account measurement.
- (B) The US Treasury prints \$1.50 for every \$1.00 required to finance government projects.
- (C) Planned Aggregate Demand increases approximately \$1 for each \$3 increase in National Income.
- (D) Highway projects require 50% matching funds from the affected states.
- (E) None of the above are true.

28. Identify which of the following statements is true.

- (A) The U.S. unemployment rate statistic measures the number of U.S. citizens over the age of 18 working less than 30 hours per week.
- (B) National Income excludes net interest paid/earned by U.S. corporations.
- (C) Disposable Income excludes income derived from transfer payments made by the U.S. Government.
- (D) Depreciation must be subtracted from Gross National Product when deriving National Income.
- (E) The numerator of the Paasche Index is equal to the numerator of the Laspeyres Index.

29. Assume all other variables are held equal.

Identify which of the following statements is true.

- (A) Reductions in interest rates tend to reduce National Income.
- (B) The demand for money (M1) tends to increase as interest rates rise.
- (C) According to the Keynesian model (without adjustments to interest rates or the money supply), U.S. GNP will decline if the value of the U.S. dollar declines relative to the Japanese yen.
- (D) Both Keynesian Theory and Classical Theory assume that the aggregate supply curve is vertical.
- (E) Labor union agreements contribute to sticky prices.

30. You are given:

- i) The government has no outstanding debt.
- ii) National Income (NI) = 10.5
- iii) Disposable Income (DI) = 5.0
- iv) Transfer Payments (TR) = 3.2
- v) Personal Tax Payments (Tp) = 1.6
- vi) Corporate Tax Payments (Tc) = 2.5
- vii) Foreign Tariffs (FT) = 1.5

Calculate retained corporate earnings (RE).

- (A) $-1.5 \leq RE \leq 1$
- (B) $1 < RE \leq 3.5$
- (C) $3.5 < RE \leq 6$
- (D) $6 < RE \leq 8.5$
- (E) $RE > 8.5$

31. You are given:
- i) Retained Corporate Earnings = 10.0
 - ii) Business Savings = 5.0
 - iii) Personal Income Taxes = 3.2
 - iv) Government Savings = -3.5
 - v) Personal Savings = 1.0
 - vi) Gross Private Domestic Investment = 8.0
 - vii) Corporate Income Taxes = 6.5
 - viii) Dividends to Investors = 2.5

Calculate Net Foreign Investment (NFI).

- (A) $-20 \leq \text{NFI} \leq -10$
- (B) $-10 < \text{NFI} \leq 0$
- (C) $0 < \text{NFI} \leq 10$
- (D) $10 < \text{NFI} \leq 20$
- (E) $\text{NFI} > 20$

32. There has been much recent discussion that the Consumer Price Index (CPI) overstates the true rate of inflation in consumer prices.

Identify which of the following statements is NOT a defect commonly cited in the CPI as a measure of inflation.

- (A) It is a Laspeyres index.
- (B) It fails to take into account improvements in quality.
- (C) It fails to take into account illicit markets for consumer products.
- (D) It fails to take into account the introduction of new products and technology.
- (E) All of the above are defects commonly cited in the CPI as a measure of inflation.

33. Assume the Federal Reserve Open Market Committee decides to purchase securities in the marketplace.

Identify which of the following is NOT a likely result.

- (A) Bank reserves increase
- (B) M1 increases
- (C) Short-term interest rates fall
- (D) Long-term inflation rates rise
- (E) Taxes increase

Finance

34. A portfolio consists of two stocks, X and Y.

You are given:

	Stock X	Stock Y
Percent of portfolio invested	50%	50%
Variance of return on stock	0.09	0.04

The covariance of returns on Stocks X and Y is 0.05.

Determine the portfolio variance.

