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, 2012.

5. This examination consists of 53 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.

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. 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 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 side 1 of the answer sheet, space is provided to write and to code candidate information. Complete Blocks A through G as follows:

(a) in Block A, print your name and the name of this test center;
(b) 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;
(c) 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);
(d) 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;
(e) in Block E, code the examination that you are taking by blackening the oval to the left of “Course EA-2, Segment A.”
(f) in Block F, blacken the appropriate oval to indicate whether you are using a calculator; and
(g) 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."

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.
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>C</td>
<td>29</td>
<td>D</td>
</tr>
<tr>
<td>2</td>
<td>B</td>
<td>30</td>
<td>D</td>
</tr>
<tr>
<td>3</td>
<td>C</td>
<td>31</td>
<td>B</td>
</tr>
<tr>
<td>4</td>
<td>B</td>
<td>32</td>
<td>B</td>
</tr>
<tr>
<td>5</td>
<td>B</td>
<td>33</td>
<td>B</td>
</tr>
<tr>
<td>6</td>
<td>C</td>
<td>34</td>
<td>D</td>
</tr>
<tr>
<td>7</td>
<td>B</td>
<td>35</td>
<td>B</td>
</tr>
<tr>
<td>8</td>
<td>A</td>
<td>36</td>
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<td>B</td>
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<tr>
<td>10</td>
<td>B</td>
<td>38</td>
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</tr>
<tr>
<td>11</td>
<td>B</td>
<td>39</td>
<td>B</td>
</tr>
<tr>
<td>12</td>
<td>A</td>
<td>40</td>
<td>C</td>
</tr>
<tr>
<td>13</td>
<td>C</td>
<td>41</td>
<td>A</td>
</tr>
<tr>
<td>14</td>
<td>B</td>
<td>42</td>
<td>B</td>
</tr>
<tr>
<td>15</td>
<td>B</td>
<td>43</td>
<td>B</td>
</tr>
<tr>
<td>16</td>
<td>D</td>
<td>44</td>
<td>D</td>
</tr>
<tr>
<td>17</td>
<td>A</td>
<td>45</td>
<td>E</td>
</tr>
<tr>
<td>18</td>
<td>B</td>
<td>46</td>
<td>D</td>
</tr>
<tr>
<td>19</td>
<td>C</td>
<td>47</td>
<td>D</td>
</tr>
<tr>
<td>20</td>
<td>A</td>
<td>48</td>
<td>D</td>
</tr>
<tr>
<td>21</td>
<td>C</td>
<td>49</td>
<td>C</td>
</tr>
<tr>
<td>22</td>
<td>D</td>
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<td>23</td>
<td>A</td>
<td>51</td>
<td>D</td>
</tr>
<tr>
<td>24</td>
<td>B</td>
<td>52</td>
<td>B</td>
</tr>
<tr>
<td>25</td>
<td>B</td>
<td>53</td>
<td>B</td>
</tr>
<tr>
<td>26</td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>B</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**BEGINNING OF EXAMINATION**

Data for Question 1 (3 points)

Plan effective date: 1/1/2000.

Type of plan: Multiple employer.

The plan is maintained by 3 employers A, B, and C.

There are no funding balances at 1/1/2013.

Selected valuation results as of 1/1/2013:

<table>
<thead>
<tr>
<th></th>
<th>Employer A</th>
<th>Employer B</th>
<th>Employer C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actuarial (market) value of assets</td>
<td>$505,000</td>
<td>$620,000</td>
<td>$600,000</td>
</tr>
<tr>
<td>Funding target</td>
<td>500,000</td>
<td>600,000</td>
<td>700,000</td>
</tr>
<tr>
<td>Target normal cost</td>
<td>10,000</td>
<td>15,000</td>
<td>20,000</td>
</tr>
</tbody>
</table>

There are no shortfall bases before 1/1/2013.

7-year amortization factor for 2013: 6.0000.

**Question 1**

In what range is the **minimum required contribution** as of 1/1/2013?

(A) Less than $30,000

(B) $30,000 but less than $40,000

(C) $40,000 but less than $50,000

(D) $50,000 but less than $60,000

(E) $60,000 or more
Data for Question 2 (4 points)

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

Prefunding balance as of 1/1/2012 before any reductions in balance: $200,000.

Effective interest rate for 2012: 6%.

Actual rate of return on assets for 2012: 30%.

The 2011 AFTAP of 120% was certified on 7/30/2011.

No quarterly contributions are required for 2012.

Selected valuation results as of 1/1/2012:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actuarial (market) value of assets</td>
<td>$950,000</td>
</tr>
<tr>
<td>Funding target</td>
<td>1,000,000</td>
</tr>
<tr>
<td>Minimum required contribution</td>
<td>250,000</td>
</tr>
</tbody>
</table>

The plan sponsor elects to apply $50,000 of the prefunding balance to offset the minimum required contribution for 2012 on 1/1/2012.

The plan sponsor contributes $300,000 on 12/31/2012 allocated towards the remaining minimum required contribution for the 2012 plan year.

The plan provides for accelerated distributions.

$X is the maximum permissible prefunding balance as of 1/1/2013.

Question 2

In what range is $X?

(A)  Less than $220,000
(B)  $220,000 but less than $235,000
(C)  $235,000 but less than $250,000
(D)  $250,000 but less than $265,000
(E)  $265,000 or more
Data for Question 3 (3 points)

Asset valuation method: Average value on valuation date and the preceding valuation date.

Segment rates for 2012 and 2013: \{4.0\%, 5.0\%, 6.0\%\}.

Effective interest rate for 2012 and 2013: 5.0\%.

Assumed annual rate of return on assets for all years: 7.0\%.

Data for all assets held by the plan:

<table>
<thead>
<tr>
<th></th>
<th>Cost basis</th>
<th>Fair market value as of</th>
<th>2012 expenses paid on</th>
<th>Fair market value as of</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mutual Fund A</td>
<td>$3,500,000</td>
<td>$4,000,000</td>
<td>$8,000</td>
<td>$3,500,000</td>
</tr>
<tr>
<td>Mutual Fund B</td>
<td>300,000</td>
<td>300,000</td>
<td>6,000</td>
<td>750,000</td>
</tr>
</tbody>
</table>

A contribution of $500,000 was deposited into Mutual Fund A on 12/31/2012.

