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

Enrolled Actuaries Pension Examination, Segment F

EA-2, Segment F

Date: Tuesday, November 7, 2017
Time: 8:30 a.m. – 12:30 p.m.

INSTRUCTIONS TO CANDIDATES

1. Write your candidate number here ____________. Your name must not appear.

2. Do not break the seal of this book until the supervisor tells you to do so.

3. Special conditions generally applicable to all questions on this examination are found at the front of this book.

4. All questions should be answered in accordance with laws, rules and regulations in effect as of May 31, 2017.

5. This examination consists of 54 multiple-choice questions of varying value. The point value for each question is shown in parentheses at the beginning of each question. Total point value is 160.

6. 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.

7. 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.

8. Up to 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.

9. 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.

10. Do not spend too much time on any one question. If a question seems too difficult, leave it and go on.

11. 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.

12. Clearly indicated answer choices in the test book can be an aid in grading examinations in the unlikely event of a lost answer sheet.

13. Use the blank portions of each page for your scratch work. Extra blank pages are provided at the back of the examination book.

14. When the supervisor tells you to do so, break the seal on the book and remove the answer sheet.

    On the front of the answer sheet, space is provided to write and code candidate information. Complete the information requested by printing in the squares and blackening the circles (one in each column) corresponding to the letters or numbers printed. For each empty box blacken the small circle immediately above the "A" circle. Fill out the boxes titled:

    (a) Name
    (include last name, first name and middle initial)

    (b) Candidate Number
    (Candidate/Eligibility Number, use leading zeros if needed to make it a five digit number)

    (c) Test Site Code
    (the supervisor will supply the number)

    (d) Examination Part
    (code the examination that you are taking by blackening the circle to the left of "Course EA-2, Segment F")

    (e) Booklet Number
    (booklet number can be found in the upper right-hand corner of this examination book. Use leading zeros if needed to make it a four digit number.)

    In box titled "Complete this section only if instructed to do so", fill in the circle to indicate if you are using a calculator and write in the make and model number.

    In the box titled "Signature and Date" sign your name and write today's date. **If the answer sheet is not signed, it will not be graded**.

    Leave the boxes titled "Test Code" and "Form Code" blank.

    On the back of the answer sheet fill in the Booklet Number in the space provided.

15. 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.

Answer Key EA-2F Fall 2017
August 24, 2017

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

Data for Question 1 (1 point)

Valuation date: 1/1/2018

A plan has a liquidity shortfall as of 3/31/2018.

On 5/1/2018, the plan sponsor makes a cash contribution for the 2018 plan year equal to the first required quarterly installment for 2018.

Consider the following statement:

> The liquidity requirement is considered satisfied as of 5/1/2018.

Question 1

Is the above statement true or false?

(A) True

(B) False

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Data for Question 2 (3 points)

Type of plan: Multiemployer

Valuation date: 1/1/2018

Plan effective date: 1/1/2010

Valuation interest rate: 7.00%

Credit balance as of 12/31/2017: $0

Selected information as of 1/1/2018:

Normal cost	$750,000
Net amortization charge	250,000

The plan is not in critical and declining status, critical status, or endangered status.

The only contribution made for the 2018 plan year was deposited on 12/31/2018 in the amount of $1,000,000.

$X = the amount of the excise tax, if any, that must be paid for failing to meet minimum funding standards for the 2018 plan year.

Question 2

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

(A) Less than $1,900

(B) $1,900 but less than $3,450

(C) $3,450 but less than $5,000

(D) $5,000 but less than $6,550

(E) $6,550 or more

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Data for Question 3 (3 points)

Plan effective date: 1/1/2015

Valuation date: 1/1/2017

Normal retirement benefit: 9.00% of highest consecutive three-year average compensation per year of service

Segment rates: {3.00%, 4.00%, 5.00%}

Selected data for participant Smith:

Gender	Male
Date of birth	1/1/1974
Date of hire	1/1/2014
Compensation for all years of service	$285,000

$X = the funding target for Smith as of 1/1/2017.

Question 3

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

(A) Less than $200,000

(B) $200,000 but less than $235,000

(C) $235,000 but less than $270,000

(D) $270,000 but less than $305,000

(E) $305,000 or more

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Data for Question 4 (1 point)

Consider the following statement regarding the use of funding standard carryover and prefunding balances:

> The plan sponsor may elect to use the funding balances to offset the minimum required contribution only if, for the prior year, the ratio of the assets reduced by the funding balances to the funding target is at least 80%.

Question 4

Is the above statement true or false?

(A) True

(B) False

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Data for Question 5 (2 points)

The sponsor of a plan is required to make quarterly installments for the current plan year.

Consider the following statements:

I. There was a funding shortfall in the prior plan year.

II. If the plan sponsor fails to make the full amount of a required quarterly installment, then the interest discount for the period of underpayment is equal to the plan's effective interest rate for the current plan year plus the lesser of 5% and the third segment rate in effect for the current plan year.

III. If the prior plan year is less than 12 months, the required annual payment is equal to 90% of the current year's minimum required contribution.

