

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

ENROLLED ACTUARIES PENSION EXAMINATION, SEGMENT F

NOVEMBER 2013 EA-2, SEGMENT F, EXAMINATION

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LIMITS AND TABLES
(Included with the 2013 EA-2 (Segment F) examination)

Maximum Benefit Limit IRC section 415(b)	
<u>Year</u>	<u>Limit at SSRA</u>
2000	135,000
2001	140,000
<u>Year</u>	<u>Limit at 65</u>
2002-2003	160,000
2004	165,000
2005	170,000
2006	175,000
2007	180,000
2008	185,000
2009-2011	195,000
2012	200,000
2013	205,000

Compensation Limit IRC section 401(a)(17)	
<u>Year</u>	<u>Limit</u>
2000-2001	170,000
2002-2003	200,000
2004	205,000
2005	210,000
2006	220,000
2007	225,000
2008	230,000
2009-2011	245,000
2012	250,000
2013	255,000

Key Employee Compensation IRC section 416		
<u>Year</u>	<u>Officer</u>	<u>1% owner</u>
2003	130,000	150,000
2004	130,000	150,000
2005	135,000	150,000
2006	140,000	150,000
2007	145,000	150,000
2008	150,000	150,000
2009-2011	160,000	150,000
2012-2013	165,000	150,000

Highly Compensated Employee Compensation IRC section 414(q)	
<u>Year</u>	<u>Limit</u>
2000-2001	85,000
2002-2004	90,000
2005	95,000
2006	100,000
2007	100,000
2008	105,000
2009-2011	110,000
2012-2013	115,000

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Data for Question 1 (2 points)

Type of plan: Multiemployer.

The plan benefit formula is integrated with Social Security.

Selected assumptions:

Compensation increase	X% per year
Inflation	Y% per year
Social Security taxable wage base increase	Z% per year

Consider the following statements regarding X, Y, and Z:

- I. In general, X should reflect expectations of productivity growth but not merit scale.
- II. In general, consistency of assumptions requires that X and Z are each less than or equal to Y.
- III. In general, Z should be based on expectations of national wage growth.

Question 1

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

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

2013

Data for Question 2 (2 points)

The 2014 Schedule SB is filed with the IRS on 3/15/2015.

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

<u>ASSERTION</u>	<u>REASON</u>
Neither the actuarial assumptions nor the funding method for the 2014 plan year can be changed after 3/15/2015 unless the Commissioner determines the assumptions were unreasonable or the funding method was impermissible.	The actuarial assumptions and funding methods are established by filing the Schedule SB if it is filed no later than the due date (including extensions).

Question 2

Which of the following statements is 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 but 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.

2013

Data for Question 3 (1 point)

Consider the following statement regarding the mortality assumptions used for determining the funding target:

A prescribed mortality table must be used for all single employer plans.

Question 3

Is the above statement true or false?

- (A) True
- (B) False

Data for Question 4 (2 points)

Consider the following statements regarding assumptions for determining minimum required contributions:

- I. For a hybrid (cash balance) plan the interest crediting rate assumption must equal the crediting rate as of the valuation date.
- II. For a plan with compensation-related benefits, a compensation increase assumption greater than 0% must be used in determining the target normal cost.
- III. For a plan that provides a lump sum option, the plan actuary must make an assumption as to the percentage of participants who will elect a lump sum.

Question 4

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

- (A) None
- (B) I only
- (C) II only
- (D) III only
- (E) The correct answer is not given by (A), (B), (C), or (D) above.

2013

Data for Question 5 (2 points)

Early retirement benefit: Accrued benefit reduced 3% for each year by which the benefit commencement date precedes age 65.

The plan sponsor has notified the actuary that they amended their postretirement medical plan such that employees who retire after 1/1/2014 will no longer be entitled to coverage before age 65 under the postretirement medical plan.

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

ASSERTION	REASON
The change in postretirement medical eligibility does not need to be considered when determining the defined benefit plan's retirement assumption.	There should not be a change in retirement assumptions until there is sufficient plan experience to conclude that retirement patterns have changed.

Question 5

Which of the following statements is true?

- (A) Both the assertion and reason are true statements and the reason is a correct explanation of the assertion.
- (B) Both the assertion and reason are true statements but 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.

2013

Data for Question 6 (3 points)

Valuation date: 12/31/2014.

Funding standard carryover balance as of 1/1/2014: \$0.

Prefunding balance as of 1/1/2014: \$40,000.

Actual rate of return on assets for 2014: (10.00)%.

Selected information as of 12/31/2014:

Actuarial (market) value of assets	\$360,000
Funding target	350,000
Target normal cost	100,000
Effective interest rate for 2014	6.00%

There were no shortfall amortization charges established prior to 2014.

7-year shortfall amortization factor for 2014: 5.92.

The employer makes a single contribution of \$X on 9/15/2015 in the **smallest amount that satisfies the minimum funding standard** for the 2014 plan year.

Question 6

In what range is \$X?

- (A) Less than \$64,000
- (B) \$64,000 but less than \$66,000
- (C) \$66,000 but less than \$68,000
- (D) \$68,000 but less than \$70,000
- (E) \$70,000 or more

2013

Data for Question 7 (2 points)

Valuation date: 1/1/2014.

A plan sponsor is considering changing the basis for setting the interest rate assumption used to determine the funding target. No changes were made in this assumption for the 2010 through 2013 plan years.

Consider the following interest rate scenarios:

	<u>Current basis</u>	<u>Proposed basis</u>
I.	Segment rates with no lookback	Yield curve
II.	Yield curve	Segment rates with 3-month lookback
III.	Segment rates with 3-month lookback	Segment rates with no lookback

Question 7

Which, if any, of the above changes would not require consent of the Secretary?

- (A) None
- (B) I only
- (C) II only
- (D) III only
- (E) The correct answer is not given by (A), (B), (C) or (D)

2013

Data for Question 8 (1 point)

Consider the following statement regarding the plan actuary's selection of actuarial assumptions for determining minimum required contributions:

The assumptions set by the plan actuary should be reasonable individually and in the aggregate.

Question 8

Is the above statement true or false?