- (A) Less than 0.05
 - (B) At least 0.05 but less than 0.06
 - (C) At least 0.06 but less than 0.07
 - (D) At least 0.07 but less than 0.08
 - (E) At least 0.08
- 35-36. Use the following information regarding XYZ Company to answer Questions 35 and 36:

Authorized shared capital	100,000 shares
Par Value	1
Treasury Stock	10,000 shares

The equity is carried on the company's books as follows:

Common Stock	80,000
Additional Paid in Capital	120,000
Retained Earnings	<u>100,000</u>
Common Equity	300,000
Treasury Stock, at cost	<u>(25,000)</u>
Net Common Equity	275,000

35. Calculate the number of shares outstanding.
- (A) 70,000
 - (B) 90,000
 - (C) 110,000
 - (D) 190,000
 - (E) None of the above

36. Assume the company issues an additional 10,000 shares at a price of 3 per share.

Calculate the net common equity.

- (A) Less than 250,000
- (B) At least 250K but less than 300K
- (C) At least 300K but less than 350K
- (D) At least 350K but less than 400K
- (E) Less than 400K

37. For three stocks D, E, and F, you are given:

- i) Stocks D and E satisfy the capital asset pricing model (CAPM)
- ii) Stock F does not satisfy the CAPM
- iii)

Stock	Expected Return	Beta	Standard Deviation
D	10.4%	0.8	20%
E	13.6%	1.2	40%
F	18.1%	2.0	50%

Assume that there are many other stocks that also satisfy the CAPM and that investors are all trying to form “efficient” portfolios (so the CAPM will hold for Stock F as well once market forces bring its price in line).

Determine whether an investor will try to buy or sell Stock F.

- (A) Investor will buy Stock F.
- (B) Investor will sell Stock F.

38. Next year's return for Stocks X, Y and Z depend on what happens to the overall economy as follows:

State	Probability	Stock A Return	Stock B Return	Stock C Return
Boom	0.2	0.30	0.17	0.404
Normal	0.5	0.15	0.095	0.194
Bust	0.3	- 0.05	- 0.005	- 0.086

A portfolio invests 55% in Stock X, 20% in Stock Y, and 25% in Stock Z.

Calculate the expected value and standard deviation for the return on the portfolio.

- (A) Expected Value = 0.12 Standard Deviation = 12.5
 (B) Expected Value = 0.15 Standard Deviation = 14.5
 (C) Expected Value = 0.18 Standard Deviation = 12.5
 (D) Expected Value = 0.15 Standard Deviation = 14.5
 (E) Expected Value = 0.18 Standard Deviation = 14.5
39. Ima Nut is the chief chestnut sheller at Acme Chestnuts. Acme's president offers Ms. Nut the following incentive scheme: If chestnuts have risen from their current price of 50 a bushel by more than 10 a bushel at the end of the year, Acme will pay Ms. Nut a 10,000 bonus.

If options to buy chestnuts in one year are currently being sold for the prices listed below, what is the approximate cost of Acme's incentive scheme?

Exercise Price	Option Price
49	7.05
50	6.50
51	5.95
59	2.50
61	2.00

- (A) 2100
 (B) 2200
 (C) 2300
 (D) 2400
 (E) 2500

40-41. Use the following information to answer Questions 40 and 41:

Company ABC's stock price changes once a month. The price either goes up by 20%, or it falls by 15%. Its price is now 30. The interest rate is 1% per month.

40. Calculate the value of a one-month call option with an exercise price of 30.

- (A) 2.56
- (B) 2.71
- (C) 3.00
- (D) 3.23
- (E) 3.39

41. Calculate the delta for the option described in Question 40.

- (A) 0.48
- (B) 0.50
- (C) 0.52
- (D) 0.54
- (E) 0.57

42. You are given:

Current stock price	20.00	Stock's beta	0.90
Current year dividend per share	2.00	Next year dividend per share	1.00
Perpetual growth in dividends	15.0%	Current year inflation rate	8.0%
Expected return on total stock market	20%	Risk-free rate yield	10%

Determine the company's estimated cost of equity by using the dividend growth model (also known as the Gordon-Shapiro model).

