

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

Enrolled Actuaries Pension Examination, Segment A

EA-2, Segment A

Date: Wednesday, November 9, 2011

Time: 8:30 a.m. – 12:30 p.m.

INSTRUCTIONS TO CANDIDATES

- Write your candidate number here _____. Your name must not appear.
 - Do not break the seal of this book until the supervisor tells you to do so.
 - Special conditions generally applicable to all questions on this examination are found at the front of this book.
 - All questions should be answered in accordance with laws, rules and regulations in effect as of May 31, 2011.
 - This examination consists of 50 multiple-choice questions of varying value. The point value for each question is shown in parenthesis at the beginning of each question. Total point value is 160.
 - Your score will be based on the point values for the questions that you answer correctly. No credit will be given for omitted answers and no credit will be lost for wrong answers; hence, you should answer all questions even those for which you have to guess. Answer choices C, D, and E will be considered incorrect answers on True-False questions.
 - A separate answer sheet is inside the front cover of this book. During the time allotted for this examination, record all your answers on side 2 of the answer sheet. **NO ADDITIONAL TIME WILL BE ALLOWED FOR THIS PURPOSE.** No credit will be given for anything indicated in the examination book but not transferred to the answer sheet. Failure to stop writing or coding your answer sheet after time is called will result in the disqualification of your answer sheet or further disciplinary action.
 - Five answer choices are given with each question, each answer choice being identified by a key letter (A to E). For each question, blacken the oval on the answer sheet which corresponds to the key letter of the answer choice that you select.
 - Use a soft-lead pencil to mark the answer sheet. To facilitate correct mechanical scoring, be sure that, for each question, your pencil mark is dark and completely fills only the intended oval. Make no stray marks on the answer sheet. If you have to erase, do so completely.
 - Do not spend too much time on any one question. If a question seems too difficult, leave it and go on.
 - While every attempt is made to avoid defective questions, sometimes they do occur. If you believe a question is defective, the supervisor or proctor cannot give you any guidance beyond the instructions on the exam booklet.
 - Clearly indicated answer choices in the test book can be an aid in grading examinations in the unlikely event of a lost answer sheet.
 - Use the blank portions of each page for your scratch work. Extra blank pages are provided at the back of the examination book.
 - When the supervisor tells you to do so, break the seal on the book and remove the answer sheet.
- On side 1 of the answer sheet, space is provided to write and to code candidate information. Complete Blocks A through G as follows:
- in Block A, print your name and the name of this test center;
 - in Block B, print your last name, first name and middle initial and code your name by blackening the ovals (one in each column) corresponding to the letters of your name; for each empty box, blacken the small rectangle immediately above the "A" oval;
 - write your candidate number in Block C (as it appears on your ticket of admission for this examination) and write the number of this test center in Block D (the supervisor will supply the number);
 - code your candidate number and center number by blackening the five ovals (one in each column) corresponding to the five digits of your candidate number and the three ovals (one in each column) corresponding to the last three digits of the test center number, respectively. Please be sure that your candidate number and the test center number are coded correctly;
 - in Block E, code the examination that you are taking by blackening the oval to the left of "Course EA-2, Segment A."
 - in Block F, blacken the appropriate oval to indicate whether you are using a calculator; and
 - in Block G, sign your name and write today's date. If the answer sheet is not signed, it will not be graded.
- On side 2 of your answer sheet, space is provided at the top for the number of this examination book. Enter the examination book number, from the upper right-hand corner of this examination book, in the four boxes at the top of side 2 marked "BOOKLET NUMBER."
- After the examination, the supervisor will collect this book and the answer sheet separately. **DO NOT ENCLOSE THE ANSWER SHEET IN THE BOOK.** All books and answer sheets must be returned. **THE QUESTIONS ARE CONFIDENTIAL AND MAY NOT BE TAKEN FROM THE EXAMINATION ROOM.**

EA-2A Fall 2011
Answer Key

Revised January 2012

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

****BEGINNING OF EXAMINATION****

Data for Question 1 (4 points)

Funding standard carryover balance as of 1/1/2012: \$0.

Prefunding balance as of 1/1/2012: \$5,000.

The value of plan-related expenses expected to be paid from plan assets during 2012 as of 1/1/2012: \$22,500.

Plan year	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>
Shortfall amortization installment	\$0	\$0	\$0	\$8,000

Selected valuation results as of 1/1/2012:

Market value of assets	\$625,000
Actuarial value of assets	685,000
Funding target	850,000
Target normal cost (excluding plan-related expenses)	50,000

Shortfall amortization factors:

7-year	5.6354
6-year	5.0167

The employer makes a single contribution of \$X on 1/1/2012 in the **smallest amount that satisfies the minimum funding standard** for the 2012 plan year.

Question 1

In what range is \$X?

- (A) Less than \$76,000
- (B) \$76,000 but less than \$84,000
- (C) \$84,000 but less than \$92,000
- (D) \$92,000 but less than \$100,000
- (E) \$100,000 or more

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Data for Question 2 (2 points)

Normal retirement age: 65.

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

Final average compensation: Highest consecutive 3-year average compensation out of last 6 years.

Data for participant Smith:

Date of birth	1/1/1947
Date of hire	1/1/1977

<u>Year</u>	<u>Compensation</u>
2006	\$255,000
2007	220,000
2008	225,000
2009	210,000
2010	205,000
2011	205,000

Question 2

In what range is Smith's annual accrued benefit as of 1/1/2012?

- (A) Less than \$74,000
- (B) \$74,000 but less than \$77,000
- (C) \$77,000 but less than \$80,000
- (D) \$80,000 but less than \$83,000
- (E) \$83,000 or more

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Data for Question 3 (3 points)

Selected valuation results as of 1/1/2012:

Actuarial (market) value of assets	\$16,500,000
Funding target	10,000,000
Target normal cost	435,000
Funding target with expected compensation increases	11,500,000
At-risk funding target for IRC section 404	16,500,000
At-risk target normal cost for IRC section 404	500,000
Effective interest rate	6.00%

Question 3

In what range is the deduction limit for 2012?

