 Course 8I: Fall 2005 -1- GO ON TO NEXT PAGE Individual Insurance Canada Morning Session **BEGINNING OF EXAMINATION 8** INDIVIDUAL INSURANCE CANADA MORNING SESSION 1. (4 points) A recent mortality experience study shows that the substandard portion of the company ’ s life insurance policies has worse than expected experience. (a) Explain reasons substandard mortality experience may be higher than expected. (b) Describe methods to reflect substandard risks in life insurance products. (c) Determine the best method to reflect each of the following substandard risks: (i) Obesity with diabetes (ii) Recovering from a temporary impairment (iii) Hazardous occupation (iv) Normal blood pressure but family history of coronary artery disease Course 8I: Fall 2005 -2- GO ON TO NEXT PAGE Individual Insurance Canada Morning Session 2. (5 points) A U.S. life insurance company is proposing a flexible premium deferred annuity with the following features: #8226. The minimum interest rate credited on funds and used in determining minimum nonforfeiture amounts is guaranteed to be no less than 3%. #8226. Surrender charges are waived upon annuitization. #8226. A death benefit is not provided during the deferral period. #8226. An annual fee of $75 is charged at the beginning of each contract year. &#8226. An administrative load of 6% is applied to each deposit. (a) Determine changes needed to the proposed product design in order to meet the requirements of the Standard Nonforfeiture Law for Individual Deferred Annuities. (b) For a contract purchased on January 1, 2005, you are given: Five-year constant maturity treasury rates January 1, 2005 5.85% January 1, 2006 5.50% January 1, 2007 5.25% January 1, 2008 4.75% January 1, 2009 4.00% Credited interest rate from January 1, 2005 to January 1, 2010 4.00% Nonrefundable state premium tax rate 2.00% Initial deposit paid on January 1, 2005 $50,000 Additional deposit paid on January 1, 2008 $5,000 Partial withdrawal on January 1, 2009 $10,000 Calculate the minimum nonforfeiture value allowed as of December 31, 2009 according to the Standard Nonforfeiture Law. Show all work. Course 8I: Fall 2005 -3- GO ON TO NEXT PAGE Individual Insurance Canada Morning Session 3. (5 points) You are given the following assumptions for a variable annuity product with a guaranteed minimum death benefit (GMDB): Account Value at time 0 $1,500 Death Benefit at time 0 $1,750 Deposit Paid to Date $1,750 Net Asset Charges 1.00% Valuation Rate 5.50% Assumed First Year Drop -14% Assumed Fund Recovery 14% Death Benefit Guarantee Type Roll-up Roll-up Interest Rate 5% Duration of Contract 5 years Valuation Time (t) 0 1 Surrender Charges as a percentage of deposit paid 7% 6% GMDB Mortality Rates per thousand - 17.192 Survival Function 1.0000 0.9828 t Projected Integrated Reserve 2 1,409.22 3 1,419.49 4 1,425.54 5 1,416.31 (a) (1 point) Explain the calculation of the integrated reserve according to Actuarial Guideline 34. (b) (4 points) Calculate the integrated reserve at time 0, according to Actuarial Guideline 34. Show all work. Course 8I: Fall 2005 -4- GO

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