

SOCIETY OF ACTUARIES  
AMERICAN SOCIETY OF PENSION ACTUARIES  
JOINT BOARD FOR THE ENROLLMENT OF ACTUARIES

**ENROLLED ACTUARIES PENSION EXAMINATION, SEGMENT A**

**NOVEMBER 2008 EA-2, SEGMENT A, EXAMINATION**

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2008

Data for Question 1 (2 points)

Interest rates for 2008:

Segment rates	(5.0%, 5.5%, 8.5%)
Effective rate	6.5%

Fair market value of assets on 1/1/2009 (excluding contribution receivable): \$200,000.

Contribution for 2008 made on 9/15/2009: \$40,000.

Question 1

In what range is the market value of assets for purposes of IRC section 430 as of 1/1/2009?

- (A) Less than \$238,000
- (B) \$238,000 but less than \$238,500
- (C) \$238,500 but less than \$239,000
- (D) \$239,000 but less than \$239,500
- (E) \$239,500 or more

# 2008

## Data for Question 2 (5 points)

Normal retirement benefit: 3% of final annual salary per year of service, up to 30 years.

Segment interest rates: (6.0%, 6.5%, 7.0%).

Assumed salary increases: 6.0% per year.

The plan was not subject to IRC section 412(l) for the 2007 plan year.

Credit balance in the funding standard account as of 12/31/2007: \$4,000.

Actuarial (market) value of assets as of 1/1/2008: \$60,000.

Data for sole plan participant Smith:

Date of birth	1/1/1968
Date of hire	1/1/1996
2007 salary	\$120,000

Selected annuity factors:	<u>Interest rate</u>	$\ddot{a}_{65}^{(12)}$
	6.0%	10.00
	6.5%	9.00
	7.0%	8.00

Contribution for 2008 made on 1/1/2008: \$30,000.

7-year shortfall amortization factor: 5.8803.

Actual rate of return on plan assets during 2008: 20%.

The plan sponsor does not elect to apply the funding standard carryover balance to offset the 2008 minimum required contribution.

## Question 2

In what range is the prefunding balance as of 1/1/2009?

- (A) Less than \$21,000
- (B) \$21,000 but less than \$23,000
- (C) \$23,000 but less than \$25,000
- (D) \$25,000 but less than \$27,000
- (E) \$27,000 or more

Data for Question 3 (4 points)

Plan effective date: 1/1/2000.

Normal retirement benefit: 2.5% of final year salary per year of service.

Early retirement benefit: None.

Segment interest rates: (6.0%, 7.0%, 8.0%).

Assumed salary increases: 2% per year.

Actuarial (market) value of assets as of 1/1/2009: \$40,000.

Data for sole plan participant Smith:

Date of birth	1/1/1966
Date of hire	1/1/1993
2008 salary	\$60,000
Highly compensated employee	Never

Selected annuity factors:	<u>Interest rate</u>	$\ddot{a}_{65}^{(12)}$
	6%	10.00
	7%	9.00
	8%	8.00

Question 3

In what range is the deductible limit for the 2009 tax year?

- (A) Less than \$10,000
- (B) \$10,000 but less than \$17,500
- (C) \$17,500 but less than \$25,000
- (D) \$25,000 but less than \$32,500
- (E) \$32,500 or more

## 2008

### Data for Question 4 (4 points)

Selected interest rates as of 1/1/2008:

Segment rates	(5.0%, 6.0%, 6.5%)
Effective interest rate	6.25%

Credit balance in funding standard account as of 12/31/2007: \$50,000.

The plan was exempt from establishing a shortfall amortization base as of 1/1/2008.

Adjusted funding target attainment percentage as of 1/1/2008: 98%.

Target normal cost as of 1/1/2008: \$200,000.

Contribution for 2008 made on 12/31/2008: \$240,000.

Actual rate of return on plan assets during 2008: -10.0%

Selected valuation results as of 1/1/2009:

Actuarial (market) value of assets	\$2,900,000
Funding target	3,200,000

The plan sponsor does not elect to apply the funding standard carryover balance to offset the 2008 minimum required contribution.

### Question 4

In what range is the shortfall amortization base established as of 1/1/2009?

- (A) Less than \$320,000
- (B) \$320,000 but less than \$345,000
- (C) \$345,000 but less than \$370,000
- (D) \$370,000 but less than \$395,000
- (E) \$395,000 or more

Data for Question 5 (3 points)

A company sponsors a defined benefit plan and a profit sharing plan.

On 12/31/2006, Employee 3 terminated and sold his 10% share of the company to Employee 1.

Selected data for all employees as of 12/31/2008:

	<u>Ownership percentage</u>	<u>Present value of accrued benefit</u>	<u>Profit sharing account balance</u>	<u>Unrelated rollover account balance</u>
Employee 1	80%	\$300,000	\$400,000	\$250,000
Employee 2	20%	0	350,000	0
Employee 3		0	650,000	0
Employee 4		100,000	180,000	0
Employee 5		60,000	80,000	0
Employee 6		10,000	30,000	30,000

The rollover accounts for Employee 1 and Employee 6 are from a terminated profit sharing plan which had been sponsored by an unrelated company. The rollovers occurred in 1990.

Employee 1 and Employee 2 are the only officers. None of the other employees have ever earned more than \$125,000.

Employee 4, Employee 5 and Employee 6 have never been key employees.

Question 5

In what range is the plan's top-heavy percentage for the 2009 plan year?

- (A) Less than 65.00%
- (B) 65.00% but less than 70.00%
- (C) 70.00% but less than 75.00%
- (D) 75.00% but less than 80.00%
- (E) 80.00% or more

Data for Question 6 (5 points)

Type of plan: Multiemployer.