- (A) Less than \$480,000
- (B) \$480,000 but less than \$780,000
- (C) \$780,000 but less than \$1,080,000
- (D) \$1,080,000 but less than \$1,380,000
- (E) \$1,380,000 or more

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Data for Question 4 (4 points)

Funding standard carryover balance as of 1/1/2012: \$5,500.

Prefunding balance as of 1/1/2012: \$0.

Effective interest rate for 2012: 6.52%.

Actual rate of return on assets for 2012: 3%.

Selected valuation results as of 1/1/2012:

Actuarial (market) value of assets	\$94,000
Funding target	100,000
Target normal cost	8,000

7-year shortfall amortization factor for 2012: 5.9982

No shortfall amortization bases were established before 2012.

Contributions for the 2012 plan year:

\$8,400 paid on 4/1/2012
\$10,000 paid on 4/1/2013

The plan sponsor elected to use \$4,000 of the funding standard carryover balance as of 1/1/2012 toward the 2012 plan year contribution.

Question 4

In what range is the maximum amount available to be added to the prefunding balance as of 1/1/2013?

- (A) Less than \$8,300
- (B) \$8,300 but less than \$10,300
- (C) \$10,300 but less than \$12,300
- (D) \$12,300 but less than \$14,300
- (E) \$14,300 or more

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Data for Question 5 (2 points)

Consider the following statements with respect to the 2012 valuation for an ongoing plan:

- I. The plan sponsor may elect to change from using the full yield curve for the 2011 plan year to segment rates for the 2012 plan year without requesting approval from the Commissioner for a change in method.
- II. The plan sponsor may elect to change from using an averaging method to determine the valuation assets for the 2011 plan year to using the market value of assets for the 2012 plan year without requesting approval from the Commissioner for a change in method.
- III. The plan sponsor may elect to change the segment rates used from October rates for the 2011 plan year to November rates for the 2012 plan year without requesting from the Commissioner approval for a change in method.

Question 5

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.

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Data for Question 6 (1 point)

The 2011 AFTAP was certified on 11/1/2011 to be 92.00%.

The 2012 AFTAP was not certified by 9/30/2012.

Consider the following statement:

From 1/1/2012 to 9/30/2012 the plan was permitted to pay lump sum distributions without restrictions.

Question 6

Is the above statement true or false?

(A) True

(B) False

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Data for Question 7 (4 points)

Valuation date: 1/1/2012.

Funding standard carryover balance as of 1/1/2012: \$1,685,000.

Prefunding balance as of 1/1/2012: \$0.

Effective interest rate: 6.00%.

Valuation data as of 1/1/2012:

Actuarial (market) value of assets	\$95,700,000
Target normal cost	2,750,000
Funding target	93,900,000
Present value of prior shortfall amortizations	0

7-year shortfall amortization factor: 5.7813

2012 plan year contribution made on 7/1/2012: \$200,000.

The employer makes a contribution of \$X on 12/31/2012 in the **smallest amount that satisfies the minimum funding standard** for the 2012 plan year.

Question 7

In what range is \$X?

- (A) Less than \$800,000
- (B) \$800,000 but less than \$900,000
- (C) \$900,000 but less than \$1,000,000
- (D) \$1,000,000 but less than \$1,100,000
- (E) \$1,100,000 or more

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Data for Question 8 (1 point)

Consider the following statement concerning the prefunding balance:

Contributions in excess of the minimum required contribution may be added to the prefunding balance only if the election is made by the end of the plan year for which the contribution applies.

Question 8

Is the above statement true or false?

- (A) True
- (B) False

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Data for Question 9 (1 point)

Consider the following statement concerning the deduction limit for a plan covered by the PBGC:

When determining the deduction limit, the increase in the funding target for a salary related plan cannot reflect compensation projected beyond the current IRC section 401(a)(17) limit nor benefits beyond the current IRC section 415 limit.

Question 9

Is the above statement true or false?

- (A) True
- (B) False

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Data for Question 10 (3 points)

Valuation date: 1/1/2012.

Postretirement death benefit: \$5,000 if retiree has completed 20 years of service, paid at end of year of death.

Data for plan participant Smith:

Date of birth	1/1/1967
Date of hire	1/1/1991

Segment rates for 2012: {5.0%, 6.0%, 7.0%}.

Selected commutation functions:

Age	<u>Segment rate 1</u>		<u>Segment rate 2</u>		<u>Segment rate 3</u>	
	<u>N_x</u>	<u>D_x</u>	<u>N_x</u>	<u>D_x</u>	<u>N_x</u>	<u>D_x</u>
45	1,902,981	109,766	1,102,397	71,651	648,046	46,958
65	485,664	38,891	242,191	21,002	122,078	11,408

There are no pre-retirement decrements assumed except for mortality.

$\$X$ equals the 1/1/2012 funding target for Smith for the post-retirement death benefit.

Question 10

In what range is $\$X$?

- (A) Less than \$225
- (B) \$225 but less than \$275
- (C) \$275 but less than \$325
- (D) \$325 but less than \$375
- (E) \$375 or more

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Data for Question 11 (4 points)

Valuation date: 1/1/2012.

Normal retirement benefit: \$20 per month per year of service.

The plan was amended 1/1/2012 to increase the monthly rate to \$22 effective 1/1/2012 and to \$24 effective 1/1/2013.

Segment rates for 2012: {5.0%, 6.0%, 7.0%}.

Data for participant Smith:

Date of birth 1/1/1952

Date of hire 1/1/1987

Selected commutation functions:

Age	<u>Segment rate 1</u>		<u>Segment rate 2</u>		<u>Segment rate 3</u>	
	$N_x^{(12)}$	D_x	$N_x^{(12)}$	D_x	$N_x^{(12)}$	D_x
60	716,302	51,272	357,175	29,032	186,269	16,527
65	467,939	38,891	232,565	21,002	122,078	11,408
80	99,039	13,385	41,453	6,270	18,666	2,958

There are no pre-retirement decrements assumed except for mortality.

$\$X$ is the sum of the funding target and the target normal cost for Smith as of 1/1/2012.

Question 11

In what range is $\$X$?

- (A) Less than \$52,000
- (B) \$52,000 but less than \$53,000
- (C) \$53,000 but less than \$54,000
- (D) \$54,000 but less than \$55,000
- (E) \$55,000 or more

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Data for Question 12 (3 points)

Plan effective date: 1/1/2000.