A benefit payment of $100,000 was made from Mutual Fund B on 12/31/2012.

Question 3

In what range is the actuarial value of assets as of 1/1/2013?

(A) Less than $4,300,000

(B) $4,300,000 but less than $4,450,000

(C) $4,450,000 but less than $4,600,000

(D) $4,600,000 but less than $4,750,000

(E) $4,750,000 or more
Data for Question 4 (4 points)

Segment rates for 2012: {2.0%, 4.0%, 6.0%}.

Segment rates for 2013: {3.0%, 5.0%, 6.0%}.

There are no funding balances at 1/1/2013.

Selected valuation results as of 1/1/2013:

- Actuarial (market) value of assets: $2,700,000
- Funding target: 3,000,000
- Target normal cost: 5,000

The plan sponsor was granted a funding waiver on the entire minimum required contribution for 2012 in the amount of $25,000.

The first funding waiver was granted to the plan sponsor for the 2012 plan year. There are no shortfall bases for 2012 or prior plan years.

7-year amortization factor for 2013: 6.2468.

$X$ is the maximum funding waiver permitted under IRC section 412(c) for 2013.

Question 4

In what range is $X$?

(A) Less than $46,500
(B) $46,500 but less than $49,000
(C) $49,000 but less than $51,500
(D) $51,500 but less than $54,000
(E) $54,000 or more
Data for Question 5 (3 points)

Plan effective date: 7/1/1990.

Plan year: 7/1 to 6/30.

Normal retirement benefit: 1.2% of final average compensation for each year of service.

Final average compensation: Average of highest 5 consecutive plan year compensation of the last 10 years.

Data for participant Smith:

<table>
<thead>
<tr>
<th>Date of hire</th>
<th>7/1/2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of retirement</td>
<td>7/1/2012</td>
</tr>
</tbody>
</table>

Annual compensation:

<table>
<thead>
<tr>
<th>Period</th>
<th>Compensation</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/1/2005 – 6/30/2006</td>
<td>$217,000</td>
</tr>
<tr>
<td>7/1/2006 – 6/30/2007</td>
<td>240,000</td>
</tr>
<tr>
<td>7/1/2007 – 6/30/2008</td>
<td>250,000</td>
</tr>
<tr>
<td>7/1/2008 – 6/30/2009</td>
<td>255,000</td>
</tr>
<tr>
<td>7/1/2009 – 6/30/2010</td>
<td>230,000</td>
</tr>
<tr>
<td>7/1/2010 – 6/30/2011</td>
<td>210,000</td>
</tr>
<tr>
<td>7/1/2011 – 6/30/2012</td>
<td>205,000</td>
</tr>
</tbody>
</table>

Question 5

In what range is Smith’s annual accrued benefit as of 6/30/2012?

(A) Less than $18,500

(B) $18,500 but less than $19,000

(C) $19,000 but less than $19,500

(D) $19,500 but less than $20,000

(E) $20,000 or more
Data for Question 6 (4 points)

Plan effective date: 1/1/2012.

Type of plan: Multiemployer.

Normal retirement benefit: 25% of final year compensation.

Actuarial cost method: Aggregate.

Selected actuarial assumptions:

<table>
<thead>
<tr>
<th>Interest rate</th>
<th>6.0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compensation increases</td>
<td>4.0%</td>
</tr>
</tbody>
</table>

Valuation data for each participant as of 1/1/2013:

<table>
<thead>
<tr>
<th>Date of birth</th>
<th>1/1/1955</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012 compensation</td>
<td>$31,200</td>
</tr>
</tbody>
</table>

There are 1,000 participants in the plan on 1/1/2013.

The minimum required contribution for 2012 of $10,600,000 was made on 12/31/2012.

Selected annuity factor:

\[ a_{65}^{(12)} = 10.00 \]

**Question 6**

In what range is the normal cost as of 1/1/2013?

(A) Less than $8,000,000

(B) $8,000,000 but less than $8,500,000

(C) $8,500,000 but less than $9,000,000

(D) $9,000,000 but less than $9,500,000

(E) $9,500,000 or more
USE THIS PAGE FOR YOUR SCRATCH WORK

EXTRA BLANK PAPER IS PROVIDED AT THE END OF THE EXAM BOOK
Data for Question 7 (3 points)

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

Prefunding balance as of 1/1/2012: $50,000.

Selected information:

<table>
<thead>
<tr>
<th></th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effective interest rate</td>
<td>7.00%</td>
<td>7.00%</td>
</tr>
<tr>
<td>Actuarial (market) value of assets, 1/1</td>
<td>$460,000</td>
<td>$473,000</td>
</tr>
<tr>
<td>Minimum required contribution, 1/1</td>
<td>35,000</td>
<td>90,000</td>
</tr>
<tr>
<td>Contributions deposited 12/31</td>
<td>40,000</td>
<td>150,000</td>
</tr>
<tr>
<td>Benefit payments paid 12/31</td>
<td>50,000</td>
<td>55,000</td>
</tr>
</tbody>
</table>

There are no other cash flows into or out of the plan during 2012 and 2013.

The employer does not elect to use the prefunding balance to offset the minimum required contribution.

Question 7

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

(A) Less than $55,025
(B) $55,025 but less than $55,525
(C) $55,525 but less than $56,025
(D) $56,025 but less than $56,525
(E) $56,525 or more
Consider the following statement:

Plan amendments permitted under IRC section 436(c) adopted on or before the valuation date and effective at any time during the plan year must be reflected in the valuation for the plan year.

Question 8

Is the above statement true or false?

(A) True

(B) False
Data for Question 9 (1 point)

Type of plan: Multiemployer.

Consider the following statement:

Pursuant to IRC section 4971, employers that fail to meet their minimum funding requirements will incur a 10% excise tax.

Question 9

Is the above statement true or false?

(A) True

(B) False
Data for Question 10 (1 point)

Consider the following statement relative to setting actuarial assumptions:

For purposes of determining minimum required contributions, no preretirement mortality assumptions are required for plans with fewer than 500 participants and beneficiaries not yet in pay status.