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 (4 points)

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

Selected information:

	2017 plan year	2018 plan year
Segment rates	{3.00%, 4.00%, 5.00%}	{4.00%, 5.00%, 6.00%}
Effective interest rate	4.50%	5.50%

Assumed rate of return on assets for 2017: 7.00%

Selected asset information, excluding contributions receivable for the 2017 plan year:

	2017	2018
Market value of assets, 1/1	\$4,000,000	\$4,180,000
Benefit payments	200,000	
Expenses paid from trust	45,000	

Benefit payments and expenses are assumed to be paid on 7/1.

Contributions for the 2017 plan year:

Date	Amount
10/1/2017	\$200,000
7/1/2018	500,000

\$X = the actuarial value of assets as of 1/1/2018.

Question 6

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

(A) Less than \$4,650,000

(B) \$4,650,000 but less than \$4,660,000

(C) \$4,660,000 but less than \$4,670,000

(D) \$4,670,000 but less than \$4,680,000

(E) \$4,680,000 or more

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Data for Question 7 (5 points)

Segment rates for 2017: {5.00%, 6.00%, 7.00%}

Segment rates for 2018: {3.00%, 4.00%, 5.00%}

There were no shortfall amortization bases prior to 1/1/2016.

Shortfall amortization charge for the plan year beginning 1/1/2016: $20,000

There were no funding balances as of 1/1/2017.

Selected information:

	1/1/2017	1/1/2018
Actuarial (market) value of assets	$855,000	$920,500
Funding target	1,000,000	1,220,000
Target normal cost	120,000	110,000

Contribution made on 1/1/2017 for the 2017 plan year: $15,000

The plan received a waiver for the 2017 unpaid minimum required contribution.

$X = the **smallest amount that satisfies the minimum funding standard** as of 1/1/2018.

Question 7

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

(A) Less than $171,200

(B) $171,200 but less than $171,600

(C) $171,600 but less than $172,000

(D) $172,000 but less than $172,400

(E) $172,400 or more

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Data for Question 8 (1 point)

Plan year: 7/1 to 6/30

The plan provides that, as of 1/1 of each plan year, the dollar limitation under IRC section 415 that takes effect on such 1/1 will become the maximum benefit payable at age 65 as a life annuity under the plan for all participants.

Consider the following statement:

> For the plan year 7/1/2017 through 6/30/2018, the plan sponsor may elect to calculate the funding target based on accrued benefits reflecting the IRC section 415 limit in effect as of 1/1/2018.

Question 8

Is the above statement true or false?

(A) True

(B) False

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Data for Question 9 (4 points)

Segment rates for 2017 and 2018: {4.00%, 5.00%, 6.00%}

Funding standard carryover balance for 2017: $6,000

Prefunding balance for 2017: $1,500

Actual rate of return on assets during 2017: (15.00%)

Selected information:

	1/1/2017	1/1/2018
Minimum required contribution	$16,000	$20,000
Effective interest rate	5.50%	5.00%

Sole contribution for the 2017 plan year made on 2/1/2017: $20,000

The plan sponsor did not elect to apply funding balances to reduce the minimum required contribution for the 2017 plan year.

The plan sponsor is allowed to apply funding balances to reduce the minimum required contribution for the 2018 plan year.

$X = the **smallest amount that satisfies the minimum funding standard** as of 1/1/2018 for the 2018 plan year.

Question 9

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

(A) Less than $8,000

(B) $8,000 but less than $10,000

(C) $10,000 but less than $12,000

(D) $12,000 but less than $14,000

(E) $14,000 or more

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Data for Question 10 (4 points)

Type of plan: Multiemployer

Plan effective date: 1/1/2006

Actuarial cost method: Frozen initial liability

Valuation interest rate: 6.00%

Credit balance as of 12/31/2017: $350,000

Selected valuation results as of 1/1/2018:

Market value of assets	$7,100,000
Actuarial value of assets	6,950,000
Present value of future benefits	12,000,000
Amortization of initial liability	90,000
Active participants	200
Present value of future service	2,160

$X = the normal cost as of 1/1/2018.

Question 10

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

(A) Less than $400,000

(B) $400,000 but less than $420,000

(C) $420,000 but less than $440,000

(D) $440,000 but less than $460,000

(E) $460,000 or more

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Data for Question 11 (4 points)

Type of plan: Multiemployer

Valuation date: 1/1/2018

Actuarial cost method: Unit credit

Valuation interest rate: 6.50%

All funding standard account bases at 1/1/2017:

	Years remaining	Outstanding balance
Initial unfunded liability	8	$650,000
Actuarial gain	14	200,000
Actuarial loss	15	110,000

Actuarial loss for 2017 plan year: $100,000

The plan receives automatic approval for a 5-year extension of amortization periods as of 1/1/2018 for eligible charge bases established on and before 1/1/2018.

$X = the absolute value of the change in the minimum required contribution as of 12/31/2018 due to the amortization extension.

Question 11

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

(A) Less than $34,000

(B) $34,000 but less than $37,000

(C) $37,000 but less than $40,000

(D) $40,000 but less than $43,000

(E) $43,000 or more

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Data for Question 12 (1 point)

Plan effective date: 1/1/1981

Normal retirement benefit: \$34 per month per year of service

The plan sponsor would like to increase the normal retirement benefit to \$35 per month per year of service effective 1/1/2018 for all service.

Compensation for each participant covered by this plan amendment has increased by 5% annually since plan inception.