Plan effective date: 1/1/1990.

Actuarial cost method: Unit credit.

Normal retirement benefit:

Before 2009	\$65 per month per year of service, for all years of service
After 2008	\$70 per month per year of service, for all years of service

Valuation interest rate: 7%.

Initial unfunded liability: \$400,000.

Credit balance in the funding standard account as of 12/31/2007: \$0.

Selected valuation results (based upon \$65 unit benefit):

Valuation date	<u>1/1/2008</u>	<u>1/1/2009</u>
Accrued liability	\$2,600,000	\$3,100,000
Normal cost	200,000	250,000
Actuarial (market) value of assets	2,800,000	3,000,000
Net amortization charges	15,000	

Contribution for the 2008 plan year: \$0.

The plan has no retirees or vested terminations.

Question 6

In what range is the **minimum required contribution** for 2009 as of 1/1/2009?

- (A) Less than \$300,000
- (B) \$300,000 but less than \$315,000
- (C) \$315,000 but less than \$330,000
- (D) \$330,000 but less than \$345,000
- (E) \$345,000 or more



Data for Question 7 (1 point)

Consider the following statement concerning a plan spinoff:

When determining the portion of Plan A's assets to be spun off into Plan B, the early retirement subsidy is disregarded for participants who have not satisfied the early retirement eligibility requirements at the time of the spinoff.

Question 7

Is the above statement true or false?

- (A) True
- (B) False

## 2008

### Data for Question 8 (5 points)

Plan effective date: 1/1/2008.

2008 segment interest rates: (5.0%, 5.5%, 6.0%).

Funding shortfall as of 1/1/2008: \$300,000.

7-year shortfall amortization factor for 2008: 6.0363.

The employer elected to make the minimum required contribution for 2008.

2009 segment interest rates: (6.5%, 7.5%, 8.5%).

Funding standard carryover balance as of 1/1/2009: \$0.

Prefunding balance as of 1/1/2009: \$0.

Funding shortfall as of 1/1/2009: \$200,000.

Target normal cost at 1/1/2009: \$30,000.

7-year shortfall amortization factor for 2009: 5.7703.

The employer makes a single contribution of \$X on 1/1/2009 in the **smallest amount that satisfies the minimum funding standard** for the 2009 plan year.

### Question 8

In what range is \$X?

- (A) Less than \$69,000
- (B) \$69,000 but less than \$69,450
- (C) \$69,450 but less than \$69,900
- (D) \$69,900 but less than \$70,350
- (E) \$70,350 or more

Data for Question 9 (1 point)

This question consists of an assertion in the left-hand column and a reason in the right-hand column.

ASSERTION

The deductible limit for a single employer defined benefit plan is limited to 150% of the funding target less the actuarial value of plan assets.

REASON

The deductible limit based on 140% of current liability applies to multiemployer plans only.

Question 9

Which of the following statements is (are) true?

- (A) Both the assertion and the reason are true statements and the reason is a correct explanation of the assertion.
- (B) Both the assertion and the reason are true statements and the reason is NOT a correct explanation of the assertion.
- (C) The assertion is a true statement, but the reason is a false statement.
- (D) The assertion is a false statement, but the reason is a true statement.
- (E) Both the assertion and the reason are false statements.

2008

Data for Question 10 (1 point)

A defined benefit plan has a shortfall amortization base for the 2008 plan year.

The minimum required contribution for 2009 is greater than zero.

Consider the following statement:

Quarterly contributions are due by 4/15/2009, 7/15/2009, 10/15/2009, and 1/15/2010 for the 2009 plan year. The balance, if any, of the minimum required contribution is due by 9/15/2010.

Question 10

Is the above statement true or false?

- (A) True
- (B) False

# 2008

## Data for Question 11 (5 points)

Normal retirement benefit: 1.5% of final compensation per year of service.

Selected assumptions:

Segment interest rates	(5%, 6%, 7%)
Salary increases	1% per year

The plan was not subject to IRC section 412(l) during the 2007 plan year.

Credit balance in the funding standard account as of 12/31/2007: \$0.

Shortfall amortization base established on 1/1/2008: \$0.

Prefunding balance as of 1/1/2009: \$0.

Actuarial (market) value of assets on 1/1/2009: \$3,700,000.

Number of plan participants on 1/1/2009: 100.

Selected data for each plan participant as of 1/1/2009:

Age	45
Credited service	20
2008 compensation	\$50,000

7-year shortfall amortization factor for 2009: 5.9982.

Selected annuity factor using 7% interest and required mortality:

$$\ddot{a}_{65}^{(12)} = 10.00$$

The employer makes a single contribution of \$X on 1/1/2009 in the **smallest amount that satisfies the minimum funding standard** for the 2009 plan year.

## Question 11

In what range is \$X?

- (A) Less than \$205,000
- (B) \$205,000 but less than \$225,000
- (C) \$225,000 but less than \$245,000
- (D) \$245,000 but less than \$265,000
- (E) \$265,000 or more

2008

Data for Question 12 (1 point)

Shortfall amortization charge for 2008: \$100,000.

Funding target attainment percentage as of 1/1/2009: 80%.

Each of the segment interest rates used for the 1/1/2009 valuation are less than the corresponding 1/1/2008 segment rates.

Consider the following statement:

The amount of the shortfall amortization installment attributable to the 2008 shortfall amortization base will decrease on 1/1/2009.

Question 12

Is the above statement true or false?