Question 10

Is the above statement true or false?

(A) True

(B) False
Consider the following statement relative to setting actuarial assumptions:

The IRS must approve any change in actuarial assumptions if the total unfunded vested benefits of all plans in the employer's controlled group are in excess of $50,000,000, determined as of the close of the prior plan year.

Question 11

Is the above statement true or false?

(A) True

(B) False
Data for Question 12 (4 points)

Type of plan: Multiemployer.

Actuarial cost method: Entry age normal.

Valuation interest rate: 7.0%.

Credit balance as of 12/31/2010: $350,000.

Selected valuation results as of:

<table>
<thead>
<tr>
<th></th>
<th>1/1/2011</th>
<th>1/1/2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actuarial (market) value of assets</td>
<td>$9,500,000</td>
<td>$11,300,000</td>
</tr>
<tr>
<td>Accrued liability</td>
<td>10,000,000</td>
<td>12,250,000</td>
</tr>
<tr>
<td>Normal cost</td>
<td>1,500,000</td>
<td>1,600,000</td>
</tr>
<tr>
<td>Total amortization charges</td>
<td>200,000</td>
<td>225,000</td>
</tr>
<tr>
<td>Total amortization credits</td>
<td>150,000</td>
<td>150,000</td>
</tr>
</tbody>
</table>

Contributions made for the 2011 plan year on 12/31/2011: $1,250,000.

Contributions made for the 2012 plan year on 12/31/2012: $1,850,000.

Question 12

In what range is the credit balance as of 12/31/2012?

(A) Less than $25,000
(B) $25,000 but less than $50,000
(C) $50,000 but less than $75,000
(D) $75,000 but less than $100,000
(E) $100,000 or more
Data for Question 13 (4 points)

Benefit formula: 2% of highest 3-year average compensation for each year of service.

Assumed compensation increase: 3%.

There are no assumed pre-retirement decrements other than death.

Selected information for participant Smith:

- Date of birth: 1/1/1962
- Date of hire: 1/1/2002
- Compensation history:
  - 2009: $90,000
  - 2010: $95,000
  - 2011: $100,000
  - 2012: $115,000

Selected commutation functions:

<table>
<thead>
<tr>
<th>Age</th>
<th>Segment 2</th>
<th>Segment 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$N^{(12)}$</td>
<td>$D_x$</td>
</tr>
<tr>
<td>50</td>
<td>75,939</td>
<td>5,336</td>
</tr>
<tr>
<td>51</td>
<td>70,745</td>
<td>5,028</td>
</tr>
<tr>
<td>65</td>
<td>23,241</td>
<td>2,103</td>
</tr>
<tr>
<td>66</td>
<td>21,202</td>
<td>1,965</td>
</tr>
<tr>
<td>70</td>
<td>14,326</td>
<td>1,479</td>
</tr>
<tr>
<td>71</td>
<td>12,896</td>
<td>1,372</td>
</tr>
</tbody>
</table>

$X = \text{the funding target as of 1/1/2013 based on Smith’s expected compensation for 2012.}$

$Y = \text{the funding target as of 1/1/2013 based on Smith’s actual compensation for 2012.}$

Question 13

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

(A) Less than $3,000
(B) $3,000 but less than $3,500
(C) $3,500 but less than $4,000
(D) $4,000 but less than $4,500
(E) $4,500 or more
Data for Question 14 (3 points)

Valuation date: 1/1/2013.

Plan type: Statutory hybrid (cash balance).

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

Benefits are assumed to be paid at normal retirement in the form of a lump sum.

Assumed cash balance crediting interest rate: 5%.

Segment rates for 1/1/2013: {5.0%, 6.0%, 6.5%}.

Selected information for participant Smith:

- Date of birth 1/1/1963
- Annual cash balance pay credit $5,000

Question 14

In what range is the target normal cost as of 1/1/2013 for Smith?

(A) Less than $4,000
(B) $4,000 but less than $4,250
(C) $4,250 but less than $4,500
(D) $4,500 but less than $4,750
(E) $4,750 or more
Data for Question 15 (1 point)

Consider the following statement:

A Schedule SB does not have to be completed for a defined benefit plan that is eligible to file a Form 5500-EZ.

Question 15

Is the above statement true or false?

(A) True

(B) False
Data for Question 16 (5 points)

Funding standard carryover balance as of 1/1/2012: $0.
 Prefunding balance as of 1/1/2012: $11,150.
 Effective interest rate for 2011: 6.1%.
 Effective interest rate for 2012: 3.1%.
 Minimum required contribution as of 1/1/2011: $50,000.
 Minimum required contribution as of 1/1/2012: $50,000.
 Quarterly installments are required for the 2012 plan year.

On 4/15/2012 the sponsor elected to apply the prefunding balance to the 2012 minimum required contribution.

The employer makes a single contribution of $X on 9/15/2013 in the smallest amount that satisfies the minimum funding standard for 2012.

Question 16
In what range is $X?

(A) Less than $35,000
(B) $35,000 but less than $38,000
(C) $38,000 but less than $41,000
(D) $41,000 but less than $44,000
(E) $44,000 or more
Data for Question 17 (2 points)

Valuation date: 1/1/2013.

Selected information as of 1/1/2013:

- Funding standard carryover balance: $18,000,000
- Prefunding balance: 4,000,000
- Funding target: 65,000,000
- Actuarial (market) value of assets: 68,000,000

The plan offers a lump sum option.

The 2012 AFTAP was certified at 91% on 8/1/2012.

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

In order to avoid benefit restrictions for the 2013 plan year when the 2013 AFTAP is certified, the funding standard carryover balance is automatically reduced by $X.

Question 17

What is $X$?

(A) $0

(B) $1 but less than $1,800,000

(C) $1,800,000 but less than $3,600,000

(D) $3,600,000 but less than $5,400,000

(E) $5,400,000 or more
Data for Question 18 (4 points)

Plan effective date: 1/1/1987.

Type of plan: Multiemployer.

Actuarial cost method: Frozen initial liability.

Valuation interest rate: 7.0%.

Initial unfunded accrued liability (30-year amortization period): $50,000,000.

Credit balance as of 12/31/2012: $700,000.