2018 AFTAP: 75.00%

No contributions will be made during 2018.

Consider the following statement:

> The plan amendment increasing the normal retirement benefit from \$34 to \$35 per year of service cannot take effect during the 2018 plan year.

Question 12

Is the above statement true or false?

(A) True

(B) False

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Data for Question 13 (3 points)

Type of plan: Multiemployer

Valuation date: 1/1/2018

Actuarial cost method: Unit credit

Valuation interest rate: 7.50%

The plan has been approved for and is using the 5-year automatic extension under IRC section 431(d) effective 1/1/2017.

Selected information:

	1/1/2017	1/1/2018
Status	Critical	
Market value of assets	$9,000,000	$11,000,000
Actuarial value of assets	8,900,000	10,500,000
Accrued liability	13,370,000	
Normal cost	145,000	
Benefit payments	800,000	
Years to projected funding deficiency with 431(d) 5-year amortization extension		12
Years to projected funding deficiency without 431(d) 5-year amortization extension		0

The plan is not projected to be insolvent within the next 35 years.

Question 13

What is the status of the plan on 1/1/2018?

(A) Critical and declining

(B) Critical

(C) Seriously endangered

(D) Endangered

(E) The correct answer is not given by (A), (B), (C), or (D) above.

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Data for Question 14 (4 points)

Valuation date: 1/1/2018

Plan type: Hybrid (cash balance)

The plan pays lump sums equal to the account balance.

Normal retirement age: 62

Pay credit: 5.00%

Interest crediting rate: 6.00%

Pay credits and interest credits are made at the end of the year.

Actuarial equivalence: Male mortality at 5.00%

Segment rates: {5.00%, 6.00%, 7.00%}

Assumed retirement age: 62

Assumed form of payment:

Lump sum	50%
Single life annuity	50%

Selected information for participant Smith:

Gender	Male
Date of birth	1/1/1976
Assumed 2018 compensation	$260,000

$X = the target normal cost for Smith as of 1/1/2018.

Question 14

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

(A) Less than $9,300

(B) $9,300 but less than $9,800

(C) $9,800 but less than $10,300

(D) $10,300 but less than $10,800

(E) $10,800 or more

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Data for Question 15 (4 points)

Selected information:

Plan year	2014	2015	2016
Minimum required contribution		\$100,000	\$120,000
Effective interest rate		6.00%	7.00%
FTAP	105.00%	98.00%	90.00%

The only contribution for the 2015 and 2016 plan years was deposited on 9/1/2017 in the amount of \$140,000.

\$X = the initial excise tax due to the failure to satisfy the minimum required contribution for the 2016 plan year.

Question 15

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

(A) Less than \$9,250

(B) \$9,250 but less than \$9,500

(C) \$9,500 but less than \$9,750

(D) \$9,750 but less than \$10,000

(E) \$10,000 or more

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Data for Question 16 (2 points)

Valuation date: 1/1/2018

Non-stabilized segment rates: {2.00%, 3.00%, 4.00%}

Selected 25-year average segment rates:

Period ending	8/31/2017	9/30/2017	10/31/2017	11/30/2017
First segment rate	4.50%	4.25%	4.00%	3.75%
Second segment rate	6.00%	5.80%	5.60%	5.40%
Third segment rate	7.00%	6.90%	6.80%	6.70%

X% = the stabilized first segment rate for the 2018 plan year.

Question 16

In what range is ***X%***?

(A) Less than 3.75%

(B) 3.75% but less than 4.05%

(C) 4.05% but less than 4.35%

(D) 4.35% but less than 4.65%

(E) 4.65% or more

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Data for Question 17 (1 point)

Type of plan: Multiemployer

Actuarial cost method: Entry age normal

Number of active employees as of 1/1/2018: 500

Disability benefit: A one-time lump sum payment of $5,000 payable upon disability

The assumed rates of disability at all ages will be changed for the 1/1/2018 valuation.

Consider the following statement.

> This change to the assumed rates of disability will have no effect on the plan's 1/1/2018 accrued liability.

Question 17

Is the above statement true or false?

(A) True

(B) False

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Data for Question 18 (2 points)

Type of plan: Multiemployer

Consider the following information about the plan at 1/1/2018:

I. The funded percentage of the plan is less than 65%; and

II. The sum of the fair market value of plan assets plus the present value of the reasonably anticipated employer contributions for the current plan year and each of the six succeeding plan years is less than the present value of all nonforfeitable benefits projected to be payable under the plan during the current plan year and each of the six succeeding plan years (plus administrative expenses for such plan years) assuming that the terms of all collective bargaining agreements pursuant to which the plan is maintained for the current plan year continue in effect for succeeding plan years.

Consider the following statement:

This plan is in critical status for the 2018 plan year.

Question 18

Is the above statement true or false?

(A) True

(B) False

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Data for Question 19 (5 points)

Normal retirement benefit: 2.0% of final year's compensation per year of service

Normal form of payment: 10-year certain and life annuity

Segment rates for 2018: {3.00%, 4.00%, 5.00%}

Selected data for sole participant Smith at 1/1/2018:

	Smith
Gender	Male
Age	60
Service	14
Status	Active
2017 compensation	$60,000

Smith's compensation in all years before 2017 was less than $60,000.

$X = the funding target for the plan as of 1/1/2018.