(A) True

(B) False

Data for Question 13 (5 points)

Normal retirement benefit: 1% of final salary per year of service.

Early retirement eligibility: Age 55.

Early retirement benefit: Accrued benefit reduced 5% for each year the benefit commencement date precedes age 65.

Selected assumptions:

Pre-retirement and post-retirement mortality Per table below

Pre-retirement decrements other than mortality None

Employee data for participant Smith:

Date of birth	1/1/1950	Date of retirement	1/1/2009
Date of hire	1/1/1989	Final salary	\$100,000

Selected commutation functions:

Age	<u>Segment 1</u>		<u>Segment 2</u>		<u>Segment 3</u>	
	$N_x^{(12)}$	$D_x$	$N_x^{(12)}$	$D_x$	$N_x^{(12)}$	$D_x$
59	702,264	52,739	365,796	30,147	192,719	17,324
63	512,579	42,171	259,267	23,210	132,559	12,846
64	471,496	39,798	236,751	21,697	120,148	11,896
65	432,743	37,519	215,712	20,262	108,660	11,005
69	299,293	29,226	144,903	15,196	70,859	7,950
70	270,933	27,337	130,218	14,080	63,208	7,297
78	105,590	14,489	47,843	6,918	21,880	3,326
79	91,718	13,143	41,247	6,216	18,721	2,960
80	79,165	11,856	35,335	5,554	15,917	2,620
84	40,889	7,359	17,704	3,319	7,735	1,508

Question 13

In what range is the absolute value of the actuarial (gain)/loss due to Smith's retirement as of 1/1/2009?

- (A) Less than \$30,000
- (B) \$30,000 but less than \$45,000
- (C) \$45,000 but less than \$60,000
- (D) \$60,000 but less than \$75,000
- (E) \$75,000 or more

Data for Question 14 (5 points)

Type of plan: Multiemployer.

Actuarial cost method: Unit credit.

Normal retirement benefit: \$40 per month per year of service prior to 2000, plus  
\$60 per month per year of service after 1999.

Early retirement age: Age 62 and 20 years of service.

Early retirement benefit: Accrued benefit reduced by 8% for each year by which the  
benefit commencement date precedes age 65.

Selected assumptions:

Valuation interest rate 6%

Probability of retirement:

Age 62 50%

Age 65 100%

There is no pre-retirement death assumption.

Data for participant Smith:

Date of birth 1/1/1960

Date of hire 1/1/1991

Selected annuity values:

$$\ddot{a}_{62}^{(12)} = 11.42 \quad \ddot{a}_{65}^{(12)} = 10.65$$

Question 14

In what range is the accrued liability for Smith as of 1/1/2009?

- (A) Less than \$40,000
- (B) \$40,000 but less than \$45,000
- (C) \$45,000 but less than \$50,000
- (D) \$50,000 but less than \$55,000
- (E) \$55,000 or more



Data for Question 15 (4 points)

Funding standard carryover balance as of 1/1/2009: \$80,000.

Prefunding balance as of 1/1/2009: \$0.

Interest rates:

Segment rates (5%, 6%, 7%)  
Effective rate 6% per year

Selected valuation results as of 1/1/2009:

Actuarial (market) value of assets	\$1,200,000
Funding target	1,400,000
Target normal cost	100,000
Funding target with future earnings increases	1,600,000
Funding target using at-risk assumptions, for IRC section 404 purposes	2,500,000
Target normal cost using at-risk assumptions, for IRC section 404 purposes	160,000

The plan is not in at-risk status for 2009.

The plan has always had over 100 participants.

Question 15

In what range is the deductible limit for 2009?

- (A) Less than \$1,250,000
- (B) \$1,250,000 but less than \$1,350,000
- (C) \$1,350,000 but less than \$1,450,000
- (D) \$1,450,000 but less than \$1,550,000
- (E) \$1,550,000 or more

2008

Data for Question 16 (1 point)

Type of plan: Multiemployer.

Year of plan amendment: 2006.

Increase in unfunded actuarial liability due to plan amendment: \$2,000,000.

Initial year of amortization: 2007.

Consider the following statement:

The outstanding balance of the increase in unfunded actuarial liability due to the plan amendment is reamortized over 15 years beginning 1/1/2008.

Question 16

Is the above statement true or false?

(A) True

(B) False

2008

Data for Question 17 (1 point)

Type of plan: Multiemployer.

Valuation date: 1/1/2008.

Funded percentage: 62%.

The plan's actuary makes a determination that, without corrective measures, the plan will first have an accumulated funding deficiency as of 12/31/2010.

Consider the following statement:

The plan is in "seriously endangered" status for 2008.

Question 17

Is the above statement true or false?

(A) True

(B) False

Data for Question 18 (4 points)

2009 effective interest rate: 7.0%.

Shortfall amortization base established on 1/1/2008: \$0.

Funding standard carryover balance as of 1/1/2009: \$720,000.

Prefunding balance as of 1/1/2009: \$0.

Actuarial value of assets as of 1/1/2009: \$13,500,000.

Funding target as of 1/1/2009: \$12,000,000.

Target normal cost as of 1/1/2009: \$2,100,000.

Amortization factor for the 1/1/2009 shortfall base: 5.9204.

Contribution for 2009 made on 7/1/2009: \$525,000.

The plan sponsor elects to apply the funding standard carryover balance to offset the 2009 minimum required contribution.

The employer makes an additional contribution of \$X on 1/1/2010 in the **smallest amount that satisfies the minimum funding standard** for the 2009 plan year.

Question 18

In what range is \$X?