- (A) True
- (B) False

2013

Data for Question 9 (1 point)

Consider the following statement regarding the plan actuary's selection of actuarial assumptions for determining minimum required contributions:

If the plan has fewer than 100 participants, then the plan actuary may assume no pre-retirement mortality, but only if that assumption would be a reasonable assumption.

Question 9

Is the above statement true or false?

- (A) True
- (B) False

2013

Data for Question 10 (3 points)

A plan offers a lump sum optional form of payment at termination based on the present value of the normal retirement benefit determined using the applicable interest rates and the applicable mortality table under IRC section 417(e).

Plan experience indicates that all participants elect a lump sum distribution at retirement. For the valuation, the plan actuary has assumed that 100% of participants will be paid in the form of a lump sum distribution.

No pre-retirement decrements are assumed.

The plan actuary uses the prescribed mortality tables for valuation mortality.

Consider the following statements with respect to the selection of actuarial assumptions for the purpose of calculating the plan's funding target.

- I. The plan actuary must substitute the applicable mortality table under IRC section 417(e)(3) for the valuation mortality table.
- II. The plan actuary must substitute the applicable interest rates under IRC section 417(e)(3) for the valuation interest rates.
- III. It would be reasonable for the plan actuary to assume that 100% of benefit payments will be paid in the form of a single life annuity.

Question 10

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

- (A) None
- (B) I and II only
- (C) I and III only
- (D) II and III only
- (E) The correct answer is not given by (A), (B), (C), or (D) above.

Data for Question 11 (2 points)

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

ASSERTION	REASON
A plan with one active participant may use a single assumed retirement age.	A plan with fewer than 15 participants who have retired in the last 5 years may not have enough credible retirement experience to use a table of retirement rates.

Question 11

Which of the following statements is 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 but 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.

2013

Data for Question 12 (5 points)

Valuation date: 1/1/2014.

Prefunding balance as of 1/1/2014: \$90,000.

2014 effective interest rate: 7.0%.

2014 minimum required contribution as of 1/1/2014: \$105,000.

2014 required quarterly installment: \$20,000.

Prefunding balance election: On 8/15/2015 an election was made to use the entire prefunding balance to meet the 2014 plan year quarterly payments due and to reduce the 2014 minimum required contribution.

The employer makes a single contribution of \$X on 9/15/2015 in the **smallest amount that satisfies the minimum funding standard** for the 2014 plan year.

Question 12

In what range is \$X?

- (A) Less than \$11,000
- (B) \$11,000 but less than \$15,000
- (C) \$15,000 but less than \$19,000
- (D) \$19,000 but less than \$23,000
- (E) \$23,000 or more

2013

Data for Question 13 (5 points)

Normal retirement benefit: 10% of the highest consecutive 5-year average compensation per year of service.

A plan amendment was adopted and effective on 1/1/2014 changing the formula to use the highest consecutive 3-year average compensation.

Selected information for the 2014 plan year:

Prefunding balance as of 1/1/2014	\$1,000
Funding standard carryover balance as of 1/1/2014	0
Actuarial (market) value of assets as of 1/1/2014	50,000
Segment rates	{5.5%, 6.5%, 7.5%}
Assumed compensation increases	4.0% per year
Prior year shortfall amortization bases	None
Election to use prefunding balance	None

Selected data for sole participant Smith:

Date of birth	1/1/1975
Date of hire and participation	1/1/2008

<u>Year</u>	<u>Compensation</u>	<u>Year</u>	<u>Compensation</u>
2008	\$50,000	2011	\$49,000
2009	55,000	2012	52,000
2010	57,500	2013	54,000

Selected annuity value at 7.50%: $\ddot{a}_{65}^{(12)} = 10.00$.

7-year shortfall amortization factor for 2014: 5.92.

$\$X$ is the change in the 2014 minimum required contribution due to the amendment.

Question 13

In what range is $\$X$?

- (A) Decrease of at least \$100
- (B) Decrease of more than \$0 but less than \$100
- (C) No change
- (D) Increase of more than \$0 but less than \$100
- (E) Increase of \$100 or more

2013

Data for Question 14 (4 points)

Plan effective date: 1/1/2008.

Optional forms of payment:

Single life annuity

50% and 75% joint and survivor annuities

Social Security level income

The 2013 AFTAP certified on 8/1/2013 was 89.00%.

2013 effective interest rate: 7.0%.

Funding standard carryover balance as of 1/1/2014: \$10,000.

Prefunding balance as of 1/1/2014: \$5,000.

Actuarial (market) value of assets as of 1/1/2014 excluding contribution receivables: \$550,000.

A contribution of \$X was made on 5/1/2014 for the 2013 plan year, and no prefunding balance was created.

No other contributions were made for the 2013 plan year.

No range certification for 2014 was performed.

On 5/2/2014 the 2014 actuarial valuation was completed by the plan actuary with the following results:

Funding target	\$640,000
AFTAP	92.00%

Question 14

In what range is \$X?

- (A) Less than \$47,500
- (B) \$47,500 but less than \$50,000
- (C) \$50,000 but less than \$52,500
- (D) \$52,500 but less than \$55,000
- (E) \$55,000 or more

2013

Data for Question 15 (3 points)

Plan type: Hybrid (cash balance).

Valuation date: 12/31/2014.

Segment rates for 2014: {5.5%, 6.5%, 7.5%}.

Interest crediting rate for hybrid plan: 4.50%.

Assumed probability of lump sum distribution: 100%.

Selected data for sole participant Smith:

Date of birth	12/31/1968
Hypothetical balance as of 1/1/2014	\$100,000
Hypothetical balance as of 12/31/2014	155,000

Hypothetical account allocation (pay credit) is credited at the end of the plan year for participants active during the plan year.

\$X is the sum of Smith's funding target and target normal cost as of 12/31/2014.

Question 15

In what range is **\$X**?

- (A) Less than \$95,000
- (B) \$95,000 but less than \$100,000
- (C) \$100,000 but less than \$105,000
- (D) \$105,000 but less than \$110,000
- (E) \$110,000 or more

2013

Data for Question 16 (2 points)

Plan type: Multiemployer.