Question 19

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

(A) Less than $175,000

(B) $175,000 but less than $181,000

(C) $181,000 but less than $187,000

(D) $187,000 but less than $193,000

(E) $193,000 or more

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Data for Question 20 (1 point)

A plan sponsor elects on 1/1/2018 to apply a portion of the prefunding balance towards the 2018 minimum required contribution.

Consider the following statement:

> For purposes of determining the amount of the first 2018 quarterly installment satisfied by this election, the portion of the prefunding balance applied to the 2018 minimum required contribution is increased from 1/1/2018 to 4/15/2018 using the 2018 effective interest rate.

Question 20

Is the above statement true or false?

(A) True

(B) False

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Data for Question 21 (4 points)

Type of plan: Multiemployer

Credit balance as of 12/31/2017: $10,000

Selected information as of 1/1/2018:

Market value of assets	$2,600,000
Actuarial value of assets	3,100,000
Accrued liability (entry age normal)	3,730,000
Normal cost (entry age normal)	40,000
Present value of future benefits	4,500,000
Present value of future compensation	2,500,000
Present value of 2018 compensation	250,000
Valuation interest rate	7.00%

Funding standard account information as of 1/1/2018:

Amortization charges	$160,000
Amortization credits	100,000

For the 1/1/2018 valuation, the cost method changed from entry age normal to aggregate (level percent of compensation).

$X = the **smallest amount that satisfies the minimum funding standard** as of 12/31/2018, using the entry age normal cost method.

$Y = the **smallest amount that satisfies the minimum funding standard** as of 12/31/2018, using the aggregate (level percent of compensation) cost method.

Question 21

In what range is **|*$X* - *$Y*|**?

(A) Less than $42,000

(B) $42,000 but less than $46,000

(C) $46,000 but less than $50,000

(D) $50,000 but less than $54,000

(E) $54,000 or more

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Data for Question 22 (5 points)

Type of plan: Multiemployer

Valuation date: 1/1/2018

Actuarial cost method: Entry age normal

Normal retirement benefit: 40% of final year's compensation

Valuation interest rate: 7.00%

Assumed compensation increases: 4.00% per year

Selected data for participant Smith:

Gender	Female
Date of birth	1/1/1964
Date of hire	1/1/1998
2017 compensation	$100,000

Smith's compensation in all years before 2017 was less than $100,000.

$X = the accrued liability for Smith as of 1/1/2018.

Question 22

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

(A) Less than $200,000

(B) $200,000 but less than $220,000

(C) $220,000 but less than $240,000

(D) $240,000 but less than $260,000

(E) $260,000 or more

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Data for Question 23 (3 points)

Type of plan: Multiemployer

Valuation date: 1/1/2018

Actuarial cost method: Projected unit credit

Normal retirement benefit: 25% of final three-year average compensation, proportionally reduced for fewer than 25 years of service

Accrued benefit: Normal retirement benefit prorated over all years of service

Valuation interest rate: 6.00%

Assumed compensation increases: 3.00% per year

Selected data for active participant Smith:

Gender	Male
Date of birth	1/1/1968
Date of hire	1/1/2013
2017 compensation	$125,000

Smith's compensation in all years before 2017 was less than $125,000.

$X = the accrued liability as of 1/1/2018 for Smith.

Question 23

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

(A) Less than $42,500

(B) $42,500 but less than $53,000

(C) $53,000 but less than $63,500

(D) $63,500 but less than $74,000

(E) $74,000 or more

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<u>Data for Question 24</u> (4 points)

Selected information for 2017:

Prefunding balance	$200,000
Minimum required contribution	100,000
Effective interest rate	7.00%
Actual rate of return on assets for 2017	(6.00%)

On 1/1/2017, the plan sponsor elected to apply $130,000 of the prefunding balance toward the 2017 minimum required contribution.

On 12/1/2017, the plan sponsor revokes that election to the extent it exceeds the minimum required contribution.

On 7/1/2018, the plan sponsor contributes $250,000 for the 2017 plan year.

$X = the maximum amount permitted to be added to the prefunding balance at 1/1/2018.

<u>Question 24</u>

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

(A) Less than $205,000

(B) $205,000 but less than $220,000

(C) $220,000 but less than $235,000

(D) $235,000 but less than $250,000

(E) $250,000 or more

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Data for Question 25 (4 points)

Type of Plan: Multiemployer

Plan effective date: 1/1/2016

Actuarial cost method: Entry age normal

Normal retirement benefit: 2.00% of final year's compensation per year of service

Valuation interest rate: 7.00%

Assumed compensation increases: 5.00% per year

Selected data for participant Smith as of 1/1/2018:

Gender	Male
Date of birth	1/1/1955
Date of hire	1/1/2015
Status	Active
2015 compensation	\$50,000
2016 compensation	52,500
2017 compensation	55,125

\$X = the normal cost for Smith as of 1/1/2018.

Question 25

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

(A) Less than \$10,000

(B) \$10,000 but less than \$11,000

(C) \$11,000 but less than \$12,000

(D) \$12,000 but less than \$13,000

(E) \$13,000 or more

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Data for Question 26 (3 points)

Valuation date: 1/1/2018

Funding standard carryover balance as of 1/1/2017: $30,000

Prefunding balance as of 1/1/2017: $50,000

There are no required quarterly installments for the 2017 plan year.