Selected valuation results as of 1/1/2013:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present value of future benefits</td>
<td>$350,000,000</td>
</tr>
<tr>
<td>Actuarial (market) value of assets</td>
<td>$300,000,000</td>
</tr>
<tr>
<td>Present value of future compensation</td>
<td>$750,000,000</td>
</tr>
<tr>
<td>Plan compensation</td>
<td>$75,000,000</td>
</tr>
</tbody>
</table>

The funding method used to determine the minimum funding requirement is changed to the level percent of compensation aggregate funding method effective with the 1/1/2013 valuation.

$X$ is the smallest amount that satisfies the minimum funding standard before the method change for the 2013 plan year as of 12/31/2013.

$Y$ is the smallest amount that satisfies the minimum funding standard after the method change for the 2013 plan year as of 12/31/2013.

Question 18

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

(A) Less than $2,500,000
(B) $2,500,000 but less than $2,650,000
(C) $2,650,000 but less than $2,800,000
(D) $2,800,000 but less than $2,950,000
(E) $2,950,000 or more
Data for Question 19 (3 points)

Effective date: 1/1/2004.

Type of plan: Multiemployer.

Annual normal retirement benefit: $4,000 for each year of service, payable monthly.

Early retirement benefit: Accrued benefit reduced by 3% for each year prior to age 65.

Actuarial cost method: Unit credit.

Pre-retirement decrements: None.

Valuation interest rate: 6.0%.

Data for plan participant Smith:

Date of birth: 1/1/1958
Date of hire: 1/1/2004
Date of retirement: 1/1/2013

Selected commutation functions:

<table>
<thead>
<tr>
<th>Age</th>
<th>$N_x^{(12)}$</th>
<th>$D_x$</th>
</tr>
</thead>
<tbody>
<tr>
<td>55</td>
<td>508,056</td>
<td>38,635</td>
</tr>
<tr>
<td>65</td>
<td>220,966</td>
<td>20,301</td>
</tr>
</tbody>
</table>

$X$ is the absolute value of the gain or loss attributable to Smith’s retirement on 1/1/2013.

Question 19

In what range is $X$?

(A) Less than $75,000
(B) $75,000 but less than $100,000
(C) $100,000 but less than $125,000
(D) $125,000 but less than $150,000
(E) $150,000 or more
Data for Question 20 (4 points)

Type of plan: Multiemployer.

Actuarial cost method: Unit credit.

Normal retirement benefit: $120,000 per year, payable monthly.

Pre-retirement death benefit lump sum: $120,000, payable immediately upon death.

The plan does not allow for early retirement.

There are no pre-retirement decrements other than death at ages through age 64.

Deaths are assumed to occur at the beginning of the year.

Valuation interest rate: 6.0%.

Data for plan participant Smith:

<table>
<thead>
<tr>
<th>Date of birth</th>
<th>1/1/1950</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of hire</td>
<td>1/1/1996</td>
</tr>
</tbody>
</table>

Selected commutation functions and mortality rates:

<table>
<thead>
<tr>
<th>Age</th>
<th>$N_s^{(12)}$</th>
<th>$D_x$</th>
<th>$q_x$</th>
</tr>
</thead>
<tbody>
<tr>
<td>63</td>
<td>264,562</td>
<td>23,213</td>
<td>0.0083</td>
</tr>
<tr>
<td>64</td>
<td>242,034</td>
<td>21,718</td>
<td>0.0091</td>
</tr>
<tr>
<td>65</td>
<td>220,966</td>
<td>20,301</td>
<td>0.0101</td>
</tr>
</tbody>
</table>

Question 20

In what range is the accrued liability for Smith as of 1/1/2013?

(A) Less than $1,145,000
(B) $1,145,000 but less than $1,150,000
(C) $1,150,000 but less than $1,155,000
(D) $1,155,000 but less than $1,160,000
(E) $1,160,000 or more
Data for Question 21 (4 points)

The asset valuation method is changed effective 1/1/2013.

Selected valuation results as of 1/1/2013:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Funding standard carryover balance</td>
<td>$0</td>
</tr>
<tr>
<td>Prefunding balance</td>
<td>4,000,000</td>
</tr>
<tr>
<td>Actuarial value of assets:</td>
<td></td>
</tr>
<tr>
<td>Before change in method</td>
<td>50,000,000</td>
</tr>
<tr>
<td>After change in method</td>
<td>47,000,000</td>
</tr>
<tr>
<td>Funding target</td>
<td>60,000,000</td>
</tr>
<tr>
<td>Target normal cost</td>
<td>1,300,000</td>
</tr>
</tbody>
</table>

7-year shortfall amortization factor for 2013: 5.9991.

The plan was exempt from establishing a shortfall amortization base in all plan years prior to 2013.

The plan offers a lump sum payment option.

$X = \text{Shortfall amortization installment for 2013 if asset method is not changed.}$

$Y = \text{Shortfall amortization installment for 2013 after change in asset method.}$

Question 21

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

(A) Less than $500,000

(B) $500,000 but less than $750,000

(C) $750,000 but less than $1,000,000

(D) $1,000,000 but less than $1,250,000

(E) $1,250,000 or more
Data for Question 22 (4 points)

No shortfall amortization bases were established prior to 1/1/2012.

Segment rates for 1/1/2012 and 1/1/2013: {5.0%, 6.0%, 7.0%}.

Selected information as of:

<table>
<thead>
<tr>
<th></th>
<th>1/1/2012</th>
<th>1/1/2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Funding standard carryover balance</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Prefunding balance</td>
<td>200,000</td>
<td>225,000</td>
</tr>
<tr>
<td>Actuarial (market) value of assets</td>
<td>2,200,000</td>
<td>2,400,000</td>
</tr>
<tr>
<td>Funding target</td>
<td>2,100,000</td>
<td>2,200,000</td>
</tr>
<tr>
<td>Target normal cost</td>
<td>85,000</td>
<td>95,000</td>
</tr>
</tbody>
</table>

The plan sponsor elected to use the prefunding balance to offset the 2012 and 2013 minimums.

7-year shortfall amortization factor: 5.9982.
6-year shortfall amortization factor: 5.2932.

$X = \text{the minimum required contribution} \text{ for the 2013 plan year.}$

Question 22

In what range is $X$?