The plan defines actuarial equivalence for all purposes as the applicable interest rates and mortality under IRC section 417(e) with no pre-retirement mortality.

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

Applicable 417(e) segment rates: {5.0%, 6.0%, 7.0%}.

Selected data for participant Smith:

Date of birth	1/1/1972
Date of hire	1/1/1999
Date of termination	1/1/2012

Selected commutation functions:

Age	<u>Segment rate 1</u>		<u>Segment rate 2</u>		<u>Segment rate 3</u>	
	$N_x^{(12)}$	D_x	$N_x^{(12)}$	D_x	$N_x^{(12)}$	D_x
40	2,472,963	140,601	1,485,450	96,233	906,354	66,101
65	465,050	38,821	321,251	20,965	116,222	11,387
70	296,871	28,602	142,396	14,731	68,985	7,635
85	39,772	7,564	17,102	3,379	7,420	1,521

Smith receives a lump sum on 1/1/2012 equal to the present value of his accrued benefit.

Question 12

In what range is the lump sum payable to Smith on 1/1/2012?

- (A) Less than \$58,000
- (B) \$58,000 but less than \$62,000
- (C) \$62,000 but less than \$66,000
- (D) \$66,000 but less than \$70,000
- (E) \$70,000 or more

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Data for Question 13 (2 points)

Valuation date: 1/1/2012.

Number of participants in the plan: 150.

Number of participants in the controlled group in 2011:

Single employer plan participants	450
Multiemployer plan participants	250

FTAP for 2011: 75.00%.

FTAP for 2011 using at-risk assumptions: 65.00%.

Consider the following statement:

The plan is at-risk for the 2012 plan year.

Question 13

Is the above statement true or false?

(A) True

(B) False

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Data for Question 14 (3 points)

Participant data as of 12/31/2011:

	<u>Smith</u>	<u>Jones</u>	<u>Brown</u>
Total service	16	14	6
Total service in years plan was top-heavy	13	11	4
Final five year average earnings	\$225,000	\$185,000	\$110,000
Non top-heavy accrued benefit	42,000	35,000	11,000
Key employee	Yes	No	No

The plan provides the minimum top-heavy benefits required by law.

At 12/31/2011 Smith's accrued benefit is **\$X**, Jones' accrued benefit is **\$Y**, and Brown's accrued benefit is **\$Z**.

Question 14

In what range is **\$X + \$Y + \$Z**?

- (A) Less than \$89,000
- (B) \$89,000 but less than \$91,000
- (C) \$91,000 but less than \$93,000
- (D) \$93,000 but less than \$95,000
- (E) \$95,000 or more

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Data for Question 15 (4 points)

The plan has always had more than 500 participants.

Before 1/1/2011, the FTAP (disregarding at-risk assumptions) was always greater than 100%.

FTAP (disregarding at-risk assumptions) as of 1/1/2011: 69.00%.

Shortfall amortization installment for 2011: \$75,000.

	<u>1/1/2011</u>	<u>1/1/2012</u>
Funding standard carryover balance	\$0	\$0
Prefunding balance	0	200,000

Selected valuation results as of 1/1/2012:

Actuarial (market) value of assets: \$7,900,000.
Effective interest rate: 6.00%.

	<u>Disregarding at-risk assumptions</u>	<u>At-risk</u>
Funding target	\$10,000,000	\$12,000,000
Target normal cost	1,000,000	1,200,000

Shortfall amortization factors for 2012:

7-year:	5.9982
6-year:	5.2932

The employer makes a single contribution of \$X on 1/1/2012 in the **smallest amount that satisfies the minimum funding standard.**

Question 15

In what range is \$X?

- (A) Less than \$1,350,000
- (B) \$1,350,000 but less than \$1,450,000
- (C) \$1,450,000 but less than \$1,550,000
- (D) \$1,550,000 but less than \$1,650,000
- (E) \$1,650,000 or more

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Data for Question 16 (5 points)

Type of plan: Multiemployer.

Funding method: Unit credit.

Valuation interest rate: 7.0%.

Credit balance in funding standard account as of 12/31/2011: \$500,000.

The plan was amended effective 1/1/2012 to increase the dollar multiplier for service after 2011 from \$25 to \$30 for active participants.

Selected valuation results (before plan amendment) at 1/1/2012:

Actuarial (market) value of assets	\$12,000,000
Accrued liability for active participants	7,500,000
Accrued liability for inactive participants	7,500,000
Normal cost	500,000

All funding standard account amortization bases established prior to 1/1/2012:

<u>Years remaining</u>	<u>Charge</u>
13	\$150,000
14	125,000

A single contribution of **\$X** is to be made on 12/31/2012 in the **smallest amount that satisfies the minimum funding standard** for the 2012 plan year.

Question 16

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

- (A) Less than \$300,000
- (B) \$300,000 but less than \$500,000
- (C) \$500,000 but less than \$700,000
- (D) \$700,000 but less than \$900,000
- (E) \$900,000 or more

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Data for Question 17 (4 points)

Type of plan: Multiemployer.

Effective date: 1/1/2011.

Actuarial cost method: Entry age normal.

Interest rate for 2011: 7.0%.

Interest rate for 2012: 6.0%.

Selected valuation results:

	<u>1/1/2011</u>	<u>1/1/2012 (after interest rate change)</u>
Accrued liability	\$1,000,000	\$1,800,000
Normal cost	200,000	250,000
Actuarial (market) value of assets	0	400,000

No benefits or expenses were paid from plan assets during 2011 or 2012.

A single contribution of \$400,000 for 2011 was made on 12/31/2011.

The actuarial experience for 2011 was a loss of \$200,000 as of 1/1/2012.

A single contribution of \$***X*** is to be made on 12/31/2012 in the **smallest amount that satisfies the minimum funding standard** for the 2012 plan year.

Question 17

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

- (A) Less than \$297,500
- (B) \$297,500 but less than \$337,500
- (C) \$337,500 but less than \$377,500
- (D) \$377,500 but less than \$417,500
- (E) \$417,500 or more

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Data for Question 18 (4 points)

Funding standard carryover balance as of 1/1/2011: \$0.