Selected valuation results as of 1/1/2017:

Target normal cost	$100,000
Shortfall amortization charge	30,000
Effective interest rate	5.00%

Actual rate of return for 2017: 3.00%

On 12/31/2017, the plan sponsor contributes $99,750 for the 2017 plan year.

Funding balances are applied to meet the 2017 minimum required contribution.

$X = the prefunding balance as of 1/1/2018.

Question 26

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

(A) Less than $32,000

(B) $32,000 but less than $37,000

(C) $37,000 but less than $42,000

(D) $42,000 but less than $47,000

(E) $47,000 or more

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Data for Question 27 (3 points)

The plan is not at-risk for 2018 and has always had over 500 participants.

Selected valuation results as of 1/1/2018 calculated for IRC section 404 purposes:

Actuarial (market) value of assets	$700,000
Funding target	525,000
Target normal cost	320,000
Funding target with expected future compensation increases	580,000
At-risk funding target	750,000
At-risk target normal cost	400,000
Effective interest rate	5.50%

$X = the deduction limit for 2018.

Question 27

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

(A) Less than $430,000

(B) $430,000 but less than $460,000

(C) $460,000 but less than $490,000

(D) $490,000 but less than $520,000

(E) $520,000 or more

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Data for Question 28 (4 points)

Type of plan: Multiemployer

Valuation date: 1/1/2018

Actuarial cost method: Unit credit

Valuation interest rate: 6.50%

Credit balance as of 12/31/2015: $200,000

Selected information:

Plan year	2016	2017
Actuarial (market) value of assets	$620,000	$680,000
Accrued liability	770,000	770,000
Normal cost	75,000	65,000
Amortization of charge bases established before 1/1/2017	55,000	55,000
Amortization of credit bases established before 1/1/2017	15,000	15,000
Contribution for plan year made on 12/31 of plan year	85,000	80,000

$X = the credit balance as of 12/31/2017.

Question 28

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

(A) Less than $152,000

(B) $152,000 but less than $156,000

(C) $156,000 but less than $160,000

(D) $160,000 but less than $164,000

(E) $164,000 or more

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Data for Question 29 (4 points)

Valuation date: 1/1/2018

Prefunding balance as of 1/1/2018: $150,000

Segment rates: {5.00%, 6.00%, 7.00%}

Selected information as of 1/1/2018:

Actuarial value of assets	$2,000,000
Funding target	1,925,000
Target normal cost	75,000
Effective interest rate	6.00%

Information about the remaining prior shortfall amortization bases as of 1/1/2018:

Year established	Installment	Outstanding balance
2015	$150,000	$558,480
2016	(125,000)	(568,250)
2017	25,000	132,330

The plan sponsor has elected to apply a portion of the prefunding balance toward the 2018 minimum required contribution.

$X = the **minimum required contribution** for 2018.

Question 29

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

(A) Less than $30,000

(B) $30,000 but less than $60,000

(C) $60,000 but less than $90,000

(D) $90,000 but less than $120,000

(E) $120,000 or more

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Data for Question 30 (2 points)

Selected information:

Number of active plan participants as of 1/1/2017: 86
Number of active plan participants as of 1/1/2018: 107

There are no inactive participants as of 1/1/2017 or 1/1/2018.

Consider the following statements:

I. The plan's actuary is permitted to assume no pre-retirement mortality for the 2017 actuarial valuation, if reasonable.

II. Different mortality tables for annuitants and non-annuitants must be used for the 2018 actuarial valuation.

III. The plan's actuary is permitted to assume no pre-retirement mortality for the 2018 actuarial valuation, if reasonable.

Question 30

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 31 (3 points)

Type of plan: Multiemployer

Valuation date: 1/1/2018

Actuarial cost method: Entry age normal

Valuation interest rate: 7.00%

Selected valuation results at 1/1/2018:

Market value of assets	$100,000
Actuarial value of assets	95,000
Accrued liability	114,000
Current liability	120,000
Outstanding balance of charge bases	73,000
Outstanding balance of credit bases	37,000

$X = the credit balance as of 12/31/2017.

Question 31

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

(A) Less than $15,000

(B) $15,000 but less than $20,000

(C) $20,000 but less than $25,000

(D) $25,000 but less than $30,000

(E) $30,000 or more

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Data for Question 32 (1 point)

2017 FTAP = 89.00%

Consider the following statement:

> The plan sponsor may elect to use funding balances to satisfy the 2018 minimum required contribution as long as the election is made no later than the filing due date (with extension) for the 2018 Form 5500 filing.

Question 32

Is the above statement true or false?

(A) True

(B) False

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Data for Question 33 (3 points)

Type of plan: Multiemployer

Valuation date: 1/1/2018

Valuation interest rate: 7.00%

Asset valuation method: Smoothed market value using a smoothing period of three years, as described in Rev. Proc. 2000-40

Selected information for the 2016 plan year:

Market value of assets at 1/1/2016	$250,000
Benefit payments paid on 7/1/2016	16,500
Contribution made on 4/1/2016	35,000

Selected information for the 2017 plan year:

Market value of assets at 1/1/2017	$315,000
Benefit payments paid on 7/1/2017	18,000
Contribution made on 9/1/2017	75,000

Market value of assets as of 1/1/2018: $385,000

$X = the actuarial value of assets as of 1/1/2018.