(A) Less than $90,000
(B) $90,000 but less than $95,000
(C) $95,000 but less than $100,000
(D) $100,000 but less than $105,000
(E) $105,000 or more
Data for Question 23 (4 points)

Effective date: 1/1/2005.

Normal retirement benefit: 2.5% of final year compensation for each year of service.

Early retirement age: 62.

Early retirement benefit: Accrued benefit reduced by 4.0% for each year prior to age 65.

Actuarial assumptions for 1/1/2013 valuation:

<table>
<thead>
<tr>
<th>Segment interest rates</th>
<th>{6.0%, 7.0%, 8.0%}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compensation increases</td>
<td>3.0%</td>
</tr>
<tr>
<td>Probability of retirement</td>
<td></td>
</tr>
<tr>
<td>Age 62</td>
<td>40%</td>
</tr>
<tr>
<td>Age 65</td>
<td>100%</td>
</tr>
</tbody>
</table>

Data for plan participant Smith as of 1/1/2013:

<table>
<thead>
<tr>
<th>Date of birth</th>
<th>1/1/1983</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of hire</td>
<td>1/1/2006</td>
</tr>
<tr>
<td>2012 compensation</td>
<td>$125,000</td>
</tr>
</tbody>
</table>

Select annuity factors:

<table>
<thead>
<tr>
<th>Interest rate</th>
<th>$\ddot{a}_{62}^{(12)}$</th>
<th>$\ddot{a}_{65}^{(12)}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.0%</td>
<td>11.85</td>
<td>11.09</td>
</tr>
<tr>
<td>7.0%</td>
<td>10.89</td>
<td>10.26</td>
</tr>
<tr>
<td>8.0%</td>
<td>10.07</td>
<td>9.53</td>
</tr>
</tbody>
</table>

Question 23

In what range is the target normal cost for Smith as of 1/1/2013?

(A) Less than $2,800
(B) $2,800 but less than $3,200
(C) $3,200 but less than $3,600
(D) $3,600 but less than $4,000
(E) $4,000 or more

Exam EA-2 (Segment A) Fall 2012 - 45 - GO ON TO NEXT PAGE
Pension
Data for Question 24 (5 points)

Effective date: 1/1/2002.

Type of plan: Multiemployer.

Normal retirement benefit: 1.5% of final year compensation for each year of service.
Early retirement age: 62.
Early retirement benefit: Accrued benefit reduced by 5.0% for each year prior to age 65.

Actuarial cost method: Projected unit credit.

Actuarial assumptions for 1/1/2013 valuation:

- Interest rate: 7.0%
- Compensation increases: 3.0%
- Probability of retirement:
  - Age 62: 50%
  - Age 63: 25%
  - Age 64: 0%
  - Age 65: 100%

Data for participant Smith as of 1/1/2013:
- Date of birth: 1/1/1953
- Date of hire: 1/1/2003
- 2012 compensation: $101,000

Select annuity factors:

\[
\begin{array}{cccc}
\ddot{a}_{62}^{(12)} & \ddot{a}_{63}^{(12)} & \ddot{a}_{64}^{(12)} & \ddot{a}_{65}^{(12)} \\
10.90 & 10.70 & 10.50 & 10.30 \\
\end{array}
\]

Question 24

In what range is the sum of Smith’s accrued liability and normal cost as of 1/1/2013?

(A) Less than $140,000
(B) $140,000 but less than $150,000
(C) $150,000 but less than $160,000
(D) $160,000 but less than $170,000
(E) $170,000 or more
Consider the following statement for the 2013 plan year:

A plan is exempt from setting up a new shortfall amortization base only when plan assets offset by a plan’s funding standard carryover balance and prefunding balance are greater than or equal to the plan’s funding target.

Question 25

Is the above statement true or false?

(A) True

(B) False
Data for Question 26 (3 points)

Type of plan: Multiemployer.

Valuation date: 1/1/2013.

Actuarial cost method: Aggregate.

Valuation interest rate: 6%.

Credit balance as of 12/31/2012: $300,000.

Selected valuation results as of 1/1/2013:

- Present value of projected benefits: $10,000,000
- Present value of future working years: 8,000
- Actuarial (market) value of assets: $4,000,000

Participants as of 1/1/2013:

- Active: 1,000
- Vested terminated: 200
- Retired: 100

For the 2013 plan year, a contribution of $500,000 was made on 7/1/2013 and a contribution of $200,000 was made on 7/1/2014.

Question 26

In what range is the credit balance at 12/31/2013?

(A) Less than $185,000
(B) $185,000 but less than $190,000
(C) $190,000 but less than $195,000
(D) $195,000 but less than $200,000
(E) $200,000 or more
Data for Question 27 (3 points)

Selected information as of 1/1/2013:

- Funding standard carryover balance: $3,700,000
- Prefunding balance: 0
- Market value of assets: 46,500,000
- Actuarial value of assets: 46,200,000
- Funding target: 45,700,000
- Target normal cost: 6,900,000
- Prior year amortization payments: 110,000
- Present value of prior years’ outstanding bases: 400,000
- 7-year shortfall amortization factor: 5.9982

The employer makes a single contribution of $X on 1/1/2013 in the smallest amount that satisfies the minimum funding standard for the 2013 plan year.

Question 27

In what range is $X?

(A) Less than $3,100,000
(B) $3,100,000 but less than $3,200,000
(C) $3,200,000 but less than $3,300,000
(D) $3,300,000 but less than $3,400,000
(E) $3,400,000 or more
Data for Question 28 (4 points)

A defined benefit plan requires mandatory employee contributions.

Selected information as of 1/1/2013:

- Funding standard carryover balance: $500,000
- Prefunding balance: 0
- Actuarial value of assets: 95,700,000
- Funding target: 95,759,000
- Present value of benefits expected to accrue during year: 2,200,000
- Expenses expected to be paid from plan assets during the year: 0
- Present value of mandatory employee contributions expected to be received during year: 750,000
- Present value of remaining shortfall amortizations from prior years: 0
- Effective interest rate: 6.00%
- 7-year shortfall amortization factor: 5.7800

No quarterly contributions were required for 2013.