Prefunding balance as of 1/1/2011: \$10,000.

Prefunding balance as of 1/1/2012: \$0.

No shortfall amortization bases were established before 2011.

Selected valuation results:

	<u>1/1/2011</u>	<u>1/1/2012</u>
Actuarial (market) value of assets	\$130,000	\$130,000
Funding target	140,000	155,000
Target normal cost	6,500	7,000
Effective interest rate	6.50%	5.70%

The plan sponsor elected to use 15-year amortization for the 2011 plan year shortfall amortization base.

Shortfall amortization factors:

	<u>2011</u>	<u>2012</u>
6-years		5.4134
7-years	6.6632	6.1596
14-years		10.4775
15-years	10.7931	10.9826

There are no Installment Acceleration Amounts.

The employer makes a single contribution of \$X on 1/1/2012 in the **smallest amount that satisfies the minimum funding standard for 2012.**

Question 18

In what range is \$X?

- (A) Less than \$8,750
- (B) \$8,750 but less than \$9,500
- (C) \$9,500 but less than \$10,250
- (D) \$10,250 but less than \$11,000
- (E) \$11,000 or more

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Data for Question 19 (4 points)

Normal retirement benefit: 5% of final average pay per year of service up to 20 years.

Final average pay: Highest consecutive three-year average compensation.

Assumed compensation increases: 0%, which changes to 10% for the 2012 plan year.

There are no funding balances at 1/1/2012.

The 2012 IRC section 401(a)(17) limit is assumed to be \$245,000.

Data for plan's sole participant as of 1/1/2012:

Date of birth	1/1/1967
Date of hire	1/1/2009
2009 compensation	\$240,000
2010 compensation	240,000
2011 compensation	240,000

Selected valuation results as of 1/1/2012:

Valuation (market) assets	\$108,720
Funding target	108,720
Target normal cost before the change	36,240

7-year shortfall amortization factor: 6.6632

\$X equals the minimum required contribution for the 2012 plan year.

Question 19

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

- (A) Less than \$36,000
- (B) \$36,000 but less than \$37,000
- (C) \$37,000 but less than \$38,000
- (D) \$38,000 but less than \$39,000
- (E) \$39,000 or more

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Data for Question 20 (3 points)

Plan year: July 1 to June 30.

Normal retirement benefit: 1% of final average pay for each year of service.

Final average pay: Highest consecutive three-year average plan years of compensation.

Data for participant Smith:

Date of birth	1/1/1966
Date of hire	1/1/2007
2007 calendar year compensation	\$245,000
2008 calendar year compensation	220,000
2009 calendar year compensation	150,000
2010 calendar year compensation	300,000
2011 calendar year compensation	90,000
2012 compensation from 1/1 to 6/30	173,000

Compensation is paid monthly and uniformly throughout the calendar year.

Question 20

In what range is Smith's final average pay as of 7/1/2012?

- (A) Less than \$211,000
- (B) \$211,000 but less than \$212,000
- (C) \$212,000 but less than \$213,000
- (D) \$213,000 but less than \$214,000
- (E) \$214,000 or more

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Data for Question 21 (4 points)

Plan effective date: 1/1/2008.

Type of plan: Multiemployer.

Actuarial cost method: Unit credit.

Valuation interest rate: 6.0%.

Unfunded past service liability as of 1/1/2008: \$2,000,000.

Amortization bases established before 1/1/2012:

Experience loss during 2010	\$600,000
Plan amendment base established 1/1/2010	900,000
Experience loss during 2009	100,000
Experience loss during 2008	150,000

Credit balance as of 12/31/2011: \$0.

Selected valuation results as of 1/1/2012:

Actuarial (market) value of assets	\$9,550,000
Accrued liability	12,000,000
Normal cost	2,000,000
Experience gain during 2011	789,312

The experience gain is the only amortization base established as of 1/1/2012.

\$X is the **smallest amount that satisfies the minimum funding standard** as of 1/1/2012.

Question 21

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

- (A) Less than \$2,250,000
- (B) \$2,250,000 but less than \$2,350,000
- (C) \$2,350,000 but less than \$2,450,000
- (D) \$2,450,000 but less than \$2,550,000
- (E) \$2,550,000 or more

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Data for Question 22 (4 points)

Asset valuation method: The average of the market value of assets on the valuation date and the adjusted market value of assets for the preceding valuation date.

Segment rates for 2011: {5.5%, 6.5%, 7.5%}.

Segment rates for 2012: {5.0%, 6.0%, 7.0%}.

Assumed rate of return on assets: 8.5%.

Effective interest rate for 2011: 6.50%.

Effective interest rate for 2012: 6.00%.

Benefit payments and expenses are assumed to be paid mid-year.

Selected asset information:

<u>Plan year</u>	<u>2011</u>	<u>2012</u>
Market value (excluding receivables)	\$34,000,000	\$44,000,000
Benefit payments	2,000,000	
Expenses	200,000	

For the 2011 plan year, a contribution of \$500,000 is deposited on 1/1/2011 (which is not included in the 1/1/2011 assets shown above) and another contribution of \$1,000,000 is deposited on 9/1/2012.

\$X is the actuarial value of assets on 1/1/2012 for the plan year beginning 1/1/2012.

Question 22

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

- (A) Less than \$40,400,000
- (B) \$40,400,000 but less than \$40,425,000
- (C) \$40,425,000 but less than \$40,450,000
- (D) \$40,450,000 but less than \$40,475,000
- (E) \$40,475,000 or more

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Data for Question 23 (3 points)

Mandatory employee contributions: 2.0% of compensation.

Funding standard carryover balance and prefunding balance are both \$0 as of 1/1/2012.

Selected valuation results as of 1/1/2012:

Total plan compensation	\$20,000,000
Actuarial (market) value of assets	36,000,000
Funding target	36,000,000
Present value of benefits expected to accrue during year	2,000,000

7-year shortfall amortization factor for 2012: 5.9982

There are no shortfall amortization bases from prior years.

The value of plan-related expenses expected to be paid from plan assets during 2012 as of 1/1/2012: \$125,000.