Question 33

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

(A) Less than $370,000

(B) $370,000 but less than $375,000

(C) $375,000 but less than $380,000

(D) $380,000 but less than $385,000

(E) $385,000 or more

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Data for Question 34 (1 point)

Selected information as of 1/1/2018:

Actuarial value of assets	$100,000
Funding target	120,000

Consider the following statement:

> The 2018 **minimum required contribution** is equal to the sum of target normal cost, shortfall amortization charge (if any), and the waiver amortization charge (if any).

Question 34

Is the above statement true or false?

(A) True

(B) False

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Data for Question 35 (1 point)

A waiver of the 2018 minimum required contribution is granted for a single-employer plan.

Consider the following statement:

> The last amortization installment for the resulting waiver amortization base will be no later than the 2022 plan year.

Question 35

Is the above statement true or false?

(A) True

(B) False

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Data for Question 36 (5 points)

Valuation date: 1/1/2018

Segment rates: {5.00%, 6.00%, 7.00%}

The plan is in at-risk status only for 2014, 2017, and 2018.

Normal retirement benefit: $83.33 per month per year of service

Early retirement eligibility: Age 55

Early retirement reduction: 7.00% per year prior to age 65

The single life annuity is the optional form of benefit available under the plan that results in the highest present value of benefits.

Number of participants at 1/1/2018: 1,000

Selected data for each participant as of 1/1/2018:

Gender	Female
Date of birth	1/1/1958
Date of hire	1/1/2008
Status	Active

$X = the funding target for the plan as of 1/1/2018.

Question 36

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

(A) Less than $82,000,000

(B) $82,000,000 but less than $83,000,000

(C) $83,000,000 but less than $84,000,000

(D) $84,000,000 but less than $85,000,000

(E) $85,000,000 or more

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Data for Question 37 (3 points)

Valuation date: 1/1/2018

Prefunding balance as of 1/1/2018: $200,000

Segment rates: {5.00%, 6.00%, 7.00%}

Selected valuation results as of 1/1/2018:

Actuarial (market) value of assets	$56,400,000
Funding target	56,000,000
Target normal cost	2,200,000
Effective interest rate	6.00%

There were no shortfall amortization bases prior to 1/1/2018.

The plan sponsor does not use funding balances to satisfy the minimum required contribution.

$X = the smallest contribution made on 12/31/2018 that would satisfy the minimum required contribution for the 2018 plan year.

Question 37

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

(A) Less than $2,000,000

(B) $2,000,000 but less than $2,100,000

(C) $2,100,000 but less than $2,200,000

(D) $2,200,000 but less than $2,300,000

(E) $2,300,000 or more

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Data for Question 38 (2 points)

Type of plan: Multiemployer

Consider the following statements regarding plan amendments adopted in 2018:

I. A plan amendment that increases the unfunded past service liability due to benefit increases that are payable for life is amortized in the funding standard account over 15 years.

II. A plan amendment that increases the unfunded past service liability due to benefit increases that are payable for a period of only 13 years is amortized in the funding standard account over 13 years.

Question 38

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

(A) None

(B) I only

(C) II only

(D) I and II

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Data for Question 39 (4 points)

Type of plan: Multiemployer

Valuation date: 1/1/2018

Plan effective date: 1/1/2007

Normal retirement benefit:	1.0% of final three-year average compensation for each year of service before 1/1/2015, plus 1.5% of final three-year average compensation for each year of service after 12/31/2014

Actuarial cost method: Projected unit credit

Valuation interest rate: 7.0%

Rate of assumed compensation increases: 5.0% per year

Selected data for active participant Smith as of 1/1/2018:

Gender	Female
Date of birth	1/1/1958
Date of hire	1/1/1995
2017 compensation	$72,000

Smith's compensation in all years before 2017 was less than $72,000.

$X = the normal cost for Smith as of 1/1/2018.

Question 39

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

(A) Less than $7,000

(B) $7,000 but less than $9,500

(C) $9,500 but less than $12,000

(D) $12,000 but less than $14,500

(E) $14,500 or more

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Data for Question 40 (3 points)

Prefunding balance as of 1/1/2018: $600,000

Selected 2018 valuation information:

Required quarterly installments	$500,000
Effective interest rate	6.00%

The plan sponsor timely elected to use funding balances to meet the quarterly installments to the extent possible.

$X = the contribution to be paid on 7/15/2018 required to meet the second quarterly installment.

Question 40

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

(A) Less than $380,000

(B) $380,000 but less than $385,000

(C) $385,000 but less than $390,000

(D) $390,000 but less than $395,000

(E) $395,000 or more

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Data for Question 41 (4 points)

Type of plan: Multiemployer

Valuation date: 1/1/2018

Actuarial cost method: Frozen initial liability

Valuation interest rate: 7.00%

Assumed compensation increases: 3.00% per year

Selected information as of 1/1/2017:

Actuarial (market) value of assets	$2,500,000
Present value of future benefits	15,000,000
Unfunded liability	5,000,000
Present value of future compensation	60,000,000
Present value of 2017 compensation	8,000,000

All participants are under age 63, there are no participants in pay status, and there have been no new participants since 1/1/2017.