- (A) 15%
- (B) 18%
- (C) 19%
- (D) 20%
- (E) 22%

43. The cash-flow streams of two potential projects are show below:

Year	Cash Flow Project 1	Cash Flow Project 2
0	-100	-100
1	120	0
2	0	140
Internal Rate of Return	IRR_1	IRR_2

Calculate $|IRR_1 - IRR_2|$.

- (A) 0%
- (B) 2%
- (C) 4%
- (D) 18%
- (E) 20%

44. You are given:

- i) the risk-free rate of return in the securities market is 10%
- ii) the expected return on the stock market as a whole is 18%.
- iii)

Company	Current Stock Price	Stock's Beta	Estimated Dividends Per Share Next Year	Estimated Growth Rate in DPS
#1	12.50	2.00	2.00	10%
#2	12.50	1.25	1.50	5%
#3	15.00	1.50	1.50	10%

Identify the companies with the same predicted cost of equity under the capital asset pricing model and the discounted cash flow model

- (A) 1
- (B) 2
- (C) 1, 2
- (D) 1, 3
- (E) 2, 3

45. Choose the correct definition of the risk premium for a security.
- (A) The standard deviation of the annual return for the security.
 - (B) The excess of the average annual return of the security over the risk-free rate.
 - (C) The sum of the risk-free rate and the standard deviation of the annual return of the security.
 - (D) The variance of the annual return for the security.
 - (E) None of these definitions is correct.

46. You are given:

- (i) Opportunity cost of capital is 10%
- (ii) No taxes
- (iii) Two projects with the following financials

	T ₀	T ₁	T ₂	T ₃
Project A				
Gross book value	100,000	100,000	100,000	100,000
Depreciation	0	33,333	33,333	33,333
Net cash flows	(100,000)	50,000	50,000	50,000
Project B				
Gross book value	75,000	75,000	75,000	75,000
Depreciation	0	25,000	25,000	25,000
Net cash flows	(75,000)	40,000	30,000	50,000

Determine which project you would choose to undertake based on net present value.

- (A) Project A
- (B) Project B

Interest Theory/Finance

47. For an asset, you are given:

- i) The value of the asset at the beginning of year 1 is 1000.
- ii) The asset returns 10% each year for 5 years.
- iii) The asset pays a dividend of 50 at the end of each year for 5 years.

Your opportunity cost of capital is 12%.

Calculate the present value of the asset at the beginning of year 1.

- (A) 909
- (B) 921
- (C) 930
- (D) 939
- (E) 951

48. Your company is considering building a new manufacturing plant. You are given:

- i) Market value of the property on which the plant would be built is 100,000 as of 12/31/97.
- ii) Initial additional investment, if the project is accepted, would be 100,000 on 12/31/97.
- iii) The new plant would have a useful life of 10 years and will be depreciated using the straight line method.
- iv) Allocation of the company's currently existing overhead to the new plant would be 5,000 each year, beginning on 6/30/98.
- v) Annual after-tax cash flows from the plant are projected to be 20,000 on 6/30/98 and are expected to grow 15% each year.
- vi) A discount rate of 10%

Calculate the project's net present value as of 12/31/97.

- (A) 0
- (B) 15,000
- (C) 25,000
- (D) 35,000
- (E) 45,000

49. Consider the following bonds:

Bond A	A 10-year bond with 5% annual coupons and a face value of 1000
Bond B	A 5-year bond with 10% annual coupons and a face value of 700
Bond C	A 10-year bond with 12 % annual coupons and a face value of 600

Assuming a discount rate of 10%, rank the following:

- I. Price of Bond A
- II. Price of Bond B
- III. Price of Bond C

- (A) $I > II > III$
- (B) $I > III > II$
- (C) $II > I > III$
- (D) $III > I > II$
- (E) $III > II > I$

50. For a potential project, you are given:

- i) Initial investment at time zero is 10,000.
- ii) Net cash flows are projected as 2000 at times one through eight.
- iii) Inflation is at a constant annual rate of 3.5%.
- iv) The real interest rate is at a constant annual rate of 4.0%.

Calculate the profitability index.