A contribution of $100,000 for 2013 was made on 7/1/2013.

The employer makes an additional contribution of $\text{X}$ on 12/31/2013 in the smallest amount that satisfies the minimum funding standard.

Question 28

In what range is $\text{X}$?

(A) Less than $1,000,000
(B) $1,000,000 but less than $1,200,000
(C) $1,200,000 but less than $1,400,000
(D) $1,400,000 but less than $1,600,000
(E) $1,600,000 or more
Data for Question 29 (3 points)

A plan was amended to freeze benefit accruals effective on 1/1/2013.

Selected information as of 1/1/2013:

- Funding standard carryover balance: $0
- Prefunding balance: 12,000
- Market value of assets: 920,000
- Actuarial value of assets: 880,000
- Funding target: 1,140,000
- Plan-related expenses paid 1/1/2013 from plan assets: 9,000
- Effective interest rates: 6.0%
- 7-year shortfall amortization factor: 5.9782

No shortfall amortization bases were established prior to 2013.

The employer makes a single contribution of $X on 1/1/2013 **in the smallest amount that satisfies the minimum funding standard** for the 2013 plan year.

**Question 29**

In what range is $X$?

- (A) Less than $34,000
- (B) $34,000 but less than $37,500
- (C) $37,500 but less than $41,000
- (D) $41,000 but less than $44,500
- (E) $44,500 or more
Data for Question 30 (3 points)

Plan effective date: 1/1/2008.

Normal retirement benefit: 5% of final compensation per year of service.

Early retirement age: 55.

Early retirement benefit: Accrued benefit, reduced 3% for each year prior to age 65.

IRC section 415 dollar maximum for 2013: $200,000.

Plan actuarial equivalence:
- Interest rate: 6.0%
- Mortality: Applicable Mortality Table

Data for participant Smith:
- Date of birth: 1/1/1958
- Date of hire: 1/1/2000
- Date of retirement: 1/1/2013
- 2012 compensation: $125,000
- High 3-year average compensation: 128,000

Selected commutation functions (based on Applicable Mortality Table):

<table>
<thead>
<tr>
<th>Age</th>
<th>5%</th>
<th>6%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$N_x^{(12)}$</td>
<td>$D_x$</td>
</tr>
<tr>
<td>55</td>
<td>989,900</td>
<td>66,554</td>
</tr>
<tr>
<td>62</td>
<td>598,284</td>
<td>46,091</td>
</tr>
<tr>
<td>65</td>
<td>470,592</td>
<td>38,961</td>
</tr>
</tbody>
</table>

Question 30

In what range is the annual benefit payable to Smith beginning on 1/1/2013?

(A) Less than $39,000

(B) $39,000 but less than $45,000

(C) $45,000 but less than $51,000

(D) $51,000 but less than $57,000

(E) $57,000 or more
Data for Question 31 (2 points)

Consider the following statements with respect to a multiemployer plan:

I. The plan is in critical status if it has a funding deficiency for the current year.

II. A plan sponsor of a plan that is in critical status must adopt a funding improvement plan not later than 240 days after the actuarial certification that the plan is in critical status.

III. No later than 90 days after the beginning of the plan year, the plan actuary must certify whether or not the plan is in endangered status and whether or not the plan is in critical status.

Question 31

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

(A) I and II only

(B) I and III only

(C) II and III only

(D) I, II and III

(E) The correct answer is not given by (A), (B), (C), or (D) above.
Data for Question 32 (4 points)

Plan effective date: 1/1/2012.

Type of plan: Multiemployer.

Actuarial cost method: Aggregate.

Plan formula: 50% of final compensation.

Selected assumptions:
- Valuation interest rate: 7.0%
- Compensation increases: 4.0%

Data for each participant as of 1/1/2012:
- Date of birth: 1/1/1962
- 2011 compensation used for the 2012 valuation: $43,000
- Compensation increase during 2012: 8.0%

There are 100 participants in the plan on 1/1/2012.

Selected annuity factor:
\[ a_{65}^{(12)} = 8.33 \]

The plan sponsor contributed the minimum required contribution for the 2012 plan year on 12/31/2012.

Question 32

In what range is the normal cost for 2013 as of 1/1/2013?

(A) Less than $1,000,000

(B) $1,000,000 but less than $1,100,000

(C) $1,100,000 but less than $1,200,000

(D) $1,200,000 but less than $1,300,000

(E) $1,300,000 or more
Data for Question 33 (1 point)

Valuation date: 1/1/2013.

The funding target and target normal cost are determined using the monthly corporate bond yield curve described in IRC section 430(h)(2)(D)(ii).

Actuarial value of assets is calculated as of 1/1/2013 using the average of the values on the valuation date and the two prior valuation dates.

Consider the following statement with respect to the asset valuation method:

The assumed rate of return for periods within the 2012 plan year must be limited to the September 2011 third segment rate.

Question 33

Is the above statement true or false?

(A) True

(B) False
USE THIS PAGE FOR YOUR SCRATCH WORK

EXTRA BLANK PAPER IS PROVIDED AT THE END OF THE EXAM BOOK
Data for Question 34 (3 points)

Type of plan: Multiemployer.

Actuarial cost method: Frozen initial liability.

Valuation interest rate: 7.0%.

Credit balance as of December 31, 2011: $0.

Selected valuation results as of 1/1/2012:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unfunded accrued liability outstanding balance</td>
<td>$1,600,000</td>
</tr>
<tr>
<td>Normal cost</td>
<td>300,000</td>
</tr>
</tbody>
</table>

Selected valuation results as of 1/1/2013:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market value of assets</td>
<td>$8,400,000</td>
</tr>
<tr>
<td>Actuarial value of assets</td>
<td>8,000,000</td>
</tr>
<tr>
<td>Present value of future benefits</td>
<td>11,500,000</td>
</tr>
<tr>
<td>Present value of future compensation</td>
<td>17,000,000</td>
</tr>
<tr>
<td>Total compensation for participants</td>
<td>1,700,000</td>
</tr>
</tbody>
</table>

The only contribution for the 2012 plan year of $500,000 was made on 4/1/2012.

Question 34

In what range is the normal cost as of 1/1/2013?