For 2017, all assumptions were realized.

A contribution of $750,000 was deposited on 6/30/2017 for the 2017 plan year.

$X = the normal cost as of 1/1/2018.

Question 41

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

(A) Less than $950,000

(B) $950,000 but less than $980,000

(C) $980,000 but less than $1,010,000

(D) $1,010,000 but less than $1,040,000

(E) $1,040,000 or more

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Data for Question 42 (4 points)

Valuation date: 1/1/2018

Segment rates: {5.00%, 6.00%, 7.00%}

The plan actuary is informed that the value of plan assets on 1/1/2018 was overstated.

Selected information as of 1/1/2018:

Actuarial (market) value of assets (before revision)	$564,000
Actuarial (market) value of assets (after revision)	514,000
Funding target	560,000
Target normal cost	22,000
Prefunding balance	0
Effective interest rate	6.00%

There were no shortfall amortization bases before 1/1/2018.

$X = the single contribution deposited on 7/1/2018 in the **smallest amount that satisfies the minimum funding standard** for the 2018 plan year, before the revision of the asset value.

$Y = the single contribution deposited on 7/1/2018 in the **smallest amount that satisfies the minimum funding standard** for the 2018 plan year, after the revision of the asset value.

Question 42

In what range is |***$X - $Y***|?

(A) Less than $6,000

(B) $6,000 but less than $8,000

(C) $8,000 but less than $10,000

(D) $10,000 but less than $12,000

(E) $12,000 or more

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Data for Question 43 (1 point)

Employer X, a member of a controlled group, sponsors a plan.

The minimum funding requirement for the plan year is not met.

Employer X is subject to a nondeductible excise tax.

Consider the following statement:

> All members of the controlled group of which Employer X is a member are jointly and severally liable for the tax imposed.

Question 43

Is the above statement true or false?

(A) True

(B) False

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Data for Question 44 (5 points)

A plan provides benefits only at normal retirement age and offers lump sum benefits.

Lump sums are calculated as the greater of the amount determined under IRC section 417(e) and the amount based on the IRC section 417(e) mortality table with a 5.00% interest rate.

Valuation segment rates for 2018: {5.00%, 6.00%, 7.00%}

IRC section 417(e) segment rates for 2018: {2.00%, 3.00%, 4.00%}

The plan actuary assumes that 75% of participants elect a lump sum and 25% of participants elect a single life annuity.

Selected information for active participant Smith as of 1/1/2018:

Gender	Male
Age	45
Monthly accrued benefit	$1,000
Status	Fully vested

Assumed probability of withdrawal at age 45: 5.00%

There are no pre-commencement decrements assumed other than withdrawal.

Age 65 immediate annuity factors using IRC section 417(e) mortality:

Interest rate	Factor
4.00%	13.31
5.00%	12.18
7.00%	10.35

$X = the portion of funding target for Smith due to the withdrawal decrement at age 45.

Question 44

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

(A) Less than $1,600

(B) $1,600 but less than $1,900

(C) $1,900 but less than $2,200

(D) $2,200 but less than $2,500

(E) $2,500 or more

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Data for Question 45 (3 points)

Valuation date: 1/1/2018

Normal retirement benefit: 1.50% of final year's compensation per year of service

Assumed compensation increases: 3.00% per year

Segment rates: {5.00%, 6.00%, 7.00%}

Selected data for participant Smith:

Gender	Male
Date of birth	1/1/1970
Date of hire	1/1/2000
2017 compensation	$100,000

Smith's compensation in all years before 2017 was less than $100,000.

$X = the sum of the funding target and target normal cost for Smith as of 1/1/2018.

Question 45

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

(A) Less than $97,000

(B) $97,000 but less than $103,000

(C) $103,000 but less than $109,000

(D) $109,000 but less than $115,000

(E) $115,000 or more

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Data for Question 46 (2 points)

A company with 80 employees sponsors a plan with 120 participants.

Non-eligible active employees	10
Active participants	70
Retirees	50

Consider the following statements regarding the actuary's choice of actuarial assumptions:

I. Only employees who have met the minimum participation requirements may be included in the actuarial valuation.

II. Other than prescribed assumptions, each assumption must be reasonable taking into account plan experience and reasonable expectations.

III. Since the plan has over 100 participants, pre-retirement mortality must be assumed.

Question 46

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 47 (3 points)

There was no funding shortfall for the 2017 plan year.

Prefunding balance as of 1/1/2018: $30,000

Selected information as of 1/1/2018:

Actuarial (market) value of assets	$812,000
Funding target	770,000
Target normal cost	185,000
Effective interest rate	5.25%

Rate of return on assets during 2018: 3.50%

No funding balance is applied to the 2018 minimum required contribution.

The plan sponsor makes a contribution of $250,000 on 7/1/2019 for the 2018 plan year and elects to add the total excess contribution amount to the prefunding balance.

$X = maximum permissible prefunding balance as of 1/1/2019.