- (A) 1.17
- (B) 1.26
- (C) 1.35
- (D) 1.44
- (E) 1.53

Finance/Economics

51. You are given:

- i) the risk-free rate of return is 4%
- ii) a risky asset is available with a mean return of 9% and a standard deviation of 2%

Determine the maximum rate of return you can achieve if you are willing to accept a standard deviation of 1%.

- (A) 5.0%
- (B) 5.5%
- (C) 6.0%
- (D) 6.5%
- (E) 7.0%

52. For a bond, you are given:

- i) the maturity risk premium is 1%.
- ii) the liquidity risk premium is 1.5%.
- iii) the default risk premium is 0.5%.
- iv) the risk-free rate is 4%.
- v) the inflation premium is 2%.

Calculate the nominal and real interest rates.

- | | | |
|-----|----------|--------------|
| (A) | Real = 4 | Nominal = 6 |
| (B) | Real = 5 | Nominal = 7 |
| (C) | Real = 4 | Nominal = 7 |
| (D) | Real = 7 | Nominal = 9 |
| (E) | Real = 7 | Nominal = 10 |

53. You are given:

- (i) A stock just paid a quarterly dividend of 2.20.
- (ii) The company has announced that the next dividend will be 2.42, a 10% increase.
- (iii) The company will continue to raise its dividend by 10% every four quarters forever.
- (iv) The market demands a 13% annual return on this stock.

Calculate the current price of this stock.

- (A) 256
- (B) 302
- (C) 338
- (D) 340
- (E) 376

54. Analysis of 60 monthly rates of return on company ABC common stock indicate $\beta = 1.55$ and $\alpha = -.25$ percent per month. A month later, the market is up by 5 percent, and company ABC stock is up by 6 percent.

Calculate Company ABC's abnormal rate of return.

- (A) -0.25
- (B) 1.50
- (C) 2.50
- (D) 3.05
- (E) 4.05

55. Assume a well-functioning capital market in equilibrium. Stocks X and Y are in the same "risk" class. Stock X has a current price of 20 per share. The expected price at the end of one year and dividends to be paid at the end of one year are shown below:

	X	Y
Expected price per share	23	19
Expected dividend per share	2	1

Calculate Stock Y's current price.

- (A) 14
- (B) 16
- (C) 18
- (D) 20
- (E) 22

Appendix

1. Match the form of price discrimination in Column A with the pricing strategy in Column B.

Form of Price Discrimination Pricing Strategy

- | | |
|------------------|---|
| 1. First degree | a) Higher price for consumer in New York City |
| 2. Second degree | b) 25% off second purchase |
| 3. Third degree | c) Barter |

- (A) 1 and c, 2 and b, 3 and a
(B) 1 and a, 2 and b, 3 and c
(C) 1 and b, 2 and a, 3 and c
(D) 1 and c, 2 and a, 3 and b
(E) 1 and a, 2 and c, 3 and b

2. In the table below, which row correctly identifies the type of good?

	<u>Public Good</u>	<u>Non Excludable Good</u>	<u>Non Rivalrous Good</u>
a)	Fishery	Fishery	Fishery
b)	Social benefits	Social benefits	Social benefits
c)	Group insurance	Group insurance	Group insurance
d)	Hospital	Hospital	Hospital

3. Smallcomp Inc. produces Thing-a-ma-bobs at a rented location in Nowheresville. Currently, Smallcomp pays \$5,000 per month in rent and produces 500 Thing-a-ma-bobs per month. Next month, Smallcomp will relocate its operation to another identical building where the rent will be \$4,500 per month. Smallcomp will employ the same production personnel and machinery at the new location, and all other costs of production will remain unchanged. Which of the following will be true at the new location? (Assume that Smallcomp is currently producing at its maximum profit potential).
- (A) If the price for Thing-a-ma-bobs remains unchanged, smallcomp will produce between 550 and 560 each month at the new location.
 - (B) Smallcomp will reduce the price of Thing-a-ma-bobs by 10%.
 - (C) The marginal cost of the 500th Thing-a-ma-bob is decreased by \$1.
 - (D) If Smallcomp continues to produce 500 Thing-a-ma-bobs each month, and the price of Thing-a-ma-bobs is unchanged, then total revenues for Smallcomp will increase by \$500 per month.
 - (E) None of the above are true.