The employer makes a single contribution for 2012 of **\$X** on 1/1/2012 in the **smallest amount that satisfies the minimum funding standard.**

Question 23

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

- (A) Less than \$1,650,000
- (B) \$1,650,000 but less than \$1,800,000
- (C) \$1,800,000 but less than \$1,950,000
- (D) \$1,950,000 but less than \$2,100,000
- (E) \$2,100,000 or more

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Data for Question 24 (2 points)

Consider the following statements with respect to the termination of a single employer defined benefit plan with 1,000 participants:

- I. A Form 5500 must be filed for each year the plan has assets.
- II. A Schedule SB is not required to be filed for the plan year that includes the termination date.
- III. If the termination fails to occur, minimum funding standards continue to apply and a Schedule SB continues to be required.

Question 24

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.

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Data for Question 25 (3 points)

Funding balances as of 1/1/2012 (prior to any deemed election to reduce the plan's funding balances to avoid benefit limitations under IRC section 436):

Funding standard carryover balance	\$80,000
Prefunding balance	150,000

Selected valuation results as of 1/1/2012:

Actuarial (market) value of assets	\$3,079,450
Funding target	3,850,000

The plan's optional forms of benefit include a single lump sum up to \$15,000.

\$X is the deemed funding balance reduction to avoid benefit restrictions.

Question 25

In what range is **\$X**

- (A) Less than \$50,000
- (B) \$50,000 but less than \$100,000
- (C) \$100,000 but less than \$150,000
- (D) \$150,000 but less than \$200,000
- (E) \$200,000 or more

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Data for Question 26 (5 points)

Plan type: Multiemployer.

Valuation date: 1/1/2012.

Actuarial cost method: Projected unit credit.

Normal retirement benefit: 1% of final 5-year average compensation for each year of service.

Early retirement benefit:

	Standard	Enhanced
Eligibility requirement	Age 55	Age 55 with 25 years of service
Early commencement reduction	3% per year before age 65	Unreduced

Actuarial assumptions:

Interest rate	7.5%
Compensation increases	2.5%

Participant data for Smith:

Date of birth	1/1/1971
Date of hire	1/1/2008
2011 compensation	\$44,000

Selected commutation functions and all retirement rates:

Age	q_x^{ret}	$N_x^{(12)}$	D_x
62	50%	2,079,449	210,916
65	100%	1,517,247	163,979

Question 26

What is the normal cost at 1/1/2012 for Smith?

- (A) Less than \$1,200
- (B) \$1,200 but less than \$1,350
- (C) \$1,350 but less than \$1,500
- (D) \$1,500 but less than \$1,650
- (E) \$1,650 or more

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Data for Question 27 (3 points)

Selected valuation results as of 1/1/2012:

Market value of assets	\$18,000,000
Actuarial value of assets	17,000,000
Funding target	24,000,000
Target normal cost	700,000
Funding target with future compensation increases	26,000,000
At-risk funding target for IRC 404 purposes	27,000,000
At-risk target normal cost for IRC 404 purposes	1,000,000
Minimum required contribution	2,300,000
Effective interest rate	3.00%

Question 27

In what range is the deduction limit for 2012?

- (A) Less than \$18,500,000
- (B) \$18,500,000 but less than \$20,000,000
- (C) \$20,000,000 but less than \$21,500,000
- (D) \$21,500,000 but less than \$23,000,000
- (E) \$23,000,000 or more

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Data for Question 28 (5 points)

Normal retirement benefit: \$150 per month per year of service.

Valuation date for defined benefit plan: 12/31.

Data for all participants:

	<u>Date of birth</u>	<u>Date of hire</u>	<u>Profit sharing account balance on 12/31/2011</u>	<u>Key employee</u>
Smith	12/31/1964	1/1/2005	\$20,500	Yes
Jones	12/31/1969	1/1/2009	10,000	Yes
Brown	12/31/1958	1/1/2010	15,000	No
Green	12/31/1971	1/1/2010	8,000	No
Black	12/31/1974	1/1/2010	3,000	No

Rate of return on profit sharing plan balances for 2012: 6.0%.

Selected annuity factors:

<u>Age</u>	<u>${}_{65-x} \ddot{a}_x^{(12)}$</u>	<u>Age</u>	<u>${}_{65-x} \ddot{a}_x^{(12)}$</u>	<u>Age</u>	<u>${}_{65-x} \ddot{a}_x^{(12)}$</u>
37	1.02	43	1.59	49	2.49
38	1.10	44	1.71	50	2.69
39	1.18	45	1.85	51	2.90
40	1.28	46	1.99	52	3.13
41	1.37	47	2.14	53	3.38
42	1.48	48	2.31	54	3.65

There are no distributions from the profit sharing plan, and no contributions are made for any participant except Smith, during 2012.

Considering only top-heavy requirements, \$X is the maximum contribution that can be made to the profit sharing plan for Smith in 2012 on 12/31/2012 without making the plan top-heavy for 2013.

Question 28

In what range is \$X?

- (A) Less than \$4,000
- (B) \$4,000 but less than \$7,000
- (C) \$7,000 but less than \$10,000
- (D) \$10,000 but less than \$13,000
- (E) \$13,000 or more

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Data for Question 29 (1 point)

Normal form of payment: Life annuity with ten years certain.

The plan's actuary has certified the 2011 AFTAP of 50.00% on July 1, 2011.

Data for participant Smith:

Marital status	Single
Date of retirement	September 1, 2011
Form of payment elected	Single life annuity that is actuarially equivalent to the normal form

Consider the following statement:

The plan may pay Smith's benefit in the form elected in 2011.

Question 29

Is the above statement true or false?

- (A) True
- (B) False

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Data for Question 30 (4 points)

Plan type: Multiemployer.

Valuation date: 1/1/2012.

Normal retirement benefit: 1.25% of final year compensation times years of service.

Actuarial cost method: Frozen initial liability.

As of 1/1/2012, assumptions were changed.

The unfunded liability is adjusted as of 1/1/2012 to reflect the change in assumptions.

The 12/31/2011 credit balance is \$0.