Question 47

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

(A) Less than $85,000

(B) $85,000 but less than $95,000

(C) $95,000 but less than $105,000

(D) $105,000 but less than $115,000

(E) $115,000 or more

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Data for Question 48 (3 points)

Type of plan: Multiemployer

Valuation date: 1/1/2018

Actuarial cost method: Projected unit credit

Valuation interest rate: 7.50%

Actual rate of return for 2017: 5.00%

Funding standard account bases as of 1/1/2017:

	Years remaining	Outstanding balance
Combined charge base	4	$8,500,000
Actuarial gain	11	950,000
Actuarial loss	15	950,000

An application for a 5-year extension on the amortizations was not submitted.

$X = the value as of 1/1/2018 of all outstanding bases that existed before 2018.

Question 48

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

(A) Less than $6,400,000

(B) $6,400,000 but less than $6,500,000

(C) $6,500,000 but less than $6,600,000

(D) $6,600,000 but less than $6,700,000

(E) $6,700,000 or more

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Data for Question 49 (5 points)

Valuation date: 1/1/2018

Segment rates for 2018: {3.00%, 4.00%, 5.00%}

Prefunding balance as of 1/1/2018: $0

Actuarial value of assets as of 1/1/2018: $90,000

The plan was amended effective 1/1/2018.

Normal retirement benefit:

Before 1/1/2018	$75 per month per year of service for all years of service
After 12/31/2017	$100 per month per year of service for all years of service

Selected data for all participants:

	Smith	Jones
Gender	Male	Male
Date of birth	1/1/1983	1/1/1968
Date of hire	1/1/2017	1/1/2003
Status	Active	Active

The plan amendment is permitted to take effect under IRC section 436.

There were no shortfall amortization installments established before 2018.

$X = **minimum required contribution** for the 2018 plan year before the plan amendment.

$Y = **minimum required contribution** for the 2018 plan year after the plan amendment.

Question 49

In what range is |***$X - $Y***|?

(A) Less than $3,000

(B) $3,000 but less than $5,500

(C) $5,500 but less than $8,000

(D) $8,000 but less than $10,500

(E) $10,500 or more

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Data for Question 50 (3 points)

Prior to 2014, the plan was never in at-risk status.

At-risk status for plan years:

Plan year	Status
2014	At-risk
2015	Not at-risk
2016	At-risk
2017	At-risk
2018	At-risk

Selected information as of 1/1/2018:

Target normal cost without regard to at-risk assumptions	$600,000
At-risk target normal cost without regard to loading factors	700,000
Number of participants	600

$X = the target normal cost for the 2018 plan year.

Question 50

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

(A) Less than $650,000

(B) $650,000 but less than $660,000

(C) $660,000 but less than $670,000

(D) $670,000 but less than $680,000

(E) $680,000 or more

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<u>Data for Question 51</u> (4 points)

Normal retirement benefit: 2.00% of final three-year average compensation per year of service

Segment rates for 2018: {3.00%, 4.00%, 5.00%}

Selected data for participant Smith as of 1/1/2018:

Gender	Male
Age	60
Service	14
Status	Active
2015 compensation	$55,000
2016 compensation	58,000
2017 compensation	60,000

Smith's compensation in all years before 2015 was less than $55,000.

The plan actuary changed the assumed annual rate of compensation increases from 3.00% to 4.00% for the 1/1/2018 valuation.

$X = the target normal cost for participant Smith as of 1/1/2018 assuming 3.00% annual future compensation increases.

$Y = the target normal cost for participant Smith as of 1/1/2018 assuming 4.00% annual future compensation increases.

<u>Question 51</u>

In what range is **|*$Y* - *$X*|**?

(A) Less than $200

(B) $200 but less than $400

(C) $400 but less than $600

(D) $600 but less than $800

(E) $800 or more

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Data for Question 52 (2 points)

Funding balances as of 1/1/2018: $200,000

Consider the following:

I. On 4/15/2018, the plan sponsor elects to apply $10,000 toward the 2018 minimum required contribution.

II. On 6/15/2018, the plan sponsor elects to apply $5,000 toward the 2017 minimum required contribution.

III. On 8/15/2018, the plan sponsor elects to reduce the funding balances as of 1/1/2018 by $20,000.

Question 52

From first to last, in what order are these funding balance elections deemed to occur?

(A) I, II, III

(B) II, I, III

(C) II, III, I

(D) III, II, I

(E) The correct answer is not given by (A), (B), (C), or (D) above.

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Data for Question 53 (3 points)

Funding standard carryover balance as of 1/1/2018: $20,000

Prefunding balance as of 1/1/2018: $500,000

The plan sponsor is not required to make quarterly installments for 2018.

Valuation results as of 1/1/2018:

Target normal cost	$400,000
Shortfall amortization charge	100,000
Effective interest rate	6.00%

The plan sponsor contributes $100,000 on 12/31/2018 and elects to use funding balances to meet the remaining minimum funding requirement.

Actual rate of return on assets for 2018: 15.00%

$X = the prefunding balance as of 1/1/2019.

Question 53

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

(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 54 (1 point)

Type of plan: Multiemployer

Valuation date: 1/1/2018

The plan zone status for 2018 is critical.

The **smallest amount that satisfies the minimum funding standard** as of 12/31/2018 is $130,000.

The only contribution for the 2018 plan year was a contribution of $80,000 deposited on 12/31/2018.

Consider the following statement:

> The initial excise tax for failing to meet the 2018 minimum funding requirement is $2,500.

Question 54

Is the above statement true or false?

(A) True

(B) False

****END OF EXAMINATION****

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