Actuarial (market) value of assets as of 1/1/2014: \$350,000.

Selected data as of 1/1/2014:

<u>Year</u>	<u>Present value of expected employer contributions during year</u>	<u>Present value of expected benefit payments payable during year</u>
2014	\$50,000	\$90,000
2015	100,000	150,000
2016	100,000	150,000
2017	100,000	250,000
2018	100,000	250,000

Consider the following statement:

The plan is in endangered status for 2014.

Question 16

Is the above statement true or false?

- (A) True
- (B) False

2013

Data for Question 17 (3 points)

Type of plan: Multiemployer.

Actuarial cost method: Projected unit credit.

Valuation interest rate: 8.0%.

Credit balance as of 12/31/2013: \$0.

Selected valuation results as of 1/1/2014:

Minimum required contribution	\$250,000
Normal cost	321,000
Amortization payment of 10-year limitation bases	139,000

Additional 2014 plan year results:

ERISA full funding limitation	\$4,659,000
Current liability projected to end of year	12,201,000
Actuarial value of assets projected to end of year	9,021,000

\$X is the deduction limit for 2014.

Question 17

In what range is \$X?

- (A) Less than \$4,000,000
- (B) \$4,000,000 but less than \$5,500,000
- (C) \$5,500,000 but less than \$7,000,000
- (D) \$7,000,000 but less than \$8,500,000
- (E) \$8,500,000 or more

2013

Data for Question 18 (3 points)

Plan type: Hybrid (cash balance).

Benefit formula: Annual cash balance credits of 3% of compensation with an interest crediting rate of 5%.

Pre-retirement death benefit is the cash balance account payable as a lump sum.

Lump sum distributions are assumed upon termination before retirement eligibility.

Assumed election of optional forms of payment upon retirement:

Single life annuity	50%
Lump sum	50%

Segment rates: {5.5%, 6.5%, 7.5%}.

The single life annuity and the lump sum provided by the plan are actuarially equivalent to each other using valuation assumptions.

Consider the following statements regarding the plan actuary's selection of non-prescribed assumptions for determining the minimum required contribution:

- I. Actual terminations greater than assumed will result in an actuarial gain.
- II. Actual pre-retirement deaths greater than assumed will result in an actuarial gain.
- III. An increase in the percentage of retirees choosing a life annuity will result in an actuarial gain.

Question 18

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

- (A) None
- (B) I only
- (C) II only
- (D) III only
- (E) The correct answer is not given by (A), (B), (C), or (D) above.

2013

Data for Question 19 (3 points)

Type of plan: Multiemployer.

Valuation date: 1/1/2014.

Actuarial cost method: Unit credit.

Valuation interest rate: 7.0%.

Selected annuity values at 7.0%:

$$\ddot{a}_{65}^{(12)} = 10.28$$

$$\ddot{a}_{66}^{(12)} = 10.06$$

Selected data for retired participant Smith:

Date of birth	1/1/1949
Monthly benefit	\$8,000
Status as of 1/1/2014	Retired/Alive
Status as of 1/1/2015	Retired/Alive

$\$X$ is the mortality gain/loss for Smith as of 1/1/2015.

Question 19

In what range is $\$X$?

- (A) Gain of \$6,000 or more
- (B) Gain of \$1 but less than \$6,000
- (C) No gain or loss
- (D) Loss of \$1 but less than \$6,000
- (E) Loss of \$6,000 or more

2013

Data for Question 20 (3 points)

A plan requires mandatory employee contributions.

Selected information as of 1/1/2014:

Actuarial (market) value of assets	\$2,900,000
Funding target	3,100,000
Present value of benefits expected to accrue during the year	200,000
Present value of expected employee contributions during year	16,000
Funding standard carryover balance	200,000
Prefunding balance	0

7-year shortfall amortization factor for 2014: 5.92.

There are no shortfall amortization bases from prior years.

The employer makes a single contribution of \$X on 1/1/2014 in the **smallest amount that satisfies the minimum funding standard.**

Question 20

In what range is \$X?

- (A) Less than \$20,000
- (B) \$20,000 but less than \$35,000
- (C) \$35,000 but less than \$50,000
- (D) \$50,000 but less than \$65,000
- (E) \$65,000 or more

2013

Data for Question 21 (2 points)

Type of plan: Multiemployer.

The plan is in endangered status for the 2014 plan year.

Consider the following statements regarding the funding improvement plan:

- I. The funding improvement plan must be designed to increase the plan's funding percentage by 20% over 10 years.
- II. The funding improvement plan must be designed to avoid an accumulated funding deficiency during the funding improvement period.
- III. The funding improvement plan may include provisions that reduce or eliminate early retirement subsidies on benefits already accrued.

Question 21

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

- (A) None
- (B) I only
- (C) II only
- (D) III only
- (E) The correct answer is not given by (A), (B), (C), or (D) above.

2013

Data for Question 22 (1 point)

The full yield curve is used in determining the funding target for the 2014 valuation.

Consider the following statement regarding the determination of the average value of plan assets:

The limitation on the assumed rate of return equal to the third segment rate does not apply in determining the average value of assets.

Question 22

Is the above statement true or false?

- (A) True
- (B) False

2013

Data for Question 23 (5 points)

Funding standard carryover balance as of 1/1/2014: \$20,000.

Prefunding balance as of 1/1/2014: \$80,000.

Segment rates for 2013: {5.5%, 6.5%, 7.5%}.

Segment rates for 2014: {5.0%, 6.0%, 7.0%}.

Selected valuation results as of 1/1/2013:

2013 shortfall amortization installment	\$330,000
Shortfall amortization installments for years before 2013	0

Selected valuation results as of 1/1/2014:

Actuarial (market) value of assets	\$5,200,000
Funding target	7,700,000
Target normal cost	85,000

7-year amortization factor for 2014: 6.00.

6-year amortization factor for 2014: 5.29.

The plan sponsor was granted a funding waiver for 2013 in the amount of \$410,000 as of 1/1/2013.

Question 23

In what range is the **minimum required contribution** as of 1/1/2014?