Selected valuation results as of 1/1/2012:

	<u>Old assumptions</u>	<u>New assumptions</u>
Present value of future benefits	\$7,700,000	\$8,900,000
Present value of future salaries	43,400,000	41,000,000
Unfunded liability	1,500,000	
Actuarial value of assets	3,400,000	3,400,000
Normal cost as of 1/1	165,000	
Entry age normal accrued liability	5,300,000	6,100,000

Question 30

In what range is the normal cost as of 1/1/2012 based on the new assumptions?

- (A) Less than \$190,000
- (B) \$190,000 but less than \$200,000
- (C) \$200,000 but less than \$210,000
- (D) \$210,000 but less than \$220,000
- (E) \$220,000 or more

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Data for Question 31 (5 points)

Effective date: 1/1/2009.

Normal retirement benefit: 2% of final-year compensation per year of service.

Early retirement benefit: Accrued benefit reduced by 2.5% for each year prior to age 65.

Early retirement eligibility: Age 45.

Preretirement decrements: None.

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

Data for plan participant Smith:

Date of birth	1/1/1967
Date of hire	1/1/2003
Date of retirement	1/1/2012
2011 compensation	\$120,000

Selected commutation functions:

Age	<u>Segment rate 1</u>		<u>Segment rate 2</u>		<u>Segment rate 3</u>	
	$N_x^{(12)}$	D_x	$N_x^{(12)}$	D_x	$N_x^{(12)}$	D_x
45	984,873	66,478	526,954	39,470	285,466	23,549
50	691,251	51,243	356,431	29,016	185,907	16,518
55	466,449	38,856	231,910	20,984	116,537	11,398
60	298,073	28,646	142,952	14,754	69,245	7,646
65	176,044	20,282	81,453	9,963	38,046	4,926

$\$X$ is the funding target at 1/1/2012.

$\$Y$ is the funding target that would have existed at 1/1/2012 if Smith had not retired.

Question 31

What is the absolute value of $\$X - \Y ?

- (A) Less than \$100,000
- (B) \$100,000 but less than \$105,000
- (C) \$105,000 but less than \$110,000
- (D) \$110,000 but less than \$115,000
- (E) \$115,000 or more

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Data for Question 32 (2 points)

Effective date: 1/1/2002.

Data for plan participant Smith:

Date of birth	1/1/1956
Date of hire	1/1/2004
Date of termination	12/31/2006
Date of rehire	1/1/2009

Compensation history:

2004	\$100,000
2005	106,000
2006	116,000
2007	0
2008	0
2009	118,000
2010	104,000
2011	106,000

Question 32

What is the average compensation used for Smith as of 12/31/2011 for purposes of IRC section 415?

- (A) Less than \$110,000
- (B) \$110,000 but less than \$111,000
- (C) \$111,000 but less than \$112,000
- (D) \$112,000 but less than \$113,000
- (E) \$113,000 or more

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Data for Question 33 (3 points)

A plan sponsor sponsors a defined benefit (DB) and defined contribution (DC) plan.

Plan year for DB plan: 10/1 to 9/30.

Valuation date for DB plan: 10/1.

Plan year for DC plan: Calendar year.

Selected data:

	<u>Key employees</u>	<u>Non-key employees</u>
PVAB in DB plan as of 10/1/2010	\$200,000	\$100,000
PVAB in DB plan as of 10/1/2011	225,000	90,000
PVAB in DB plan as of 10/1/2012	190,000	160,000
Account balance in DC plan as of 12/31/2010	\$80,000	\$50,000
Account balance in DC plan as of 12/31/2011	130,000	60,000

Question 33

In what range is the top-heavy ratio that will be used to determine whether the defined contribution plan is top-heavy for 2012?

- (A) Less than 0.60
- (B) 0.60 but less than 0.63
- (C) 0.63 but less than 0.66
- (D) 0.66 but less than 0.69
- (E) 0.69 or more

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Data for Question 34 (3 points)

2011 effective interest rate: 7.00%.

2012 effective interest rate: 6.00%.

Funding standard carryover balance as of 1/1/2011: \$2,500.

Prefunding balance as of 1/1/2011: \$1,000.

Minimum required contribution as of 1/1/2011: \$150,000.

Minimum required contribution as of 1/1/2012: \$50,000.

Contributions:

\$150,000 deposited on 12/31/2011

\$40,000 deposited on 12/31/2012

There are no unpaid minimum required contributions prior to 2011.

Question 34

In what range is the initial excise tax on the unpaid minimum required contribution for the 2012 tax year?

- (A) Less than \$1,800
- (B) \$1,800 but less than \$1,900
- (C) \$1,900 but less than \$2,000
- (D) \$2,000 but less than \$2,100
- (E) \$2,100 or more

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Data for Question 35 (3 points)

Type of plan: Multiemployer.

Plan effective date: 1/1/2000.

Actuarial cost method: Aggregate.

Valuation interest rate: 7.0%.

Credit balance as of 12/31/2011: \$2,250,000.

Selected valuation results as of 1/1/2012:

Present value of future benefits	\$50,000,000
Actuarial (market) value of assets	40,000,000
Outstanding balance of waiver amounts required to be amortized	1,500,000
Present value of future compensation	175,000,000
Total 2012 expected compensation	21,000,000

Question 35

In what range is the normal cost for 2012 as of 1/1/2012?

- (A) Less than \$1,250,000
- (B) \$1,250,000 but less than \$1,400,000
- (C) \$1,400,000 but less than \$1,550,000
- (D) \$1,550,000 but less than \$1,700,000
- (E) \$1,700,000 or more

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Data for Question 36 (5 points)

The plan sponsor elects to use the full corporate bond yield curve.

Selected values from 2012 full corporate bond yield curve:

<u>Maturity</u>	<u>Yield</u>
1	1.0%
2	2.5%
3	3.5%
4	4.5%
5	5.5%
6	6.5%

2011 shortfall amortization installment: \$200,000.

There were no shortfall amortization bases established before 2011.

Funding standard carryover balance as of 1/1/2012: \$0.

Prefunding balance as of 1/1/2012: \$500,000.

Selected valuation results as of 1/1/2012 using the full corporate bond yield curve:

Actuarial value of assets	\$7,000,000
Funding target	7,000,000
Target normal cost	160,000
Effective interest rate	5.50%

Actual asset return for 2012: 7.5%.

