****BEGINNING OF EXAMINATION 8****
COMPREHENSIVE SEGMENT – U.S.
MORNING SESSION

1. *(9 points)* A pension committee member at your U.S. based client believes that the interest rate for the defined benefit plan valuations is too low. He supports his view by stating that a higher interest rate would lower the cost of the plan. A second committee member argued against raising the assumption.

The chairman of the pension committee has asked you to lead a discussion at the next pension committee meeting regarding the interest rate assumptions for funding purposes and for accounting purposes, and their effect on the interested parties.

Outline your discussion.

Questions 2 – 6 pertain to the Case Study

2. *(12 points)* The CFO of NOC has decided to take a more active role in managing NOC's pension plan assets. In reviewing the performance of the National Oil Full-Time Hourly Union Pension Plan, he is disturbed by the recent absolute performance. He proposes that the assets should be moved to 100% domestic fixed income because that asset class has outperformed the other asset classes in 2 of the last 3 years.

You are given:

Calendar Year	R_f	R_m	β
2003	4%	21%	0.9
2002	5%	-5%	0.85
2001	4%	1%	0.8

<u>Additional Information for 2003</u>

	Target Portfolio Mix for 2003	Benchmark Return in 2003
Domestic Large Cap Equities	35%	30%
Domestic Small Cap Equities	25%	47%
Domestic Fixed Income	25%	4%
International Equities	10%	39%
Real Estate	5%	9%
Cash	0%	1%

(a) Describe the features in a Statement of Investment Policies and Procedures that could help the CFO in his evaluation of the Plan's performance.

(b) Calculate the 2001, 2002 & 2003 Risk Adjusted Rate of Return for the fund.

(c) Calculate the 2001, 2002 & 2003 Treynor Measure for the fund.

(d) Evaluate the investment performance of the fund during 2003.

(e) Critique the CFO's proposal.

Questions 2 – 6 pertain to the Case Study

3. *(8 points)* The government of Vosne is concerned that workers are harmed by switching companies periodically throughout their careers. The government has asked for your assistance in understanding this issue.

(a) Describe the implications of switching employers on workers' retirement benefits.

(b) Suggest policies that could be adopted by the government of Vosne to improve the portability of private retirement benefits.

(c) Describe how these policies address the issues identified in (a).

(d) Describe the impact of these policies on NOC.

4. *(10 points)* Auditors in Vosne have criticized its current pension accounting standards as being misleading to readers of financial statements and contrary to the teachings of financial economics.

The Department of Accounting Standards is considering changes to the current accounting rules to achieve the following goals:

- Increased transparency;
- Improved consistency with how financial economics measures "risk"; and
- More practical and usable information for financial statement readers.

(a) Critique the current accounting rules in light of the Department's goals.

(b) Recommend changes to the accounting rules to meet the Department's goals.

Questions 2 – 6 pertain to the Case Study

5. *(9 points)* In order to attract and retain employees in senior positions, NOC wants to introduce terminal funding by providing the options of an insured annuity or a lump sum benefit for the National Oil Full-Time Salaried Supplemental Retirement Plan (SRP).

The lump sum will be equivalent to the net present value of the after-tax annual SRP benefit. The after-tax payment from the insured annuity will be equal to the after-tax annual SRP benefit. NOC will reimburse the member for any immediate taxes payable under both options.

You are given:

- Pat, a senior executive of NOC, will retire with an annual pension under the SRP of $100,000.
- The before-tax discount rate used by NOC to calculate lump sum benefits is 10%.
- Lump sum annuity factors at Pat's retirement date are:
  At a discount rate of 10%: 9.5
  At a discount rate of 6%: 13.5
- The cost of buying Pat's annuity at retirement is $10 for every $1 of annual benefit purchased.

Vosne's tax rules for single premium annuity contracts are:

- The employer obtains a deduction for any premiums it pays;
- The executive is immediately taxed on the full purchase price of the annuity;
- A proportionate part of each annuity payment would be deemed a tax-free return of the premium ("exclusion ratio") and the balance is taxable at the individual tax rate. For this purpose, a life expectancy of 20 years is used.

(a) Describe the issues that NOC must address in adopting a terminal funding approach.

(b) Calculate the cost differential between the two terminal funding options. Show your work.