- (A) Less than \$520,000
- (B) \$520,000 but less than \$550,000
- (C) \$550,000 but less than \$580,000
- (D) \$580,000 but less than \$610,000
- (E) \$610,000 or more

2013

Data for Question 24 (4 points)

Type of plan: Multiemployer.

Valuation date: 1/1/2014.

Actuarial cost method: Projected unit credit.

Valuation interest rate: 7.5%.

Funding standard account bases as of 1/1/2013:

	<u>Years remaining</u>	<u>Outstanding balance</u>
Combined charge base	8	\$9,700,000
Actuarial gain	14	(775,000)
Actuarial loss	15	710,000

An actuarial loss of \$775,000 is measured in the 1/1/2014 valuation.

The plan meets the criteria for automatic extension of amortization periods, and an application is submitted and approved requesting a 5-year extension as of 1/1/2014 for eligible bases established on or before 1/1/2013.

\$X is the absolute value of the change in the minimum required contribution as of 12/31/2014 due to the amortization extension.

Question 24

In what range is **\$X**?

- (A) Less than \$500,000
- (B) \$500,000 but less than \$520,000
- (C) \$520,000 but less than \$540,000
- (D) \$540,000 but less than \$560,000
- (E) \$560,000 or more

2013

Data for Question 25 (2 points)

Type of plan: Multiemployer.

Valuation date: 1/1/2014.

Funding status on 1/1/2013: Neither critical nor endangered.

Funding status on 1/1/2014: Critical.

Rehabilitation plan adoption date: 10/1/2014.

Selected plan data for all employers, collective bargaining agreements and active participants as of 3/31/2014:

<u>Employer</u>	<u>Number of actives covered by collective bargaining agreement</u>	<u>Collective bargaining agreement expiration date</u>
Employer 1	150	9/1/2014
Employer 2	400	2/15/2015
Employer 3	300	12/31/2015
Employer 4	275	3/1/2016

Consider the following statement:

The latest date the plan's rehabilitation period can end is 12/31/2024.

Question 25

Is the above statement true or false?

(A) True

(B) False

2013

Data for Question 26 (5 points)

Normal retirement benefit: \$50 per month per year of service.

Segment rates for 2014: {5.5%, 6.5%, 7.5%}.

Selected information as of 1/1/2014:

2013 shortfall amortization installment	\$25,000
Funding standard carryover balance	0
Prefunding balance	50,000
Actuarial (market) value of assets	4,500,000
Funding target for inactive participants	4,500,000
Assumed annual administrative expenses paid from the trust on 1/1/2014	35,000
7-year amortization factor	5.92
6-year amortization factor	5.24

No shortfall amortization bases were established prior to 1/1/2013.

Active participant data as of 1/1/2014:

Number of actives	50
Age for all actives	35
Service for all actives	10

Selected annuity values:

	<u>5.5%</u>	<u>6.5%</u>	<u>7.5%</u>
$\ddot{a}_{65}^{(12)}$	11.80	10.86	10.05

The employer makes a single contribution of \$X on 1/1/2014 in the **smallest amount that satisfies the minimum funding standard** for the 2014 plan year.

Question 26

In what range is \$X?

- (A) Less than \$55,000
- (B) \$55,000 but less than \$70,000
- (C) \$70,000 but less than \$85,000
- (D) \$85,000 but less than \$100,000
- (E) \$100,000 or more

2013

Data for Question 27 (4 points)

The plan has always had more than 1,000 plan participants.

Selected plan information:

	<u>1/1/2013</u>	<u>1/1/2014</u>
Funding target	\$2,500,000	\$3,050,000
Target normal cost	250,000	350,000
Funding balances	0	0

Actuarial (market) value of assets:

	<u>1/1/2013</u>	<u>1/1/2014</u>	<u>3/31/2014</u>
Liquid assets	\$2,000,000	\$2,250,000	\$2,300,000
Illiquid assets	200,000	250,000	300,000

	<u>1/1/2013- 3/31/2013</u>	<u>4/1/2013- 6/30/2013</u>	<u>7/1/2013- 9/30/2013</u>	<u>10/1/2013- 12/31/2013</u>	<u>1/1/2014- 3/31/2014</u>
Annuity benefit payments	\$200,000	\$205,000	\$250,000	\$270,000	\$280,000
Administrative expenses	5,000	5,000	5,000	5,000	5,000
Lump sum payments	5,000	0	0	0	50,000
Annuity purchases	10,000	0	0	0	100,000

The liquidity requirement is larger than the otherwise required 2014 quarterly required installment.

\$X is the contribution needed on 4/15/2014 to satisfy the liquidity requirements.

Question 27

In what range is **\$X**?

- (A) Less than \$585,000
- (B) \$585,000 but less than \$685,000
- (C) \$685,000 but less than \$785,000
- (D) \$785,000 but less than \$885,000
- (E) \$885,000 or more

2013

Data for Question 28 (5 points)

Segment rates: $\{5.5\%, 6.5\%, 7.5\%\}$.

The normal retirement benefit is paid annually at the beginning of the year.

The plan's pre-retirement death benefit provides an annuity equal to the participant's accrued benefit to his or her spouse, payable immediately and without reduction, and at no cost to the participant.

No pre-retirement decrements other than death are assumed. Deaths are assumed to occur at the beginning of the year.

Selected information for active participant Smith as of 1/1/2014:

Age (Smith and spouse)	64
Accrued benefit	\$18,500
2013 compensation	100,000

All participants are assumed to elect a life annuity at age 65.

$$q_{64} = 0.0105.$$

Selected commutation functions for Smith and spouse:

Age	<u>Segment 1</u>		<u>Segment 2</u>		<u>Segment 3</u>	
	D_x	N_x	D_x	N_x	D_x	N_x
64	306	3,833	167	1,931	92	984
65	287	3,527	155	1,764	85	892
69	222	2,478	116	1,203	61	590
70	207	2,256	107	1,087	56	530
84	62	403	28	175	13	77
85	55	340	25	147	11	64

Question 28

In what range is the funding target for Smith as of 1/1/2014?