- (A) Less than \$80,000
- (B) \$80,000 but less than \$85,000
- (C) \$85,000 but less than \$90,000
- (D) \$90,000 but less than \$95,000
- (E) \$95,000 or more

Data for Question 19 (3 points)

Applicable 417(e) segment rates (after reflecting phase-in): (5.0%, 5.5%, 6.0%).

Selected data for participant Smith:

Date of birth	1/1/1964
Date of termination	1/1/2009
Vested annual accrued benefit	\$36,000

Participant Smith terminated and will receive a lump sum distribution on 1/1/2009 equal to the present value of the deferred vested accrued benefit.

The plan defines actuarial equivalence as the applicable interest and mortality basis under Code section 417(e) (with no pre-retirement mortality)

Selected annuity values:

<u>Interest</u>	$\ddot{a}_{65}^{(12)}$
5.0%	11.79
5.5%	11.31
6.0%	10.87

Question 19

In what range is the lump sum distribution payable to Smith on 1/1/2009?

- (A) Less than \$100,000
- (B) \$100,000 but less than \$112,000
- (C) \$112,000 but less than \$124,000
- (D) \$124,000 but less than \$136,000
- (E) \$136,000 or more

Data for Question 20 (1 point)

Funding standard carryover balance as of 1/1/2009: \$25,000.

Prefunding balance as of 1/1/2009: \$36,000.

Minimum required contribution for 2009: \$150,000.

Consider the following statement:

On 1/1/2009, the plan sponsor has the option of offsetting the minimum required contribution for the 2009 plan year by either the funding standard carryover balance or the prefunding balance.

Question 20

Is the above statement true or false?

(A) True

(B) False

Data for Question 21 (3 points)

Normal retirement benefit:

Prior to 1/1/2009	\$30 per month times all years of service
After 12/31/2008	\$35 per month times all years of service

Carryover balance in the funding standard account as of 1/1/2009: \$0.

Prefunding balance as of 1/1/2009: \$0.

Selected valuation results as of 1/1/2009 prior to plan change:

Actuarial (market) value of assets	\$ 950,000
Funding target	1,000,000
Target normal cost	31,750
Shortfall amortization bases	0

The plan is not subject to benefit restrictions.

7-year amortization factor for shortfall amortization base: 5.9982.

The plan has no inactive participants.

The employer makes a single contribution of \$X on 1/1/2009 in **the smallest amount that satisfies the minimum funding standard** for the 2009 plan year.

Question 21

In what range is \$X?

- (A) Less than \$40,000
- (B) \$40,000 but less than \$55,000
- (C) \$55,000 but less than \$70,000
- (D) \$70,000 but less than \$85,000
- (E) \$85,000 or more

Data for Question 22 (4 points)

Plan effective date: 1/1/2004.

Final average pay: Average of highest five consecutive years of salary taken over all years of service.

Accrued benefit: 11% of final average pay multiplied by years of service not in excess of 9.

Data for sole participant Smith:

Date of birth	1/1/1939
Date of hire	1/1/2003
Date of participation	1/1/2004
Normal retirement date	Later of age 65 and fifth anniversary of date of participation

<u>Year</u>	<u>Salary</u>
2003	\$300,000
2004	250,000
2005	225,000
2006	225,000
2007	230,000
2008	235,000

Selected commutation functions using 5% interest:

$N_{65}^{(12)} = 447,114$	$D_{65} = 37,910$
$N_{70}^{(12)} = 283,630$	$D_{70} = 27,647$

Question 22

What is Smith's accrued monthly benefit as of 12/31/2008?

- (A) Less than \$8,300
- (B) \$8,300 but less than \$9,800
- (C) \$9,800 but less than \$11,300
- (D) \$11,300 but less than \$12,800
- (E) \$12,800 or more



Data for Question 23 (2 points)

Consider the following statements:

- I. Both the prior year's funding standard carryover and prefunding balances must be subtracted from the prior year's actuarial value of assets to determine if the plan is in at-risk status for the current year.
- II. Both the funding standard carryover and prefunding balances must be subtracted from the actuarial value of assets to determine if a plan is exempt from establishing a new shortfall amortization base when calculating the minimum required contribution.
- III. Both the prior year's funding standard carryover balance and prefunding balance must be subtracted from the prior year's actuarial value of assets to determine if the current year's funding standard carryover and pre-funding balances may be used to reduce the current year's minimum required contribution.

Question 23

Which, if any, of the above statement(s) is (are) true?

- (A) I only
- (B) II only
- (C) III only
- (D) I, II, and III
- (E) The correct answer is not given by (A), (B), (C), or (D) above.

Data for Question 24 (1 point)

A plan maintains a funding standard carryover balance as of 1/1/2009 and does not reduce it for any reason during 2009.

Consider the following statement:

The funding standard carryover balance is increased for interest to 12/31/2009 using the effective interest rate for 2009.

Question 24

Is the above statement true or false?

(A) True

(B) False

2008

Data for Question 25 (5 points)

Plan effective date: 1/1/2004.

The plan was not subject to IRC Section 412(l) for the 2007 plan year.

Funding standard carryover balance as of 1/1/2008: \$55,000.

Selected valuation results as of 1/1/2008:

Funding target	\$1,270,000
Target normal cost	50,000
Actuarial value of assets	960,000
Market value of assets	1,030,000

Funding standard carryover balance as of 1/1/2009: \$15,000.

Prefunding balance as of 1/1/2009: \$10,000.

