SOA/CAS Course 2 - Interest Theory, Economics, and Finance

This four-hour multiple-choice examination is administered by Preliminary Actuarial Examinations and is identical to SOA Course 2. Webnotes are available.

Please check the Admissions section of the CAS Web Site for any changes to the *Syllabus*.

The purpose of this examination is to test the candidate's basic knowledge of economics and finance. Concepts from microeconomics and macroeconomics are fundamental to understanding the general business environment. Basic interest theory and finance are essential to understanding the business of insurance. A basic knowledge of calculus and probability is assumed.

Learning Objectives

A. Economics

1. Microeconomics

a. Candidates should be able to use the following microeconomic principles to build models to increase their understanding of the framework of contingent events and to use as a frame for activities such as pricing.

- The shape of the Demand Curve, demand versus quantity demanded, changes in demand, and market demand

- The supply versus quantity supplied equilibrium and the point of equilibrium and changes in the equilibrium point

- Tastes, indifference curves and the Marginal Rate of Substitution

- Changes in income and the budget line, the Engel Curve

- Changes in price and changes in the budget line, the Demand Curve

- Income and substitution effects, the Compensated Demand Curve, why Demand Curves slope downward

- Decisions under uncertainty such as the following: attitudes toward risk, and the theory of rational expectations; and

- Adverse selection and moral hazard.

b. Candidates should be able to use knowledge of the following microeconomic principles to increase their understanding of the markets in which we operate and of the regulatory issues. Candidates should also be able to use the following microeconomic principles to increase their understanding of the ramification of strategic decisions:

- The competitive firm, the competitive industry in the short run, revenue, costs and supply, elasticity of supply, and competitive equilibrium

- The competitive firm, the competitive industry in the long run, long run costs, supply, profits, constant/decreasing-cost industries, and equilibrium

- Sources of monopoly power: natural, patents, resources, and legal barriers

- Oligopoly, contestable markets, a fixed number of firms

- Collusion, game theory, the prisoner's dilemma and the breakdown of cartels

- Monopolistic competition, product differentiation and the economics of location

- Consumers' and producers' surplus economics, theories of value

- Adverse selection and moral hazard

2. Macroeconomics

a. Candidates should understand the following macroeconomic principles and use them in developing economic models and/or economic assumptions.

- The general accounting conventions and data sources used in tracking economic activity

- The simplified Keynesian model, without adjustments for changes in price level or money supply, as it applies to changes in GDP caused by changes in investment, government spending, and net exports

- The relationship among interest rates, demand for money, consumption and investment using concepts such as the IS/LM curve, fiscal and monetary policy, and how foreign exchange rates affect GDP/NI

- The instruments and processes that shape the money supply including the money multiplier and the role of central banks, and their impact on inflation.

b. Candidates should understand the following macroeconomic principles and how they relate to the business cycle

- The general accounting conventions and data sources used to track economic activity

- The simplified Keynesian model, without adjustments for changes in price level or money supply, as it applies to changes in GDP caused by changes in investment, government spending, and net exports

- The relationship of price level, money demand, total demand, and total supply under the Keynesian Model

B. Interest Theory and Finance

1. Interest Theory

a. Candidates should have a practical knowledge of the theory of interest in both finite and continuous time. That knowledge should include how these concepts are used in the various annuity functions and apply the concepts of present and accumulated value for various streams of cash flows as a basis for future use in reserving,

valuation, pricing, duration, asset/liability management, investment income, capital budgeting, and contingencies. Candidates should be able to perform present and accumulated value calculations using non-level interest rates.

b. Candidates should understand the following principles and applications of interest theory:

- Accumulation function and the special cases of simple and compound interest

- Nominal and effective interest and discount rates, and the force of interest - constant and varying

- Valuation of discrete and continuous streams of payments, including the case in which the interest conversion period differs from the payment period

- Determination of yield rates on investments and the time required to accumulate a given amount or repay a given loan amount

- Application of interest theory to amortization of lump sums, fixed income securities, depreciation, mortgages, etc.

c. Candidates should be able to use annuity functions in a broad finance context.

2. Finance

a. Candidates should understand and be able to analyze financial statements including balance sheets, income statements, and statements of cash flow. Candidates should be able to calculate discounted cash flows, internal rate of return, present and future values of bonds and apply the dividend growth model and price/earnings ratios concept to valuing stocks.

b. Candidates must be able to assess financial performance using net present value and the payback, discounted payback models, internal rate of return and profitability index models. Candidates should be able to analyze statements and identify what should be discounted, what other factors should be considered, and the possible interactions between models.

c. Candidates should understand the trade-off between risk and return, the implications of the efficient market theory to the valuation of securities, and be able to perform the following:

- Apply measures of portfolio risk, analyze the effects of diversification, systematic and unsystematic risks. Calculate portfolio risk and analyze the impact of individual securities on portfolio risk

- Identify efficient portfolios and apply the CAPM to firm cost of capital measures

- Value cash flows and analyze the certainty equivalent versus risk-adjusted discount rates using assumptions for inflation, the term structure of interest rates and default risk correctly in their calculations

d. Candidates should understand the following concepts and be able to use them to analyze financial structures.