- (A) Less than \$193,000
- (B) \$193,000 but less than \$211,000
- (C) \$211,000 but less than \$229,000
- (D) \$229,000 but less than \$247,000
- (E) \$247,000 or more

2013

Data for Question 29 (2 points)

Type of plan: Multiemployer final average pay plan.

Funding method: Aggregate.

Mandatory employee contributions: 2.5% of compensation.

Credit balance as of 12/31/2013: \$0.

Selected valuation results as of 1/1/2014:

Present value of future benefits	\$7,200,000
Actuarial (market) value of assets including past employee contributions	4,500,000
Present value of future compensation	35,000,000
Total compensation for participants below age 65	3,500,000

Question 29

In what range is the employer normal cost as of 1/1/2014?

- (A) Less than \$190,000
- (B) \$190,000 but less than \$215,000
- (C) \$215,000 but less than \$240,000
- (D) \$240,000 but less than \$265,000
- (E) \$265,000 or more

2013

Data for Question 30 (3 points)

Type of plan: Multiemployer.

Actuarial cost method: Unit credit.

Benefit accrual: There are no benefit accruals after 30 years of service.

Early retirement benefit: Unreduced accrued benefit for participants who retire at age 50 or older with 30 or more years of service.

Valuation interest rate: 7.0%.

Assumed retirement rates: 50% at age 55 and 100% at age 65.

Retirement is the only decrement assumed prior to age 65.

Data for participant Smith as of 1/1/2014:

Date of birth	1/1/1964
Date of hire	1/1/1983
Date of retirement	1/1/2014
Annual accrued benefit	\$25,000

Selected annuity factors at 7.0%:

$\frac{\ddot{a}_{50}^{(12)}}{12.84}$	$\frac{\ddot{a}_{55}^{(12)}}{12.15}$	$\frac{\ddot{a}_{65}^{(12)}}{10.26}$
--------------------------------------	--------------------------------------	--------------------------------------

$\$X$ is the absolute value of the gain or loss due to Smith's retirement as of 1/1/2014.

Question 30

In what range is $\$X$?

- (A) Less than \$84,000
- (B) \$84,000 but less than \$127,000
- (C) \$127,000 but less than \$170,000
- (D) \$170,000 but less than \$213,000
- (E) \$213,000 or more

2013

Data for Question 31 (4 points)

Valuation date: 1/1/2014.

Type of plan: Multiemployer.

Actuarial value of assets: Smoothed market value with a 5-year smoothing period (smoothing of difference between expected and actual market value of assets).

Selected asset information:

	<u>1/1/2013</u>	<u>1/1/2014</u>
Market value of assets	\$186,000	\$205,000
Actuarial value of assets	200,000	

Assumed rate of return for 2013: 7.5%.

Contributions for the 2013 plan year paid on 10/1/2013: \$20,000.

Benefit payments paid uniformly throughout 2013: \$21,500.

Asset (gain)/loss amounts (difference between expected and actual market value of assets):

During 2012	\$30,000
During 2011	25,000
During 2010	7,000

Question 31

In what range is the actuarial value of assets as of 1/1/2014?

- (A) Less than \$181,000
- (B) \$181,000 but less than \$205,000
- (C) \$205,000 but less than \$229,000
- (D) \$229,000 but less than \$253,000
- (E) \$253,000 or more

2013

Data for Question 32 (2 points)

The 2013 AFTAP was certified on 3/31/2013 as 92.00%.

The plan offers a lump sum option.

The plan sponsor did not make any election to use funding balances to satisfy the 2013 minimum required contribution.

Selected information as of 1/1/2014:

Funding balances prior to any deemed reductions:	
Funding standard carryover balance	\$55,120
Prefunding balance	30,000
Actuarial (market) value of assets	6,900,000
Funding target	8,600,000

The 2014 AFTAP is certified on 8/1/2014.

\$X is the deemed reduction to the funding balances as of 1/1/2014 that occurs when the 2014 AFTAP is certified.

Question 32

In what range is **\$X**?

- (A) Less than \$63,000
- (B) \$63,000 but less than \$64,000
- (C) \$64,000 but less than \$65,000
- (D) \$65,000 but less than \$66,000
- (E) \$66,000 or more

2013

Data for Question 33 (1 point)

Consider the following statement:

For any single employer plan that does not base benefits on compensation, the cushion amount for the deduction limit is 50% of the funding target for the plan year.

Question 33

Is the above statement true or false?

- (A) True
- (B) False

2013

Data for Question 34 (4 points)

Valuation date: 1/1/2014.

Type of plan: Multiemployer.

Normal retirement benefit: 2% times final 3-year average compensation times years of service.

Actuarial cost method: Aggregate.

Selected assumptions:

Valuation interest rate	7.5%
Annual compensation increases	4.0%

Credit balance as of 12/31/2013: \$75,000.

Actuarial (market) value of assets as of 1/1/2014: \$2,000,000.

Selected data for each of the 100 active participants in the plan:

Date of birth	1/1/1963
Date of hire	1/1/2008
2013 compensation	\$30,000

There are no inactive participants in the plan.

Selected annuity value:

$$\ddot{a}_{65}^{(12)} = 9.90$$

Question 34

In what range is the normal cost as of 1/1/2014 for minimum funding purposes for the 2014 plan year?

- (A) Less than \$435,000
- (B) \$435,000 but less than \$460,000
- (C) \$460,000 but less than \$485,000
- (D) \$485,000 but less than \$510,000
- (E) \$510,000 or more

2013

Data for Question 35 (1 point)

Type of plan: Multiemployer.

Consider the following statement:

The plan's actuary is required to certify the plan's status under IRC section 432 no later than the 90th day of each plan year.

Question 35

Is the above statement true or false?

- (A) True
- (B) False

2013

Data for Question 36 (3 points)

Segment rates for all years: {5.5%, 6.5%, 7.5%}.

Selected information:

	<u>1/1/2012</u>	<u>1/1/2013</u>	<u>1/1/2014</u>
Funding standard carryover balance	\$0	\$0	\$0
Prefunding balance	50,000	225,000	300,000
Actuarial (market) value of assets	2,200,000	2,400,000	2,600,000
Funding target	2,100,000	2,300,000	2,350,000
Target normal cost	85,000	95,000	100,000

7-year shortfall amortization factor: 5.92.