Selected valuation results as of 1/1/2009:

Funding target	\$1,400,000
Target normal cost	58,500
Actuarial value of assets	1,100,000
Market value of assets	1,140,000

Shortfall amortization factors for both 2008 and 2009:

7-year	5.9982	6-year	5.2932
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The plan sponsor does not elect to apply the funding standard carryover balance to offset the 2009 minimum required contribution.

The employer makes a single contribution of \$X on 1/1/2009 in the **smallest amount that satisfies the minimum funding standard** for the 2009 plan year.

Question 25

In what range is \$X?

- (A) Less than \$90,000
- (B) \$90,000 but less than \$100,000
- (C) \$100,000 but less than \$110,000
- (D) \$110,000 but less than \$120,000
- (E) \$120,000 or more

2008

Data for Question 26 (4 points)

Shortfall amortization base established on 1/1/2008: \$20,000.

Funding standard carryover balance as of 1/1/2009: \$5,000.

Prefunding balance as of 1/1/2009: \$10,000.

Selected valuation results as of 1/1/2009:

Funding target	\$341,000
Target normal cost	36,000
Actuarial value of assets	375,000
Market value of assets	355,000

Shortfall amortization factors for both 2008 and 2009:

7-year	5.9982
6-year	5.2932

The employer makes a single contribution of \$X on 1/1/2009 in the **smallest amount that satisfies the minimum funding standard** for the 2009 plan year.

Question 26

In what range is \$X?

- (A) Less than \$5,000
- (B) \$5,000 but less than \$10,000
- (C) \$10,000 but less than \$15,000
- (D) \$15,000 but less than \$20,000
- (E) \$20,000 or more

Data for Question 27 (5 points)

Normal retirement benefit: 1.5% of final compensation per year of service.

Early retirement eligibility: Age 55.

Early retirement benefit: Accrued benefit reduced by 4.5% for each year by which the benefit commencement date precedes age 65.

Selected assumptions:

Salary increases	4% per year
Post-retirement mortality	Same as pre-retirement mortality

Assumed retirement age:

Prior to 2009	65
After 2008	62

Data for sole participant Smith:

Date of birth	1/1/1949
Date of hire	1/1/1989
2008 compensation	\$120,000
Marital status	Single

There are no pre-retirement decrements other than death.

Selected commutation functions:

Age	<u>Segment 1</u>		<u>Segment 2</u>		<u>Segment 3</u>	
	$N_x^{(12)}$	$D_x$	$N_x^{(12)}$	$D_x$	$N_x^{(12)}$	$D_x$
60	650,817	49,921	336,510	28,267	175,959	16,092
62	556,090	44,644	283,341	24,805	145,953	13,858
65	432,743	37,519	215,712	20,262	108,660	11,005
80	79,165	11,856	35,335	5,554	15,917	2,620

Question 27

In what range is the absolute value of the change in the target normal cost due to the change in assumed retirement age as of 1/1/2009?

- (A) Less than \$2,000
- (B) \$2,000 but less than \$3,000
- (C) \$3,000 but less than \$4,000
- (D) \$4,000 but less than \$5,000
- (E) \$5,000 or more

Data for Question 28 (3 points)

Plan effective date: 1/1/1985.

Normal retirement benefit: 5% of highest five consecutive year average compensation for each year of service up to 15 years.

Data for participant Smith:

Date of birth	1/1/1949
Date of hire	1/1/1989

<u>Year</u>	<u>Compensation</u>
2002	\$245,000
2003	238,000
2004	232,000
2005	228,000
2006	222,000
2007	228,000
2008	235,000

Question 28

In what range is Smith's annual accrued benefit as of 12/31/2008?

- (A) Less than \$140,000
- (B) \$140,000 but less than \$150,000
- (C) \$150,000 but less than \$160,000
- (D) \$160,000 but less than \$170,000
- (E) \$170,000 or more

Data for Question 29 (5 points)

Type of plan: Multiemployer.

Plan effective date: 1/1/2005.

Actuarial cost method: Unit credit.

Valuation interest rate: 7%.

Credit balance in the funding standard account as of 12/31/2008: \$25,000.

The plan is amended effective January 1, 2009 to increase all benefit levels.

Selected valuation results and funding standard account items as of 1/1/2009:

Accrued liability after amendment	\$1,000,000
Normal cost after amendment	75,000
Actuarial (market) value of assets	800,000
Amortization charge due to initial accrued liability	5,000
Amortization charge due to (gain)/loss during 2007	2,500
Experience (gain)/loss during 2008	0

The plan had no experience (gains)/losses during 2005 or 2006.

Collectively the employers make a contribution of \$X on 1/1/2009 equal to the **smallest amount that satisfies the minimum funding standard** for the 2009 plan year.

Question 29

In what range is \$X?

- (A) Less than \$65,000
- (B) \$65,000 but less than \$67,500
- (C) \$67,500 but less than \$70,000
- (D) \$70,000 but less than \$72,500
- (E) \$72,500 or more

Data for Question 30 (4 points)

Selected valuation results as of 1/1/2009:

Funding target	\$1,000,000
Target normal cost	60,000
Actuarial (market) value of assets	700,000
7-year amortization factor	5.9982
Effective rate	5.75%

There is no funding standard carryover or prefunding balance as of 1/1/2009.

There is no shortfall amortization base established for 2008.

The employer makes a single contribution of \$X on 3/1/2010, in the **smallest amount that satisfies the minimum funding standard** for the 2009 plan year.

Question 30

In what range is \$X?

- (A) Less than \$115,500
- (B) \$115,500 but less than \$116,500
- (C) \$116,500 but less than \$117,500
- (D) \$117,500 but less than \$118,500
- (E) \$118,500 or more



Data for Question 31 (4 points)

A company sponsors two pension plans.

