

Data for Question 8

1993

Normal retirement benefit:

Before 1993: 40% of final 5-year average compensation.
After 1992: 50% of final 3-year average compensation.

Normal form of payment:

Before 1993: Life annuity.
After 1992: Fully subsidized 100% joint and survivor annuity for married participants. Life annuity for unmarried participants.

Actuarial cost method: Entry age normal (level dollar).

Actuarial assumptions:

Interest rate: 7% per year.
Compensation increases: 3% per year.
Preretirement deaths and terminations: None.
Retirement age: 65.
Marital characteristics: 80% married; spouse same age as participant.

Valuation data for each of the plan's 100 participants as of 1/1/93:

| | |
|-------------------|----------|
| Date of birth | 1/1/53 |
| Date of hire | 1/1/80 |
| 1993 compensation | \$40,000 |

Selected annuity values:

$$\ddot{a}_{65}^{(12)} = 8.736 \quad \ddot{a}_{65:65}^{(12)} = 10.576$$

Question 8

In what range is the increase in the accrued liability as of 1/1/93 due to the changes in plan provisions?

- (A) Less than \$1,550,000
- (B) \$1,550,000 but less than \$1,600,000
- (C) \$1,600,000 but less than \$1,650,000
- (D) \$1,650,000 but less than \$1,700,000
- (E) \$1,700,000 or more

1991

Data for Question 5

Normal retirement benefit: \$2,500 per year, payable as of 1/1 of each year.

Normal form of payment: Annuity payable for the life of the retiree.

For married participants, the plan provides for the following two optional forms of payment which are actuarially equivalent to the normal form of payment.

Option A: Annuity payable for the life of the retiree. After the retiree's death, the surviving spouse will receive an annual payment each 1/1 equal to 50% of the amount payable to the retiree.

Option B: Annuity payable during the joint life of the retiree and the retiree's spouse. After either's death, the survivor will receive an annual payment each 1/1 equal to 50% of the amount payable during their joint lifetime.

Data for sole participant:

| | |
|------------------------|--------|
| Date of birth | 1/1/26 |
| Date of retirement | 1/1/91 |
| Spouse's date of birth | 1/1/29 |

Present value of future benefits as of 12/31/90: \$26,000.

Initial annual benefit under Option B: \$2,376.

Selected annuity value:

$$\ddot{a}_{65:\overline{25}|} = 9.42$$

Question 5

In what range is the initial annual benefit under Option A?

- (A) Less than \$2,000
- (B) \$2,000 but less than \$2,100
- (C) \$2,100 but less than \$2,200
- (D) \$2,200 but less than \$2,300
- (E) \$2,300 or more

2007

Data for Question 31 (4 points)

Type of plan: Multiemployer plan.

Valuation interest rate: 7% per year.

Valuation data for retired participant Smith as of 1/1/2007:

| | |
|-----------------------|--------------------------|
| Date of birth | 1/1/1947 |
| Retirement date | 1/1/2002 |
| Monthly benefit | \$1,250 |
| Payment form selected | Life and 10 year certain |

Smith died on 12/31/2007.

Selected commutation functions:

| <u>Age</u> | <u>D_x</u> | <u>$N_x^{(12)}$</u> |
|------------|-------------------------|--------------------------------|
| 60 | 16,285 | 187,842 |
| 61 | 15,127 | 171,557 |
| 65 | 11,154 | 117,315 |
| 66 | 10,305 | 106,161 |

Question 31

In what range is the absolute value of the mortality (gain)/loss during 2007 due to Smith's death?

- (A) Less than \$113,000
- (B) \$113,000 but less than \$114,000
- (C) \$114,000 but less than \$115,000
- (D) \$115,000 but less than \$116,000
- (E) \$116,000 or more

2007

Data for Question 43 (4 points)

Type of plan: Multiemployer plan.

Actuarial cost method: Unit credit.

Form of benefit:

| | |
|----------------------------|--|
| While participant is alive | \$100,000 per year payable on 1/1 of each year |
| After participant dies | \$50,000 per year payable on 1/1 of each year to the retiree's beneficiary |

Valuation interest rate: 7% per year.

Data for retired participant Smith:

| | |
|-----------------------------|----------|
| Date of birth | 1/1/1937 |
| Beneficiary's date of birth | 1/1/1940 |

Selected annuity values:

$$\ddot{a}_{67} = 8.30 \quad \ddot{a}_{68} = 8.10 \quad \ddot{a}_{70} = 7.60 \quad \ddot{a}_{71} = 7.40 \quad \ddot{a}_{67:70} = 6.10$$

Smith receives the scheduled \$100,000 payment on 1/1/2007.

\$X = mortality gain if Smith survives to 1/1/2008, but his beneficiary dies during 2007.

\$Y = mortality gain if Smith dies during 2007, but his beneficiary survives to 1/1/2008.

Question 43

In what range is the absolute value of the sum of \$X + \$Y?

- (A) Less than \$500,000
- (B) \$500,000 but less than \$575,000
- (C) \$575,000 but less than \$650,000
- (D) \$650,000 but less than \$725,000
- (E) \$725,000 or more