For questions 23 and 24, you are given the following. In the list at the left are three types of individuals lettered X, Y and Z. In the list at the right are three preferences related to acceptance of a wager. The preferences are numbered I, II, III, IV, V and VI. One of the lettered items is related to **EXACTLY** two of the numbered items. Indicate the related items.

Type of Individual

Preference

X: Risk averse	I. At fair odds, preference is not to wager.
Y: Risk neutral	II. At fair odds, preference is to wager maximum amount.
Z: Risk preferring	III. At favorable odds, preference is not to wager.
	IV. At favorable odds, preference is to wager maximum amount.
	V. At fair odds, preference is indifferent.
	VI. At favorable odds, preference is indifferent.

4. Letter Item is Related to Numbered Items
- (A) Z II and VI
 - (B) Z II and IV
 - (C) Y II and IV
 - (D) Y II and VI
 - (E) The correct answer is not given by (A), (B), (C) or (D)

5. You are given the following information:

Quantity	Price per Computer	Total Cost
1	\$1,000	\$500
2	\$900	\$1,100
3	\$800	\$1,800
4	\$700	\$2,600
5	\$600	\$3,500

Determine the marginal cost if 4 computers are produced and the number of computers that maximizes profit.

- (A) \$700 and 3
- (B) \$700 and 2
- (C) \$800 and 4
- (D) \$800 and 3
- (E) \$800 and 2

Which of the following statements is/are true?

- I. The US unemployment rate statistic measures the number of US citizens over the age of 18 working less than 30 hours per week.
- II. Depreciation, or Capital Consumption Allowance, must be subtracted from Gross National Product when deriving National Income.
- III. National Income excludes net interest paid/earned by US corporations.

- (A) I Only
- (B) II Only
- (C) III Only
- (D) I and II Only
- (E) All of the above are true.

6. All other things being equal, which of the following are true?
- I. Reductions in interest rates tend to reduce National Income.
 - II. The demand for money (M1) tends to increase as interest rates rise.
 - III. According to the Keynesian model, without adjustments to interest rates or the money supply, as the value of the US dollar declines relative to the Japanese Yen, US GNP will tend to decline.
- (A) I Only
 - (B) II Only
 - (C) III Only
 - (D) II and III Only
 - (E) None of the above are true.

7.

8. Use the following information regarding XYZ Company to answer Question 8:

Authorized shared capital	100,000 shares
Par Value	\$1
Treasury Stock	10,000 shares

The equity is carried on the company's books as follows:

Common Stock	\$ 80,000
Additional Paid in Capital	120,000
Retained Earnings	<u>100,000</u>
Common Equity	300,000
Treasury Stock, at cost	<u>(25,000)</u>
Net Common Equity	\$275,000

Calculate the number of shares issued.

- (A) 80,000
 - (B) 100,000
 - (C) 120,000
 - (D) 200,000
 - (E) None of the above
9. According to Brealey and Myers, which of the following statements are true?
- 1. The company cost of capital is a weighted average of the returns that investors expect from the various debt and equity securities issued by the firm.
 - 2. When the firm changes its financial leverage, the asset beta and the company cost of capital also change.
 - 3. The expected return on the company's common stock is not relevant in capital budgeting decisions.
- (A) 1
 - (B) 3
 - (C) 1, 2
 - (D) 1, 3
 - (E) 1, 2, 3