	<u>Effective date</u>	<u>Benefit formula</u>
Plan A	1/1/2002	1.50% of pay for each year of service
Plan B	1/1/2000	\$250 per year for each year of service

Ratio used to determine whether the plans are top-heavy in each plan year:

<u>Plan years</u>	<u>Plan A</u>	<u>Plan B</u>	<u>Aggregated</u>
2000 - 2001	N/A	70%	70%
2002 - 2003	45%	80%	62%
2004 - 2009	45%	61%	59%

Participant data as of 12/31/2009 for two active participants:

	<u>Smith</u>	<u>Jones</u>
Plan	A	B
Date of hire	1/1/2003	1/1/2000
Key employee	Never	Never
Annual compensation (all years)	\$35,000	\$35,000

If a plan is top-heavy, the company will make the smallest increase in benefits allowable to satisfy the top-heavy requirements.

There is at least one key employee who participates in each plan.

Question 31

In what range is the sum of Smith's and Jones' annual accrued benefit as of 12/31/2009?

- (A) Less than \$6,250
- (B) \$6,250 but less than \$7,500
- (C) \$7,500 but less than \$8,750
- (D) \$8,750 but less than \$10,000
- (E) \$10,000 or more

Data for Question 32 (5 points)

Plan effective date: 1/1/2001.

Early retirement eligibility: Age 55 and 5 years benefit service.

Early retirement benefit: Accrued benefit reduced 6% for each year benefits commence prior to age 65.

Special early retirement benefit: There is no reduction for participants who have 25 years of service at retirement.

Employee data:

	<u>Smith</u>	<u>Jones</u>
Date of birth	12/31/1948	12/31/1950
Date of hire	12/31/1977	12/31/1999
Date of retirement	12/31/2008	12/31/2008
Accrued benefit as of 12/31/2008	\$185,000	\$185,000
Compensation for all years	230,000	230,000

Reduction factors based on IRC section 415 applicable mortality and 5% interest:

<u>Age</u>	<u>Factor</u>
58	57.8%
60	67.0%
62	78.2%
65	100.0%

Question 32

In what range is the sum of the annual life only benefits payable to Smith and Jones?

- (A) Less than \$193,000
- (B) \$193,000 but less than \$213,000
- (C) \$213,000 but less than \$233,000
- (D) \$233,000 but less than \$253,000
- (E) \$253,000 or more

2008

Data for Question 33 (1 point)

Data for plan participant Smith:

Date of hire	1/1/1990
Date of termination	7/1/2008
2008 compensation	\$190,000
2008 ownership	4%

Smith's ownership in the company was sold upon Smith's termination of employment.

There have never been more than 5 employees.

Consider the following statement:

Smith is a key employee for the 2009 plan year.

Question 33

Is the above statement true or false?

(A) True

(B) False

Data for Question 34 (5 points)

Type of plan: Multiemployer.

Actuarial cost method: Unit credit.

Plan formula: 1% of final pay times years of service.

Early retirement: Age 55 with 5 years of service.

Early retirement reduction: 5% for each year by which the benefit commencement age precedes age 65.

## Data for participant Smith:

Date of birth	1/1/1946
Date of hire	1/1/2001
Status as of 1/1/2008	Active
Date of retirement	12/31/2008
2007 compensation used for the 2008 valuation	\$50,000
2008 compensation used for the 2009 valuation	52,500

## Selected assumptions:

Valuation interest rate	7.00%
Salary increases	4.50%
Retirement decrements (beginning of the year):	
Age 62	25%
Age 65	100%
Pre-retirement mortality	None

## Selected annuity factors:

$$\ddot{a}_{62}^{(12)} = 9.94 \qquad \ddot{a}_{63}^{(12)} = 9.72 \qquad \ddot{a}_{65}^{(12)} = 9.24$$

Question 34

In what range is the absolute value of the experience gain/loss during 2008 for Smith as of 1/1/2009?

- (A) Less than \$500
- (B) \$500 but less than \$1,000
- (C) \$1,000 but less than \$1,500
- (D) \$1,500 but less than \$2,000
- (E) \$2,000 or more

Data for Question 35 (3 points)

Valuation date: 1/1/2009.

The plan had a deficit reduction contribution in 2007.

Shortfall amortization installment for 2008: \$0.

Funding standard carryover balance as of 1/1/2009: \$20,000.

Prefunding balance as of 1/1/2009: \$0.

Selected valuation results as of 1/1/2009:

Funding target	\$2,000,000
Target normal cost	250,000
Actuarial (market) value of assets	1,840,000

7-year shortfall amortization factor: 5.9852.

The employer makes a single contribution of \$X on 1/1/2009 in the **smallest amount that satisfies the minimum funding standard** for the 2009 plan year.

Question 35

In what range is \$X?

- (A) Less than \$219,000
- (B) \$219,000 but less than \$239,000
- (C) \$239,000 but less than \$259,000
- (D) \$259,000 but less than \$279,000
- (E) \$279,000 or more

2008

Data for Question 36 (4 points)

Funding standard carryover balance as of 1/1/2008: \$240,000.

Selected valuation results:

	<u>1/1/2008</u>	<u>1/1/2009</u>
Funding target		\$2,100,000
Target normal cost	160,000	183,000
Actuarial (market) value of assets		2,000,000
Shortfall amortization charge	20,000	
7-year amortization factor		5.9928
6-year amortization factor		5.2798

No contribution was made for 2008.

Actual return on assets during 2008: 15%.