6-year shortfall amortization factor: 5.24.

The plan sponsor made a standing election in 2011 to apply funding balances to the minimum required contribution, and that standing election has not been revoked.

Question 36

In what range is the **minimum required contribution** as of 1/1/2014?

- (A) Less than \$97,500
- (B) \$97,500 but less than \$105,000
- (C) \$105,000 but less than \$112,500
- (D) \$112,500 but less than \$120,000
- (E) \$120,000 or more

2013

Data for Question 37 (3 points)

There are no 2013 funding balances.

Selected valuation results:

	<u>1/1/2013</u>	<u>1/1/2014</u>
Target normal cost	\$250,000	\$275,000
Shortfall amortization charge	100,000	125,000
Effective interest rate	6.25%	5.50%

Segment rates for 2013: {5.5%, 6.5%, 7.5%}.

Segment rates for 2014: {5.0%, 6.0%, 7.0%}.

The plan sponsor obtained a waiver for the full amount of the 2013 minimum required contribution.

Question 37

In what range is the **minimum required contribution** as of 1/1/2014?

- (A) Less than \$479,000
- (B) \$479,000 but less than \$480,500
- (C) \$480,500 but less than \$482,000
- (D) \$482,000 but less than \$483,500
- (E) \$483,500 or more

2013

Data for Question 38 (3 points)

Type of plan: Multiemployer.

Actuarial cost method: Unit credit.

Valuation interest rate: 7%.

Credit balance as of 12/31/2013: \$80,000.

Selected valuation results as of 1/1/2014 prior to plan amendment:

Normal cost	\$100,000
Amortization charges	75,000
Amortization credits	50,000

Increase in liability due to plan amendment: \$100,000.

Increase in normal cost due to plan amendment: \$0.

Contribution made 12/31/2014 for the 2014 plan year: \$100,000.

Question 38

In what range is the credit balance as of 12/31/2014?

- (A) Less than \$40,000
- (B) \$40,000 but less than \$43,000
- (C) \$43,000 but less than \$46,000
- (D) \$46,000 but less than \$49,000
- (E) \$49,000 or more

2013

Data for Question 39 (3 points)

Type of plan: Multiemployer.

The actuarial value of assets is calculated based on a 5-year average of unrecognized (gains) and losses.

Market value of assets as of 12/31/2012: \$1,000,000.

Market value of assets as of 12/31/2013: \$1,250,000.

Asset (gain)/loss amounts (difference between expected and actual market value of assets) for plan years ending 12/31:

2013	\$(250,000)
2012	100,000
2011	150,000
2010	200,000
2009	300,000

$\$Y$ is the actuarial value of assets as of 12/31/2012.

$\$X$ is the actuarial value of assets as of 12/31/2013.

Question 39

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

- (A) Less than \$25,000
- (B) \$25,000 but less than \$50,000
- (C) \$50,000 but less than \$75,000
- (D) \$75,000 but less than \$100,000
- (E) \$100,000 or more

2013

Data for Question 40 (1 point)

Consider the following statement:

In determining the deduction limit for a plan year, the actuary may not take into account increases in the IRC 415 limitations that are expected to occur in succeeding plan years.

Question 40

Is the above statement true or false?

- (A) True
- (B) False

2013

Data for Question 41 (3 points)

Funding standard carryover balance as of 1/1/2013: \$0.

Prefunding balance as of 1/1/2013, before any voluntary reductions: \$6,200,000.

The plan sponsor made an election on 1/1/2013 to reduce the prefunding balance as of 1/1/2013 by \$1,800,000.

Effective interest rate for 2013: 6.0%.

Actual rate of return on assets for 2013: 12.0%.

The minimum required contribution for the 2013 plan year is \$3,000,000.

The plan sponsor elects to use \$400,000 of the prefunding balance as of 1/1/2013 to satisfy the quarterly installment due on 4/15/2013.

A contribution of \$6,180,000 was made on 7/1/2013 for the 2013 plan year.

The plan sponsor elected to add the maximum amount of the excess contributions for 2013 to the prefunding balance on 1/1/2014.

Question 41

In what range is the prefunding balance as of 1/1/2014?

- (A) Less than \$7,800,000
- (B) \$7,800,000 but less than \$7,950,000
- (C) \$7,950,000 but less than \$8,100,000
- (D) \$8,100,000 but less than \$8,250,000
- (E) \$8,250,000 or more

2013

Data for Question 42 (3 points)

Type of plan: Multiemployer.

Plan effective date: 1/1/1970.

Actuarial cost method: Unit credit.

Credit balance as of 12/31/2013: \$800,000.

Valuation interest rate: 7.5%.

Selected information as of 1/1/2014:

Market value of assets	\$25,900,000
Actuarial value of assets	30,900,000
Actuarial accrued liability	37,200,000
Normal cost	400,000

Amortization information as of 1/1/2014, not including an experience gain of \$1,400,000 for the plan during 2013:

Amortization charges	1,800,000
Amortization credits	1,300,000

The employer makes a single contribution for the 2014 plan year on 1/1/2014 in the **smallest amount that satisfies the minimum funding standard**, plus an additional \$900,000.

Question 42

In what range is the credit balance as of 12/31/2014?

- (A) Less than \$950,000
- (B) \$950,000 but less than \$975,000
- (C) \$975,000 but less than \$1,000,000
- (D) \$1,000,000 but less than \$1,025,000
- (E) \$1,025,000 or more

2013

Data for Question 43 (3 points)

Effective interest rate for 2014: 6.0%.

Selected information as of 1/1/2014:

Actuarial (market) value of assets	\$6,200,000
Funding target	6,350,000
Target normal cost	275,000
Funding target with compensation increases	7,250,000
At-risk funding target for IRC section 404 purposes	8,800,000
At-risk target normal cost for IRC section 404 purposes	385,000

Question 43

In what range is the deduction limit for 2014?