10. According to Brealey and Myers, which of the following are true?
1. [Buy Call, Sell Put] = [Buy Share, Borrow Exercise Price]
 2. Bond Value = Asset Value + value of Call Option on firm assets
 3. Bond Default Option = Put Option of firm assets
- (A) 1
 (B) 2
 (C) 3
 (D) 1, 3
 (E) 2, 3
11. According to Brealey and Myers, which of the following are true?
1. Call options are less risky when the exercise price is below the stock price rather than above it.
 2. The call option delta equals the number of calls needed to replicate a levered position in one share of stock.
 3. As a stock price becomes very large, the call option value approaches the difference between the stock price and the exercise price.
- (A) 1
 (B) 2
 (C) 3
 (D) 1, 3
 (E) 2, 3
12. Assume you own a European call option with an exercise price of \$110 and an exercise date one year from now. According to Brealey and Myers, which of the following combinations of current share price and call option value are possible.
1. Share price = \$100; Call Value = \$5
 2. Share price = \$120; Call Value = \$5
 3. Share price = \$110; Call Value = \$10
- (A) 1
 (B) 2
 (C) 3
 (D) 1, 3
 (E) 2, 3

13. Assume there are taxes but no costs of financial distress or bankruptcy. The tax rate is 35%. A firm has a capital structure with \$100 million of debt and \$400 million equity. The expected return on debt is 8%, and the expected return on equity is 14%. The firm is considering issuing another \$100 million of new debt and using the proceeds to repurchase some of the equity. The required return on the debt will remain at 8%. Determine the value and the required return of equity under the new capital structure. **REWRITE FOR MULTIPLE-CHOICE**
14. A firm has total value of \$200 million, including \$40 million of debt and \$160 million of equity, and a corporate tax rate of 38%. The debt yields 8%, the risk-free rate is 6%, the return on the market is 14%, and the stock has a beta of 0.8. The firm expected to maintain these capital structure weights and is expanding rapidly enough that new issues of securities will be required to finance any new investments. The issue costs are 1% for the debt and 6% for the equity. The firm is considering an investment that yields the following after-tax incremental cash flows (free cash flows -- assuming all equity, etc.) in millions: -15, +6, +7, +7. These cash flows are judged to have risk similar to the overall assets of the firm. Determine the net present value for the investment. **REWRITE FOR MULTIPLE-CHOICE**
15. Company A retains 70 percent of its earnings and invests them at an average return on equity (ROE) of 10 percent. Company B retains only 20 percent of its earnings but invests them at an average ROE of 25 percent. Assuming both companies have a market capitalization rate of 10%, and that both companies are stable, calculate each company's price-earnings ratio. Show all work. **REWRITE FOR M-C**
16. In the constant-growth discounted cash flow model, which of the following statements are true?
1. Dividend Growth Rate = $(1 - \text{Plowback Ratio}) \times (\text{ROE})$
 2. Dividend Yield = Market Capitalization Rate - $[(\text{Plowback Ratio}) \times (\text{ROE})]$
 3. Price = Present Value of Growth Opportunities + Earnings per Share
- (A) 2
 (B) 3
 (C) 1, 2
 (D) 2, 3
 (E) 1, 2, 3

- 17.
18. According to Brealey and Myers, which of the following are true concerning the security market line?
1. The security market line measures the relationship between a stock's expected return and stock's beta.
 2. The security market line intersects the Y-axis at the risk-free interest rate.
 3. A stock lying above the security market line would be undervalued.
- (A) 2
(B) 1, 2
(C) 2, 3
(D) 1, 3
(E) 1, 2, 3
19. A monopolistic firm has two independent markets for a product. The demand curve for market number 1 is defined by $P = 50 - 2Q$, and the demand curve for market number 2 is defined by $P = 30 - \frac{Q}{2}$. The combined demand curve for both markets is $P = 34 - .4Q$, for $Q > 10$. The monopolist's marginal cost curve is defined by $MC = 5 + \frac{Q}{5}$.
1. What quantities will be sold in each market and at what price?
 2. What quantity would be sold and at what price if the markets were not separable, and only the total demand curve applied?

REWRITE AS MULTIPLE-CHOICE

20. Which of the following are impediments to the successful operation of a cartel?
1. The firm that does not join the cartel enjoys larger profits than those that do.
 2. New entrants into the industry will not join the cartel except on unusually favorable terms.
 3. Cartel members have little incentive to invest in productive capacity.

21. Briefly define private costs and social costs.

According to the Coase Theorem, when are these two costs equal?