The employer makes a single contribution of \$X on 1/1/2009 in the **smallest amount that satisfies the minimum funding standard** for the 2009 plan year.

Question 36

In what range is \$X?

- (A) Less than \$140,000
- (B) \$140,000 but less than \$145,000
- (C) \$145,000 but less than \$150,000
- (D) \$150,000 but less than \$155,000
- (E) \$155,000 or more

Data for Question 37 (5 points)

Funding standard carryover balance as of 1/1/2008: \$0.

Selected valuation results:

	<u>1/1/2008</u>	<u>1/1/2009</u>
Funding target	\$1,700,000	\$2,000,000
Target normal cost	80,000	100,000
Actuarial (market) value of assets	1,520,000	1,800,000
Net shortfall amortization charge		40,000
Effective interest rate	5.75%	6.00%
7-year amortization factor	5.9928	5.9928
6-year amortization factor		5.2798

The employer makes a single contribution of \$X on 12/31/2009 in the **smallest amount that satisfies the minimum funding standard** for the 2009 plan year.

Question 37

In what range is \$X?

- (A) Less than \$115,000
- (B) \$115,000 but less than \$125,000
- (C) \$125,000 but less than \$135,000
- (D) \$135,000 but less than \$145,000
- (E) \$145,000 or more

Data for Question 38 (3 points)

Segment interest rates: (5.00%, 5.75%, 6.50%)

Effective interest rate: 5.8% per year.

Selected valuation results as of 1/1/2009:

Funding target	\$300,000
Target normal cost	24,000
Increase in funding target attributable to future compensation increases	60,000
Funding target using at-risk assumptions	450,000
Target normal cost using at-risk assumptions	30,000
Actuarial (market) value of assets	275,000
Minimum required contribution	28,000

The plan is not in at-risk status for 2009.

The plan has always had over 100 lives.

Question 38

In what range is the deductible limit for 2009?

- (A) Less than \$250,000
- (B) \$250,000 but less than \$300,000
- (C) \$300,000 but less than \$350,000
- (D) \$350,000 but less than \$400,000
- (E) \$400,000 or more



Data for Question 39 (5 points)

Valuation date: 1/1/2009.

Normal retirement benefit: \$1,750 per year for each year of service.

Early retirement eligibility: Age 55 with 25 years of service.

Early retirement benefit: Unreduced immediate benefit.

2009 segment interest rates: (5.60%, 5.75%, 6.35%).

Data for participant Smith:

Date of birth	1/1/1964
Date of hire	1/1/1994

Selected post-retirement commutation functions:

Age	<u>Segment 1</u>		<u>Segment 2</u>		<u>Segment 3</u>	
	$N_x^{(12)}$	$D_x$	$N_x^{(12)}$	$D_x$	$N_x^{(12)}$	$D_x$
55	494,928	36,155	450,843	33,440	386,161	29,367
65	221,321	19,724	199,375	17,985	167,616	15,426

Retirement rates:

Age 55	50%
Age 65	100%

There are no pre-retirement decrements.

Question 39

In what range is the funding target for Smith as of 1/1/2009?

- (A) Less than \$135,000
- (B) \$135,000 but less than \$139,000
- (C) \$139,000 but less than \$143,000
- (D) \$143,000 but less than \$147,000
- (E) \$147,000 or more

Data for Question 40 (5 points)

2009 segment interest rates: (5.0%, 5.5%, 6.0%)

Normal retirement benefit: \$100 per month for each year of service.

Early retirement eligibility: Age 60 with 10 years of service.

Early retirement benefit:      Accrued benefit reduced by 7% for each year by which the benefit commencement age precedes age 65.

Unreduced early retirement eligibility: Age 62 with 20 years of service.

Data for sole participant:

Date of birth   1/1/1969

Date of hire    1/1/1999

Probabilities of retirement and selected commutation functions:

<u>Age</u>	Retirement <u>Rate</u>	<u>Segment 1</u>		<u>Segment 2</u>		<u>Segment 3</u>	
		$\frac{N_x^{(12)}}{D_x}$	$\frac{D_x}{D_x}$	$\frac{N_x^{(12)}}{D_x}$	$\frac{D_x}{D_x}$	$\frac{N_x^{(12)}}{D_x}$	$\frac{D_x}{D_x}$
60	25%	8,967	667	8,152	606	7,411	551
62	100%	7,699	599	6,999	544	6,363	495

There are no pre-retirement decrements.

Question 40

In what range is the funding target as of 1/1/2009?

- (A)   Less than \$39,000
- (B)   \$39,000 but less than \$44,000
- (C)   \$44,000 but less than \$49,000
- (D)   \$49,000 but less than \$54,000
- (E)   \$54,000 or more

Data for Question 41 (3 points)

Valuation date: 1/1/2009.

	<u>1/1/2008</u>	<u>1/1/2009</u>
Funding standard carryover balance	\$45,600	\$0
Prefunding balance	0	0

Selected valuation results:

	<u>1/1/2008</u>	<u>1/1/2009</u>
Funding target	\$848,000	\$1,200,000
Actuarial (market) value of assets	736,000	918,400
7-year amortization factor	5.9682	5.9682
6-year amortization factor		5.2532

Question 41

In what range is the shortfall amortization installment attributable to the 2009 shortfall base?

- (A) Less than \$25,000
- (B) \$25,000 but less than \$30,000
- (C) \$30,000 but less than \$35,000
- (D) \$35,000 but less than \$40,000
- (E) \$40,000 or more

Data for Question 42 (3 points)

Selected valuation results as of 1/1/2010:

Funding target without regard to at-risk assumptions	\$ 8,325,000
Funding target using at-risk assumptions, but excluding the loading factor	10,250,000

The plan has been in at-risk status for all years after 2007.