(A) Less than $167,000

(B) $167,000 but less than $182,000

(C) $182,000 but less than $197,000

(D) $197,000 but less than $212,000

(E) $212,000 or more
Data for Question 35 (3 points)

Type of plan: Multiemployer.

Assumed rate of return on assets: 7%.

Contributions for 2011: $0.

Contributions for 2012: $90,000 paid 8/1/2012.
                   $10,000 paid 4/1/2013.

Actuarial (market) value of assets, excluding receivable contributions:

<table>
<thead>
<tr>
<th></th>
<th>1/1/2012</th>
<th>1/1/2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\text{value}$</td>
<td>$870,000</td>
<td>$1,014,000</td>
</tr>
</tbody>
</table>

Data for all retired participants:

<table>
<thead>
<tr>
<th></th>
<th>Smith</th>
<th>Jones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of retirement</td>
<td>8/1/2010</td>
<td>5/1/1998</td>
</tr>
<tr>
<td>Monthly benefit</td>
<td>$1,000</td>
<td>$500</td>
</tr>
</tbody>
</table>

There were no deaths or new retirements during 2012.

$\text{X}$ is the gain or loss at 1/1/2013 due to investment earnings during 2012.

Question 35

In what range is $\text{X}$?

(A) Gain of $10,000 or more
(B) Gain of less than $10,000
(C) No gain or loss
(D) Loss of less than $10,000
(E) Loss of $10,000 or more
Data for Question 36 (3 points)

Plan effective date: 1/1/2007.

Valuation date: 1/1/2013.

Funding standard carryover balance as of 1/1/2013: $100,000.

Prefunding balance as of 1/1/2013: $300,000.

History of annuity purchases:

<table>
<thead>
<tr>
<th></th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly compensated employees</td>
<td>$2,000,000</td>
<td>$3,350,000</td>
</tr>
<tr>
<td>All employees</td>
<td>2,850,000</td>
<td>3,500,000</td>
</tr>
</tbody>
</table>

Funding target as of 1/1/2013: $4,800,000.

The percentage used to determine whether funding balances can be applied to the minimum required contribution for the 2014 plan year is 97.91%.

Question 36

In what range is the AFTAP for 2013?

(A) Less than 98%
(B) 98% but less than 100%
(C) 100% but less than 102%
(D) 102% but less than 104%
(E) 104% or more
Data for Question 37 (3 points)

Valuation date: 1/1/2013.

Normal retirement benefit: $120 per month for each year of service.

Funding standard carryover balance as of 1/1/2013: $8,000.

Prefunding balance as of 1/1/2013: $1,000.

Segment rates for 2013: {4.0%, 5.0%, 6.0%}.

Actuarial (market) value of assets as of 1/1/2013: $41,000.

No shortfall amortization bases were established prior to 2013.

Selected data for sole participant Smith:

<table>
<thead>
<tr>
<th>Date of birth</th>
<th>1/1/1973</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of hire</td>
<td>1/1/2003</td>
</tr>
</tbody>
</table>

Selected annuity factors at age 65:

<table>
<thead>
<tr>
<th>4%</th>
<th>5%</th>
<th>6%</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.73</td>
<td>12.57</td>
<td>11.56</td>
</tr>
</tbody>
</table>

7-year shortfall amortization factor for 2013: 6.1596.

Question 37

In what range is the **minimum required contribution** as of 1/1/2013?

(A) Less than $1,500
(B) $1,500 but less than $4,000
(C) $4,000 but less than $6,500
(D) $6,500 but less than $9,000
(E) $9,000 or more
Data for Question 38 (1 point)

Plan effective date: 5/1/2008.

A short plan year applies for the period beginning 5/1/2012 and ending 12/31/2012.

Quarterly installments are required for the plan year beginning 1/1/2013 (2013 plan year).

Consider the following statement:

The calculation of the quarterly required installment for the 2013 plan year is based solely on the minimum required contribution for the 2013 plan year.

Question 38

Is the above statement true or false?

(A) True

(B) False
Data for Question 39 (3 points)

Plan effective date: 1/1/2003.

Normal form of payment: 15-year certain and life annuity.

Normal retirement benefit: 1.25% of final 3-year average compensation for each year of service.

Data for participant Smith:

<table>
<thead>
<tr>
<th>Date of birth</th>
<th>1/1/1955</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of hire</td>
<td>1/1/2007</td>
</tr>
<tr>
<td>Compensation for all years</td>
<td>$75,000</td>
</tr>
</tbody>
</table>

Smith is not a key employee.

Plan actuarial equivalence annuity factors at age 65:

<table>
<thead>
<tr>
<th>Single life annuity</th>
<th>10.86</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-year certain and life annuity</td>
<td>11.92</td>
</tr>
</tbody>
</table>

The plan was determined to be top-heavy for the 2008 plan year and all subsequent plan years.

$X$ is Smith’s annual accrued benefit as of 1/1/2013 in the plan’s normal form of payment.

**Question 39**

In what range is $X$?

(A) Less than $6,000

(B) $6,000 but less than $7,000

(C) $7,000 but less than $8,000

(D) $8,000 but less than $9,000

(E) $9,000 or more
Data for Question 40 (3 points)

2012 segment rates: \{4.00\%, 5.00\%, 6.00\%\}.

2013 segment rates: \{4.75\%, 5.25\%, 6.00\%\}.

There are no funding balances at 1/1/2012 and 1/1/2013.

Selected valuation results as of:

<table>
<thead>
<tr>
<th></th>
<th>1/1/2012</th>
<th>1/1/2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actuarial (market) value of assets</td>
<td>$900,000</td>
<td>$925,000</td>
</tr>
<tr>
<td>Funding target</td>
<td>1,000,000</td>
<td>1,100,000</td>
</tr>
<tr>
<td>Target normal cost</td>
<td>50,000</td>
<td>54,000</td>
</tr>
<tr>
<td>Shortfall amortization charge</td>
<td>5,000</td>
<td>8,000</td>
</tr>
<tr>
<td>Effective interest rate</td>
<td>4.50%</td>
<td>5.00%</td>
</tr>
</tbody>
</table>

The plan sponsor obtained a funding waiver for the full amount of the minimum required contribution for the 2012 plan year.