Questions 2 – 6 pertain to the Case Study

6. *(12 points)* NOC is proposing the following changes to the Retiree Health Benefit program of its salaried employees:

- Effective January 1, 2004, the program will be closed to new employees;
- Salaried employees with less than 20 years of service at January 1, 2004 who do not retire before January 1, 2005 will not be eligible for the benefit after that date; and
- For all other salaried employees, effective January 1, 2005, the portion of the premium paid by the program will be in accordance with the following schedule:

Years of Service at Retirement	Plan	Retiree/Spouse
20-24	50%	50%
25-29	75%	25%
30+	100%	0%

NOC wants an analysis of the proposed changes, in respect of the following groups of employees:

- **Group A –** the salaried employees who are currently eligible for the benefits but who lose the benefits if they do not retire in the next year;
- **Group B –** the salaried employees other than those in Group A who are no longer eligible to receive benefits under the program;
- **Group C –** the salaried employees who are eligible, under current assumptions, to receive reduced benefits under the program; and
- **Group D –** the salaried employees not affected by the proposed changes.

(a) *(7 points)* Based on the age and service distribution of the NOC Full-Time Salaried Pension Plan at January 1, 2004, estimate the number of salaried employees in Groups A, B, C and D. Identify any assumptions you used in your estimate.

(b) *(3 points)* Describe any special accounting treatments that are applicable for Groups A, B, C and D.

(c) *(2 points)* Describe the consequences to NOC of the proposed changes.

****END OF EXAMINATION****
MORNING SESSION

****BEGINNING OF EXAMINATION 8****
COMPREHENSIVE SEGMENT – U.S.
AFTERNOON SESSION

Questions 7 – 9 pertain to the Case Study

7. *(8 points)* Your client NOC is budgeting for fiscal year 2005 in June of 2004. They have asked you to estimate the fiscal year 2005 pension expense for the National Oil Full-Time Hourly Union Pension Plan.

You are given (all numbers in $000's):

Projected Benefit Obligation at January 1, 2004 with 6% discount rate = 560,919
Service Cost at January 1, 2004 with 6% discount rate = 27,169
2005 Estimated Employer Contributions = 38,000
2005 Estimated Benefit Payments = 12,100

(a) Describe the considerations for selecting the return on assets during 2004 and the discount rate for 2005 for budgeting purposes.

(b) Estimate the 2005 pension expense using a discount rate of 6% and assuming no other gains or losses.

(c) Describe and estimate the effect of a change in the economic environment on each component of your estimate of the 2005 pension expense.

Questions 7 – 9 pertain to the Case Study

8. *(12 points)* The Vice-President of Human Resources of NOC (VP of HR) is concerned about the increased level and volatility of the National Oil Company Full-Time Salaried Pension Plan costs over the past few years.

The VP of HR has proposed the following new cash balance design:

- Interest rate credit: 6% per annum
- Annual contribution credit: 5% of earnings

You are the actuary for NOC and have been hired by the VP of HR to assist with implementing the new plan design. For purposes of this question, assume that regulations governing pension plan benefits in Vosne are identical to those in the United States.

(a) Identify the key plan design features that will need to be addressed in the proposed design pertaining to retirement and ancillary benefits.

(b) Propose two options for transitioning current plan participants to the new design.

(c) Describe the effect that each of your proposed options is expected to have on the benefits of current participants.

(d) Describe the effect that each of your proposed options is expected to have on the 2004 expense.

Questions 7 – 9 pertain to the Case Study

9. *(10 points)* Vosne is proposing the introduction of a defined contribution (DC) social insurance program (SIP) effective January 1, 2004. Benefits would be funded by employee and employer contributions, as follows:

- Employees and employers both contribute 5% of pay on earnings up to $45,000 (the "Wage Base").
- The Wage Base changes in line with changes in the average wage in Vosne.
- Contributions are invested at the direction of the employees by privately managed investment companies selected by Vosne.
- Account balances are available to provide death, disability and retirement benefits.
- Account balances must be used to purchase annuities no later than age 65.

(a) Describe the challenges that other countries with DC based social insurance systems have faced.

(b) Recommend changes to the proposed program. Justify your recommendation.

(c) In order to maintain an employee's total benefit (DC SIP plus current plan) at a level equivalent to that provided under the current salaried plan provisions, the CFO of NOC is proposing to amend the National Oil Full-Time Salaried Pension Plan benefit to 0.5% of best average earnings up to the Wage Base, plus 2.0% of best average earnings in excess of the Wage Base.

Critique this proposal.

****END OF EXAMINATION****
AFTERNOON SESSION