There have been 600 participants in the plan since 1/1/2008.

Question 42

In what range is the funding target used to calculate the shortfall amortization base for 2010?

- (A) Less than \$9,540,000
- (B) \$9,540,000 but less than \$9,740,000
- (C) \$9,740,000 but less than \$9,940,000
- (D) \$9,940,000 but less than \$10,140,000
- (E) \$10,140,000 or more

2008

Data for Question 43 (5 points)

Valuation date: 1/1/2009.

Plan amended July 1, 2008, effective January 1, 2009.

Accrued benefit formula:

Before plan amendment	\$25 per month for all years of service
After plan amendment	\$27 per month for all years of service

Funding standard carryover balance as of 1/1/2008: \$180,000.

Selected valuation results:	<u>1/1/2008</u>	<u>1/1/2009</u>
Funding target (before plan amendment)	\$1,500,000	\$1,600,000
Target normal cost (before plan amendment)	120,000	145,000
Actuarial (market) value of assets	1,519,600	1,550,000
7-year amortization factor	5.9682	5.9682
6-year amortization factor		5.2532

No contributions were made for 2008.

Actual return on plan assets for 2008: 2%.

There have never been any inactive participants in the plan.

The employer makes a single contribution of \$X on 1/1/2009 in the **smallest amount that satisfies the minimum funding standard** for the 2009 plan year.

Question 43

In what range is \$X?

- (A) Less than \$125,000
- (B) \$125,000 but less than \$135,000
- (C) \$135,000 but less than \$145,000
- (D) \$145,000 but less than \$155,000
- (E) \$155,000 or more

Data for Question 44 (2 points)

A company sponsors a defined benefit plan and a profit sharing plan.

Defined benefit plan data:

Plan benefit formula	100% of compensation
Minimum benefit	The plan incorporates the \$10,000 minimum benefit provision of IRC section 415(b)(4)

Data for participant Smith

Date of birth	1/1/1941
Date of hire	1/1/2001
Date of participation	1/1/2004
Date of retirement	12/31/2008
Compensation for all years	\$8,700 per year

Participant Smith's account balance as of 12/31/2008: \$4,200.

Question 44

In what range is the maximum monthly annuity benefit payable to Smith commencing 12/31/2008?

- (A) Less than \$400
- (B) \$400 but less than \$500
- (C) \$500 but less than \$600
- (D) \$600 but less than \$700
- (E) \$700 or more

Data for Question 45 (5 points)

Actuarial cost method: Unit credit.

Type of plan: Multiemployer plan.

Early retirement eligibility: Age 55.

Early retirement benefit: Accrued benefit reduced by 8% for each of the first five years and by 3% for each of the next five years for which the benefit commencement date precedes the normal retirement date.

Selected assumptions:

Interest rate	7% per year
Retirement age	65
Pre-retirement mortality	None
Selected annuity values:	<u>Age</u> <u><math>\ddot{a}_x^{(12)}</math></u>
	56      14.00
	60      13.00
	64      12.00
	65      11.75

Data for selected participants:

	<u>Date of birth</u>	<u>Monthly accrued benefit</u>
Smith	1/1/1953	\$120
Jones	1/1/1945	550
Brown	1/1/1949	300

These three participants retire on 12/31/2008 and commence receiving benefits on 1/1/2009.

Question 45

Which, if any, of the three retirements will result in an experience gain?

- (A) The election by Smith only
- (B) The election by Jones only
- (C) The election by Brown only
- (D) The election by Smith, Brown and Jones
- (E) The correct answer is not given by (A), (B), (C), or (D) above.

Data for Question 46 (5 points)

Plan effective date: 1/1/2009.

Type of plan: Multiemployer.

Actuarial cost method: Entry age normal.

Normal retirement benefit: \$200 per month per year of service.

Early retirement eligibility: Age 60 and 10 years of service.

Early retirement benefit: Accrued benefit reduced 5% per year by which the benefit commencement age precedes age 65.

Selected assumptions:

Valuation interest rate	6% per year
Pre-retirement decrements other than death	None
Retirement age	Age 60 50%
	Age 65 100%

Data for participant Smith:

Date of birth	1/1/1959
Date of hire	1/1/1999

Selected commutation functions without regard to the probability of retirement:

Age	$N_x$	$N_x^{(12)}$	$D_x$
40	3,845,511	3,733,714	243,921
50	1,950,577	1,888,913	134,541
60	911,524	878,199	72,709
65	591,082	567,159	52,197

Question 46

In what range is the normal cost for retirement benefits for Smith as of 1/1/2009?

- (A) Less than \$9,200
- (B) \$9,200 but less than \$10,200
- (C) \$10,200 but less than \$11,200
- (D) \$11,200 but less than \$12,200
- (E) \$12,200 or more



## 2008 EA-2(A) Answer Key

<u>Question Number</u>	<u>Answer</u>		<u>Question Number</u>	<u>Answer</u>
1	B		40	B
2	B		41	A
3	E		42	C
4	D		43	C
5	B		44	C
6	B		45	C
7	B		46	C
8	D			
9	D			
10	A			
11	C			
12	B			
13	A			
14	B			
15	D			
16	B			
17	B			
18	E			
19	C			
20	B			
21	D			
22	C			
23	A			
24	B			
25	D			
26	A			
27	C			
28	D			
29	D			
30	C			
31	B			
32	C			
33	A			
34	C			
35	D			
36	B			
37	C			
38	B			
39	B			

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