22. Which of the following changes in elasticity causes a shift in the market demand curve?

A. Demand curve = $Q = 135 - \frac{4}{3} p$; elasticity: $E = -\frac{9}{19}$

B. Demand curve = $Q = 135 - \frac{4}{3} p$; elasticity: $E = -\frac{8}{19}$

C. Demand curve = $Q = 135 - \frac{4}{3} p$; elasticity: $E = -\frac{1}{5}$

D. Demand curve = $Q = 115 - \frac{2}{3} p$; elasticity: $E = -\frac{9}{19}$

E. Demand curve = $Q = 115 - \frac{2}{3} p$; elasticity: $E = -\frac{8}{19}$

23. Which of the following are true?

1. The slope of an Engel curve is positive for normal goods and negative for inferior goods.
2. A rational consumer would select the attainable combination of goods that is on the highest indifference curve.
3. The compensated demand curve for a good shows the quantity of a good purchased as the price of the good varies.

24. Which of the following statements are true?
1. As a general rule, demand curves are more elastic, the longer the period of adjustment.
 2. The elasticity of demand for a commodity that has good substitutes will be greater than the elasticity of demand for a commodity that does not have good substitutes.
 3. The market demand curve in a competitive industry has infinite elasticity (i.e., is flat).

25. The individual demand curves for two consumers who make up the total market are:

Consumer 1: $q_1 = 75 - p$

Consumer 2: $q_2 = 60 - \frac{p}{3}$

Determine the total market demand curve for these consumers.

26. Firm XYZ has the option of undertaking only one of the following two projects:

Year	Cash Flow Project 1	Cash Flow Project 2
0	-100	-100
1	120	0
2	0	140

Assume the market rate of interest is 12%.

Calculate the NPV of each project.

- (A) ?
- (B) ?
- (C) ?
- (D) ?
- (E) ?

27. Firm XYZ has the option of undertaking only one of the following two projects:

Year	Cash Flow Project 1	Cash Flow Project 2
0	-100	-100
1	120	0
2	0	140

Assume the market rate of interest is 12%.

Using the logic of Brealey and Myers, which projects should be undertaken? Why?

- (A) ?
 (B) ?
 (C) ?
 (D) ?
 (E) ?
28. Assume the risk-free rate of return is 4%, and a risky asset is available with a mean return of 9% and a standard deviation of 2%.

What percentage of your wealth would have to be invested in the risky asset?

- (A) ?
 (B) ?
 (C) ?
 (D) ?
 (E) ?
29. A risk-averse investor has an expected utility function of the form $u(w) = u^{\frac{1}{2}}$ and initial wealth of \$100,000. This person is offered an investment opportunity that yields \$300,000 with probability $\frac{1}{2}$ and will be worth \$0 with probability $\frac{1}{2}$.

What is the lowest price p at which the investor would be willing to pay to participate in this opportunity?

- (A) ?
 (B) ?
 (C) ?
 (D) ?
 (E) ?

Jeff's new questions

Internal Growth Rate

Abbreviated financial statements for Company ABC are shown below:

1997 Income Statement	
Sales	2,000
Costs, including interest	1,800
Net Income	200

1997 Balance Sheet, Year End			
Assets	1,500	Debt	500
Total	1,500	Equity	1,000
		Total	1,500

Sales are projected to increase by 10% in 1998. ABC's payout ratio is set at 50%, and no external debt or equity is to be issued.

Determine the maximum possible growth rate for Company ABC.

- (A) 6.8%
- (B) 7.3%
- (C) 10.0%
- (D) 11.0%
- (E) 14.7%

Jeff's New Question

Option Pricing

Company ABC's stock price changes once a month. The price either goes up by 20%, or it falls by 15%. It's price is now 30. The interest rate is 1% per month.

Calculate the value of a one-month call option with an exercise price of 30.

- (A) 2.56
- (B) 2.71
- (C) 3.00
- (D) 3.23

ANSWERS
COURSE TWO SAMPLE EXAMINATION

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