The plan sponsor elects to use the prefunding balance to satisfy the minimum required contribution for the 2012 plan year.

Question 36

In what range is the prefunding balance as of 1/1/2013?

- (A) Less than \$240,000
- (B) \$240,000 but less than \$250,000
- (C) \$250,000 but less than \$260,000
- (D) \$260,000 but less than \$270,000
- (E) \$270,000 or more

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Data for Question 37 (1 point)

Plan effective date: 1/1/2008.

2011 AFTAP (certified 8/1/2011): 65.00%.

There were no funding balances as of 1/1/2011.

As of 4/1/2012, the enrolled actuary had not certified the actual AFTAP for the 2012 plan year.

Consider the following statement:

Benefit accruals must cease beginning 4/1/2012.

Question 37

Is the above statement true or false?

(A) True

(B) False

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Data for Question 38 (3 points)

2011 FTAP: 85.00%.

2011 shortfall amortization installment: \$25,000.

2012 segment rates: {5.0%, 6.0%, 7.0%}.

Funding standard carryover balance as of 1/1/2012: \$40,000.

Prefunding balance as of 1/1/2012: \$140,000.

Selected valuation results as of 1/1/2012:

Actuarial (market) value of assets	\$1,100,000
Funding target	1,000,000
Target normal cost	40,000
Effective interest rate	6.00%

Rate of return on assets during 2012: 1.50%.

Shortfall amortization factors for 2012:

7-year	5.9982
6-year	5.2932

The plan did not have any shortfall amortization bases before the 2011 plan year.

The plan sponsor did not make any contributions for the 2012 plan year and elects to apply balances to satisfy the minimum required contribution.

Question 38

In what range is the prefunding balance as of 1/1/2013?

- (A) Less than \$100,000
- (B) \$100,000 but less than \$110,000
- (C) \$110,000 but less than \$120,000
- (D) \$120,000 but less than \$130,000
- (E) \$130,000 or more

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Data for Question 39 (5 points)

Valuation date: 1/1/2013.

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

Prefunding balance as of 1/1/2013: \$0.

Effective interest rate for 2013: 6.00%.

A funding shortfall exists as of 1/1/2012.

2012 minimum required contribution: \$1,000,000.

2013 minimum required contribution: \$1,200,000.

Contributions for 2013 plan year:

<u>Date</u>	<u>Contribution</u>	<u>Days from 1/1/2013</u>
4/15/2013	\$250,000	104
7/15/2013	0	195
8/10/2013	250,000	221
10/15/2013	0	287
11/10/2013	350,000	313
1/15/2014	150,000	379
9/15/2014		622

Question 39

In what range is the remaining contribution required on 9/15/2014 to meet the minimum funding standard for 2013?

- (A) Less than \$239,000
- (B) \$239,000 but less than \$247,500
- (C) \$247,500 but less than \$256,000
- (D) \$256,000 but less than \$264,500
- (E) \$264,500 or more

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Data for Question 40 (2 points)

Selected valuation data:

Actuarial (market) value of assets	\$90,000,000
Funding target	100,000,000
Funding standard carryover balance	10,000,000
Prefunding balance	10,000,000

Consider the following statement:

If the plan does not offer an optional form of benefit subject to benefit restrictions and, therefore, no benefit restrictions can apply, there is no deemed election under IRC section 436 to reduce the funding balances.

Question 40

Is the above statement true or false?

- (A) True
- (B) False

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Data for Question 41 (3 points)

Selected historical valuation information:

	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>
At-risk for plan year?	Yes	No	Yes	Yes	Yes

Selected valuation results as of 1/1/2012:

Actuarial (market) value of assets	\$430,000,000
Funding target disregarding At-risk assumptions	600,000,000
At-risk funding target disregarding 5-year transition and load	660,000,000
Present value of prior shortfall bases	29,000,000
Participant count	20,000
7-year shortfall amortization factor	5.9982

There are no funding balances as of January 1, 2012.

Question 41

In what range is the shortfall amortization installment for the shortfall amortization base established in 2012?

- (A) Less than \$30,500,000
- (B) \$30,500,000 but less than \$33,500,000
- (C) \$33,500,000 but less than \$36,500,000
- (D) \$36,500,000 but less than \$39,500,000
- (E) \$39,500,000 or more

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Data for Question 42 (4 points)

Plan type: Multiemployer.

Plan effective date: 1/1/1985.

The plan was amended effective 1/1/2012.

Actuarial cost method: Frozen initial liability.

Valuation interest rate: 7%.

Initial unfunded accrued liability: \$25,000,000.

Credit balance as of 12/31/2011: \$1,000,000.

Selected valuation results as of 1/1/2012:

Actuarial (market) value of assets	\$40,000,000
Present value of future benefits after plan change	50,000,000
Present value future of future compensation	150,000,000
Covered payroll	20,000,000
Entry age accrued liability before plan change	41,000,000
Entry age accrued liability after plan change	46,000,000

Question 42

In what range is the **smallest amount that satisfies the minimum funding standard** for 2012 as of 12/31/2012?

- (A) Less than \$1,500,000
- (B) \$1,500,000 but less than \$1,600,000
- (C) \$1,600,000 but less than \$1,700,000
- (D) \$1,700,000 but less than \$1,800,000
- (E) \$1,800,000 or more

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Data for Question 43 (2 points)

Consider the following three tax rates:

X is the tax rate on reversions of qualified plan assets (provided there is a qualified replacement plan).

Y is the tax rate on failure to pay the excess of the liquidity shortfall over the liquid assets (assuming a timely correction is subsequently made).

Z is the tax rate for multiemployer plans on the amount of accumulated funding deficiency (assuming a timely correction is subsequently made).

Question 43

Which is the correct ordering of *X*, *Y* and *Z*?

- (A) $X < Z < Y$
- (B) $Y < X < Z$
- (C) $Y < Z < X$
- (D) $Z < X < Y$
- (E) $Z < Y < X$

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Data for Question 44 (3 points)

Funding standard carryover balance as of 1/1/2012: \$5,000.

Prefunding balance as of 1/1/2012: \$3,000.