- (A) Less than \$3,000,000
- (B) \$3,000,000 but less than \$3,700,000
- (C) \$3,700,000 but less than \$4,400,000
- (D) \$4,400,000 but less than \$5,100,000
- (E) \$5,100,000 or more

2013

Data for Question 44 (5 points)

Type of plan: Multiemployer.

The plan was amended in 2013 effective 1/1/2014.

Normal retirement benefit for active participants:

Dollar multiplier (all service) before 2014	\$26
Dollar multiplier (all service) after 2013	28

Credit balance as of 12/31/2013: \$500,000.

Actuarial cost method: Unit credit.

Valuation interest rate: 7.0%.

Selected information as of 1/1/2014 before the amendment:

Actuarial (market) value of assets	\$10,000,000
Actuarial accrued liability for active participants	8,000,000
Actuarial accrued liability for inactive participants	6,000,000
Normal cost	500,000

Remaining amortization charges/(credits) for all bases established prior to 1/1/2014:

<u>Base</u>	<u>Years remaining</u>	<u>Amortization payment</u>
Experience loss for 2011	13	\$300,000
Experience loss for 2012	14	250,000

A single contribution of \$X is to be made on 12/31/2014 in the **smallest amount that satisfies the minimum funding standard** for the 2014 plan year.

Question 44

In what range is \$X?

- (A) Less than \$600,000
- (B) \$600,000 but less than \$650,000
- (C) \$650,000 but less than \$700,000
- (D) \$700,000 but less than \$750,000
- (E) \$750,000 or more

2013

Data for Question 45 (4 points)

Type of plan: Multiemployer.

Normal retirement benefit: 40% of final compensation.

Actuarial cost method: Entry age normal.

Valuation interest rate: 7.0%.

Assumed compensation increases: 4% per year.

Data for active participant Smith:

Date of birth	1/1/1964
Date of hire	1/1/1998
2013 compensation	\$100,000

Selected annuity value at 7%:

$$\ddot{a}_{65}^{(12)} = 9.58$$

Question 45

In what range is Smith's accrued liability as of 1/1/2014?

- (A) Less than \$120,000
- (B) \$120,000 but less than \$140,000
- (C) \$140,000 but less than \$160,000
- (D) \$160,000 but less than \$180,000
- (E) \$180,000 or more

2013

Data for Question 46 (4 points)

Valuation date: 1/1/2014.

Segment rates for 2014: {5.0%, 6.0%, 7.0%}.

Selected information as of 1/1/2014:

Funding standard carryover balance	\$0
Prefunding balance	4,000,000
Market value of assets	57,000,000
Actuarial value of assets	61,000,000
Funding target	60,000,000

Remaining shortfall amortization installments for bases established prior to 1/1/2014:

<u>Years Remaining</u>	<u>Amortization installment</u>
6	\$350,000
5	500,000

\$X is the shortfall amortization charge as of 1/1/2014.

Question 46

In what range is **\$X**?

- (A) Less than \$200,000
- (B) \$200,000 but less than \$400,000
- (C) \$400,000 but less than \$600,000
- (D) \$600,000 but less than \$800,000
- (E) \$800,000 or more

2013

Data for Question 47 (1 point)

Valuation date: 1/1/2014.

A plan sponsor is considering a revocation of an election to use funding balances to offset the minimum required contribution to the extent the amount the plan sponsor had elected to use exceeded the minimum required contribution for the plan year.

Consider the following statement with regard to funding balance elections:

This election is permitted provided written notification of the revocation is given to both the plan's enrolled actuary and the plan administrator by the last date for making the minimum required contribution for the plan year.

Question 47

Is the above statement true or false?

- (A) True
- (B) False

Data for Question 48 (2 points)

Consider the following statements with regard to the required quarterly installments for a single employer defined benefit plan.

- I. The plan is subject to required quarterly installments if the plan had a funding shortfall for the preceding plan year.
- II. The amount of the required quarterly installment is zero if the plan does not have a funding shortfall for the current plan year.
- III. If an election to use a funding balance to satisfy a required quarterly installment is made after the due date for the required installment, then the amount used to offset the minimum required contribution for the plan year is the portion of the balance so used, discounted from the date of the election to the due date of the required installment at the effective interest rate plus 5 percentage points, and then further discounted from the installment due date to the valuation date at the effective interest rate.

Question 48

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

- (A) None
- (B) I and II only
- (C) I and III only
- (D) II and III only
- (E) The correct answer is not given by (A), (B), (C), or (D) above.

2013

Data for Question 49 (3 points)

2013 effective interest rate: 6.0%.

2013 minimum required contribution: \$10,000.

2013 required quarterly installment: \$2,000.

There are no funding balances.

A single contribution of \$11,500 is made on 9/1/2014 for the 2013 plan year.

Consider the following statement:

The unpaid minimum required contribution for 2013 is \$0.

Question 49

Is the above statement true or false?

(A) True

(B) False

2013

Data for Question 50 (2 points)

Type of plan: Multiemployer.

On 3/30/2014, the plan actuary certifies that the plan is in critical status for the 2014 plan year.

The current collective bargaining agreement that covers all participants expires on 12/31/2014.

Consider the following statements:

- I. The deadline for adopting a rehabilitation plan is 11/30/2014.
- II. The rehabilitation period ends on 12/31/2025.
- III. No plan amendment can increase liabilities during the rehabilitation period.

Question 50

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

- (A) None
- (B) I only
- (C) II only
- (D) III only
- (E) The correct answer is not given by (A), (B), (C) or D above

2013

Data for Question 51 (4 points)

Type of plan: Multiemployer.

Normal retirement benefit: \$204 per month per year of service.

Early retirement benefit: Accrued benefit reduced by 5% for each year prior to age 65.

Actuarial cost method: Unit credit.

Credit balance as of 12/31/2013: \$0.

Selected information as of 1/1/2014:

Valuation interest rate	6%
Actuarial (market) value of assets	\$6,200,000
Amortization bases established before 2014	None

The plan has 10 participants, each with the following selected data:

Date of birth	1/1/1954
Date of hire	1/1/1984

Retirement rates:

<u>Age</u>	<u>Retirement rates</u>
63	20%
64	20%
65	100%

There are no assumed preretirement decrements.