- Efficient markets and their effect on security prices

- Capital structure and the impact of financial leverage and long/short term financing policies on capital structure

- Sources of capital and the definitions of techniques for valuing basic options such as calls and puts

e. Candidates should understand and be able to analyze financial performance by evaluating financial statements and financial ratios such as leverage, liquidity, profitability, market value ratios and analysis of accounting return versus economic return.

f. Candidates should understand and be able to apply the basic principles of option pricing theory including:

- Black-Scholes formula

- Valuation of basic options

Note: Concepts, principles, and techniques needed for Exam 2 are covered in the references listed below. Candidates and educators may use other references, but candidates should be very familiar with the notation, terminology, and viewpoints espoused in the listed references.

A table of values for the normal distribution will be included with the examination booklet.

Readings

A. Economics

Landsburg, S.E., *Price Theory and Applications* (Fifth Edition), 2002, International Thomson Publishing. Chapters: 1, Supply, Demand, and Equilibrium; 2, Prices, Costs and the Gains from Trade; 3, Behavior of Consumers; 4, Consumers in the Marketplace; 5, The Behavior of Firms; 7, Competition; 8, Welfare Economics and the Gains from Trade; 9, Knowledge and Information (9.3 only-Topics in the Economics of Information); 10, Monopoly; 11, Market Power, Collusion, and Oligopoly; and 14, Common Property and Public Goods.

W Wachtel, P., "Macroeconomics," Society of Actuaries Study Note 2-21-00 (Third or Fourth Printing, including the errata).

B. Interest Theory and Finance

Kellison, S., *Theory of Interest* (Second Edition) 1991, Irwin/McGraw-Hill, Chapters: 1, Measurement of Interest; 2, Solution of Problems in Interest; 3, Basic Annuities (excluding 3.6, 3.7, 3.8, 3.10); 4, More General Annuities (excluding 4.8); 5, Yield Rates (excluding 5.8-5.9); 6, Amortization Schedules and Sinking Funds (excluding 6.7, 6.8); 7, Bonds and Other Securities (7.3 and 7.4 only); and 8, Practical Applications (8.5-8.7 only).

Brealey, R.A.; and Myers, S.C., *Principles of Corporate Finance* (Seventh Edition), 2003, McGraw-Hill, Chapters: 1, Finance and the Financial Manager; 4, The Value of Common Stocks; 5, Why Net Present Value Leads to Better Investment Decisions than Other Criteria; 6, Making Investment Decisions with the Net Present Value Rule; 7, Introduction to Risk, Return, and the Opportunity Cost of Capital; 8, Risk and Return; 9, Capital Budgeting and Risk; 10, A Project is Not a Black Box; 11, Where Positive Net Present Values Come From; 12, Making Sure Managers Maximize NPV; 13, Corporate Financing and the Six Lessons of Market Efficiency; 14, An Overview of Corporate Financing; 15, How Corporations Issue Securities; 16, The Dividend Controversy; 17, Does Debt Policy Matter?; 18, How Much Should a Firm Borrow?; 19, Financing and Valuation; 20, Understanding Options; 21, Valuing Options; 22, Real Options; and 29, Financial Analysis and Planning.

[Candidates may also use the sixth edition, Chapters 1, 4-21, and 28.]

Publishers and Distributors

Contact information is furnished for those who wish to purchase the text references cited for Exam 1. Publishers and distributors are independent and listed for the convenience of candidates; inclusion does not constitute endorsement by the CAS.

ACTEX Publications (Mad River Books), 140 Willow Street, Suite One, P.O. Box 974, Winsted, CT 06098; telephone: (800) 282-2839 or (860) 379-5470; fax: (860) 738-3152; e-mail retail@actexmadriver.com.

Actuarial Bookstore, P.O. Box 69, Greenland, NH 03840; telephone: (800) 582-9672 (U.S. only) or (603) 430-1252; fax: (603) 430-1258; www.actuarialbookstore.com.

Brealey, R.A.; and Myers, S.C., *Principles of Corporate Finance* (Seventh Edition), 2003, McGraw-Hill, P.O. Box 182605, Columbus, OH 43218-2605; telephone: (800) 262-4729.

Kellison, S.G., *Theory of Interest*, 1991, Irwin/McGraw-Hill, P.O. Box 182605, Columbus, OH 43218-2605; telephone: (800) 262-4729.

Landsburg, S.E., *Price Theory and Applications* (Fifth Edition), 2002, International Thomson Publishing, Order Department, P.O. Box 6904, Florence, KY 41022; telephone: (800) 347-7707.

SlideRule Books, 10 First Avenue East, Mobridge, SD 57601; telephone: (877) 407-5433 or (605) 845-5580; fax: (877) 417-5433 or (605) 845-7627; Web site: www.sliderulebooks.com.

Wachtel, P., "Macroeconomics," Study Note 2-21-00, Society of Actuaries, 475 N. Martingale Road, Suite 600, Schaumburg, IL 60173-2226; telephone: (847) 706-3500; fax: (847) 706-3599; Web site: www.soa.org.