Selected valuation results as of 1/1/2012:

Market value of assets	\$153,000
Actuarial value of assets	155,000
Funding target (disregarding at-risk assumptions)	180,000
Funding target	185,000

In the prior two plan years, annuities were purchased in the following amounts:

For NHCEs	\$8,000
For HCEs	2,000

Question 44

In what range is the AFTAP under IRC section 436 as of 1/1/2012?

- (A) Less than 81.00%
- (B) 81.00% but less than 82.00%
- (C) 82.00% but less than 83.00%
- (D) 83.00% but less than 84.00%
- (E) 84.00% or more

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Data for Question 45 (4 points)

Asset valuation method: Smoothed average value using assets on the valuation date and the two previous valuation dates.

Segment rates used for 2010 and 2011 valuation: {6.0%, 7.0%, 8.0%}.

Selected asset information:

	<u>2010</u>	<u>2011</u>	<u>2012</u>
Expected rate of return	6.75%	6.75%	
Market value of assets 1/1	\$330,000	\$270,000	\$290,000
Contributions made 7/1 of current year for the current year	44,000	6,000	
Benefit payments made 7/1	27,000	30,000	
Expenses paid from the trust	0	0	0

Question 45

In what range is the actuarial value of assets as of 1/1/2012?

- (A) Less than \$288,000
- (B) \$288,000 but less than \$294,000
- (C) \$294,000 but less than \$300,000
- (D) \$300,000 but less than \$306,000
- (E) \$306,000 or more

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Data for Question 46 (5 points)

Plan type: Multiemployer.

Valuation interest rate: 7%.

Benefits are paid annually as of 1/1.

Data for sole participants as of 1/1/2011:

	<u>Age</u>	<u>Spouse age</u>	<u>Annual benefit</u>	<u>Form of benefit</u>
Smith	65	65	\$20,000	100% J&S
Jones	65	65	20,000	100% J&S

Smith's spouse dies on 10/1/2011.

Selected commutation functions:

N_{65}	339,200	D_{65}	31,600	$N_{65:65}$	272,000	$D_{65:65}$	29,400
N_{66}	307,600	D_{66}	29,200	$N_{66:66}$	242,600	$D_{66:66}$	27,000
N_{67}	278,400			$N_{67:67}$	215,600		

Question 46

In what range is the absolute value of the total mortality gain or loss experienced in 2011?

- (A) Less than \$29,000
- (B) \$29,000 but less than \$32,000
- (C) \$32,000 but less than \$35,000
- (D) \$35,000 but less than \$38,000
- (E) \$38,000 or more

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Data for Question 47 (3 points)

Valuation date: 1/1/2012.

Funding standard carryover balance as of 1/1/2011: \$15,000.

Prefunding balance as of 1/1/2011: \$1,000.

Effective interest rate for 2011: 4.00%.

Actual rate of return during 2011: 8.50%.

The minimum required contribution for the 2011 plan year is \$10,000.

The plan sponsor elected to apply \$10,000 of the carryover balance towards the 2011 minimum required contribution on 1/1/2011.

The plan sponsor made a single contribution of \$16,000 on 12/31/2011 for the 2011 plan year.

Question 47

In what range is the prefunding balance on 1/1/2012?

- (A) Less than \$16,150
- (B) \$16,150 but less than \$16,650
- (C) \$16,650 but less than \$17,150
- (D) \$17,150 but less than \$17,650
- (E) \$17,650 or more

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Data for Question 48 (3 points)

Plan year: 4/1 – 3/31.

The plan is a defined benefit plan with 50 participants.

Monthly normal retirement benefit: 3.29% of final 36-month average compensation per year of service.

Data for participant Smith as of 4/1/2012:

Date of birth	4/1/1947
Date of hire	1/1/2006
Date of termination	12/31/2008
Monthly compensation	\$40,000 for all months
Vested percentage	100%

Lump sum factors at attained age on 4/1/2012:

12/2011 using applicable interest and mortality	12.82
3/2012 using applicable interest and mortality	13.05

Applicable lookback month: The month preceding the first day of the stability period.

Stability period: One calendar quarter.

Question 48

In what range is the lump sum benefit payable to Smith on 4/1/2012?

- (A) Less than \$285,000
- (B) \$285,000 but less than \$295,000
- (C) \$295,000 but less than \$305,000
- (D) \$305,000 but less than \$315,000
- (E) \$315,000 or more

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Data for Question 49 (2 points)

A defined benefit plan covers 10 highly compensated and 40 non-highly compensated employees. There are no inactive participants.

The benefit formula is amended on 1/1/2011 to increase plan benefits effective 1/1/2012.

The plan has a funding standard carryover balance and a prefunding balance on 1/1/2012.

Consider the following statements for the 2012 plan year for purposes of IRC section 404:

- I. The cushion amount will be calculated by applying the amended formula to all participants.
- II. The plan's target normal cost will be calculated by applying the amended formula to all participants.
- III. The actuarial value of assets will be reduced by the funding standard carryover balance and prefunding balance to calculate the deduction limit.

Question 49

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.

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Data for Question 50 (4 points)

Number of participants in 2011: 150.

Effective interest rate in 2012: 6.00%.

Funding standard carryover balance as of 1/1/2011: \$35,000.

Funding standard carryover balance as of 1/1/2012: \$38,000.

Liquidity shortfall on 3/31/2012: \$115,000.

Contribution on 3/31/2012 that would increase the 2012 FTAP to 100.00% if FTAP were determined taking into account benefits accruing during the plan year: \$100,000.

Selected valuation results:

	<u>1/1/2011</u>	<u>1/1/2012</u>
Funding target attainment percentage	76.00%	
Minimum required contribution	\$85,000	\$150,000

The first and second quarterly installments and the liquidity shortfall contributions were made on 7/15/2012. No funding balances were applied or contributions were made before 7/15/2012.

Question 50

In what range is the discounted value on 1/1/2012 of the contributions made on 7/15/2012?

- (A) Less than \$106,500
- (B) \$106,500 but less than \$116,500
- (C) \$116,500 but less than \$126,500
- (D) \$126,500 but less than \$136,500
- (E) \$136,500 or more

****END OF EXAMINATION****

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