Selected annuity values:

$$\ddot{a}_{63}^{(12)} = 12.78$$

$$\ddot{a}_{64}^{(12)} = 12.53$$

$$\ddot{a}_{65}^{(12)} = 12.27$$

\$X is the smallest amount that satisfies the minimum funding standard as of 12/31/2014.

Question 51

In what range is \$X?

- (A) Less than \$295,000
- (B) \$295,000 but less than \$315,000
- (C) \$315,000 but less than \$335,000
- (D) \$335,000 but less than \$355,000
- (E) \$355,000 or more

2013

Data for Question 52 (4 points)

Plan effective date: 1/1/2011.

Normal retirement benefit: 10% of final three-year average compensation for each year of service.

Segment rates for 2014: {5.5%, 6.5%, 7.5%}.

The section 401(a)(17) limit for 2014 is \$255,000.

The section 415 limit for 2014 is \$205,000.

Assumed compensation increase: 10% per year.

Data for sole participant Smith:

Date of birth	1/1/1964
Date of hire	1/1/2011
Compensation:	
2011	\$100,000
2012	200,000
2013	240,000

Selected commutation functions:

	6.5%		7.5%	
	$\frac{N_x^{(12)}}{D_x}$	$\frac{D_x}{D_x}$	$\frac{N_x^{(12)}}{D_x}$	$\frac{D_x}{D_x}$
65	16,118	1,540	8,155	839
70	9,666	1,056	4,714	549

$\$X$ is the sum of the funding target and target normal cost as of 1/1/2014.

Question 52

In what range is $\$X$?

- (A) Less than \$265,000
- (B) At least \$265,000 but less than \$295,000
- (C) At least \$295,000 but less than \$325,000
- (D) At least \$325,000 but less than \$355,000
- (E) At least \$355,000

2013

Data for Question 53 (2 points)

Selected information:

	<u>1/1/2013</u>	<u>1/1/2014</u>
Funding standard carryover balance	\$150,000	\$159,000
Prefunding balance	200,000	287,000
Actuarial (market) value of assets	900,000	1,175,000

$\$X$ /(Funding Target) is the percentage used to determine whether funding balances may be used to reduce the minimum funding requirement for the 2014 plan year.

In what range is $\$X$?

Question 53

In what range is $\$X$?

- (A) Less than \$625,000
- (B) \$625,000 but less than \$725,000
- (C) \$725,000 but less than \$825,000
- (D) \$825,000 but less than \$925,000
- (E) \$925,000 or more

2013

Data for Question 54 (4 points)

Type of plan: Multiemployer.

Retirement benefit: \$300 per year of service payable at the beginning of the year.

Actuarial cost method: Entry age normal.

Preretirement decrements other than death: None.

Data for all participants as of 1/1/2014:

<u>Participant</u>	<u>Age at hire</u>	<u>Age as of 1/1/2014</u>
Smith	45	45
Jones	45	55
Brown	45	65

Selected commutation functions:

<u>Age</u>	<u>N_x</u>	<u>D_x</u>
45	106,115	7,142
55	52,143	3,932
65	22,745	2,090

\$X is the actuarial accrued liability as of 1/1/2014.

Question 54

In what range is \$X?

- (A) Less than \$70,000
- (B) \$70,000 but less than \$77,500
- (C) \$77,500 but less than \$85,000
- (D) \$85,000 but less than \$92,500
- (E) \$92,500 or more

2013

Data for Question 55 (3 points)

Plan effective date: 1/1/2000.

Type of plan: Multiple employer.

Employers A, B, and C maintain a defined benefit plan. The employers are not part of a controlled group of corporations or an affiliated service group and are not involved with businesses or trades under common control.

Selected information as of 1/1/2013:

	<u>Employer A</u>	<u>Employer B</u>	<u>Employer C</u>
Funding target attainment percentage	85%	75%	65%
Prefunding balance	\$0	\$0	\$0

Selected information as of 1/1/2014:

	<u>Employer A</u>	<u>Employer B</u>	<u>Employer C</u>
Plan participants	300	175	200
Funding standard carryover balance	\$150,000	\$75,000	\$95,000
Prefunding balance	100,000	300,000	275,000
Actuarial value of assets	3,250,000	1,800,000	2,300,000
Funding target	3,500,000	2,000,000	2,250,000
Target normal cost	400,000	225,000	250,000
Shortfall amortization charge	80,000	65,000	70,000

Employer A makes a single contribution of \$X for the 2014 plan year on 1/1/2014 in the **smallest amount that satisfies the minimum funding standard** for Employer A.

Question 55

In what range is \$X?

- (A) Less than \$250,000
- (B) \$250,000 but less than \$335,000
- (C) \$335,000 but less than \$420,000
- (D) \$420,000 but less than \$505,000
- (E) \$505,000 or more

2013

Data for Question 56 (3 points)

Type of plan: Multiemployer.

Actuarial cost method: Aggregate.

The plan requires mandatory employee contributions.

Selected information for the 2014 valuation:

Actuarial (market) value of assets	\$4,500,000
Present value of future benefits	10,000,000
Present value of future employee contributions	200,000
Present value of future compensation	6,500,000
Assumed annual compensation for 2014	1,000,000

Question 56

In what range is the employer normal cost as of 1/1/2014?

- (A) Less than \$825,000
- (B) \$825,000 but less than \$845,000
- (C) \$845,000 but less than \$865,000
- (D) \$865,000 but less than \$885,000
- (E) \$885,000 or more

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Answer Key EA-2F Fall 2013

Question	Answer		Question	Answer
1	E		31	C
2	A		32	D
3	B		33	B
4	D		34	C
5	E		35	A
6	B		36	C
7	B		37	D
8	A		38	B
9	A		39	A
10	E		40	B
11	B		41	D
12	D		42	D
13	A		43	D
14	B		44	B
15	D		45	C
16	B		46	D
17	D		47	B
18	A		48	C
19	E		49	A
20	D		50	A
21	C		51	B
22	B		52	B
23	D		53	B
24	C		54	D
25	B		55	A
26	D		56	A
27	D			
28	B			
29	A			
30	C			

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