No contributions were made for the 2012 plan year.

---

Question 40

In what range is the **minimum required contribution** as of 1/1/2013?

(A) Less than $73,500

(B) $73,500 but less than $74,000

(C) $74,000 but less than $74,500

(D) $74,500 but less than $75,000

(E) $75,000 or more
Data for Question 41 (5 points)

Plan type: Multiemployer.

Valuation date: 1/1/2013.

Interest rate: 7%.

Selected participant data:

<table>
<thead>
<tr>
<th></th>
<th>Smith</th>
<th>Jones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of birth</td>
<td>1/1/1947</td>
<td>1/1/1947</td>
</tr>
<tr>
<td>Date of retirement</td>
<td>1/1/2012</td>
<td>1/1/2012</td>
</tr>
<tr>
<td>Annual benefit paid on 1/1</td>
<td>$30,000</td>
<td>$6,000</td>
</tr>
<tr>
<td>Form of benefit</td>
<td>10-year certain and life</td>
<td>10-year certain and life</td>
</tr>
<tr>
<td>Status on 1/1/2012</td>
<td>Alive</td>
<td>Alive</td>
</tr>
<tr>
<td>Status on 1/1/2013</td>
<td>Alive</td>
<td>Deceased</td>
</tr>
</tbody>
</table>

Selected commutation functions:

<table>
<thead>
<tr>
<th>Age</th>
<th>$N_x$</th>
</tr>
</thead>
<tbody>
<tr>
<td>65</td>
<td>102,245</td>
</tr>
<tr>
<td>66</td>
<td>92,585</td>
</tr>
<tr>
<td>67</td>
<td>83,649</td>
</tr>
<tr>
<td>75</td>
<td>33,380</td>
</tr>
<tr>
<td>76</td>
<td>29,238</td>
</tr>
</tbody>
</table>

$X = \text{the gain (loss) due to mortality experience for Smith as of 1/1/2013.}$

$Y = \text{the gain (loss) due to mortality experience for Jones as of 1/1/2013.}$

$Z = X + Y$

**Question 41**

In what range is the absolute value of $Z$?

(A) Less than $22,000$

(B) $22,000$ but less than $23,000$

(C) $23,000$ but less than $24,000$

(D) $24,000$ but less than $25,000$

(E) $25,000$ or more
Data for Question 42 (3 points)

Applicable 417(e) segment rates: \{4.5\%, 5.0\%, 6.0\%\}.

Selected data for participant Smith:

<table>
<thead>
<tr>
<th>Date of birth</th>
<th>1/1/1963</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of termination</td>
<td>1/1/2013</td>
</tr>
<tr>
<td>Vested accrued benefit</td>
<td>$20,000</td>
</tr>
</tbody>
</table>

Benefits are payable as a 5-year certain and life annuity, in annual installments, starting at age 65.

Participant Smith terminated and elected to receive a lump sum distribution on 1/1/2013 equal to the present value of the deferred vested accrued benefit.

The plan definition of actuarial equivalence is the Applicable Interest Rate and Applicable Mortality Table under 417(e) with no pre-retirement mortality.

Selected annuity values:

<table>
<thead>
<tr>
<th>Interest rate</th>
<th>(\ddot{a}_{65})</th>
<th>(\ddot{a}_{70})</th>
</tr>
</thead>
<tbody>
<tr>
<td>5%</td>
<td>12.11</td>
<td>10.50</td>
</tr>
<tr>
<td>6%</td>
<td>11.14</td>
<td>9.78</td>
</tr>
</tbody>
</table>

\(s \ p_{65} = 0.90\)

Question 42

In what range is lump sum distribution payable to Smith on 1/1/2013?

(A) Less than $96,000

(B) $96,000 but less than $102,000

(C) $102,000 but less than $108,000

(D) $108,000 but less than $114,000

(E) $114,000 or more

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Pension
Data for Question 43 (1 point)

Consider the following statement for the 2013 plan year:

A plan with more than 500 participants is at-risk if either:

(a) the FTAP using not-at-risk assumptions for the prior plan year is less than 80%,

or

(b) the FTAP using at-risk assumptions for the prior plan year is less than 70%.

Question 43

Is the above statement true or false?

(A) True

(B) False
Data for Question 44 (4 points)

Type of plan: Multiemployer.
Valuation date: 1/1/2013.
Normal retirement benefit: 1% of final 3-year average compensation for each year of service.
Actuarial cost method: Projected unit credit.

Actuarial assumptions:
- Interest rate 7.5%
- Compensation increases 2.0% per year

There are no pre-retirement decrements other than mortality.

Credit balance as of 12/31/2012: $100,000.

Selected information as of 1/1/2013:
- Amortization of outstanding charges 550,000
- Amortization of outstanding credits 200,000
- Data for each participant:
  - Date of birth 1/1/1973
  - Date of hire 1/1/2009
  - 2012 compensation $34,000

There are 1,000 participants in the plan on 1/1/2013.

Selected commutation functions:

<table>
<thead>
<tr>
<th>Age</th>
<th>(N^{(12)}_x)</th>
<th>(D_x)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>14,243,879</td>
<td>1,118,969</td>
</tr>
<tr>
<td>65</td>
<td>1,517,247</td>
<td>163,979</td>
</tr>
</tbody>
</table>

A single contribution of $X is made on 12/31/2013 in the smallest amount that satisfies the minimum funding standard for the 2013 plan year.

Question 44

In what range is $X$?

(A) Less than $850,000
(B) $850,000 but less than $925,000
(C) $925,000 but less than $1,000,000
(D) $1,000,000 but less than $1,075,000
(E) $1,075,000 or more
Data for Question 45 (5 points)

Type of plan: Multiemployer.
Valuation date: 1/1/2013.
Benefit formula: $100 per month for each year of service.
The plan provides an unreduced retirement benefit at age 62 with 15 years of service.
Retirements are assumed to occur at the beginning of the year.
Actuarial cost method: Aggregate.
Interest rate: 7.5%.
Credit balance as of 12/31/2012: $500.
Actuarial (market) value of assets as of 1/1/2013: $250,000.
Data for all plan participants:

<table>
<thead>
<tr>
<th>Name</th>
<th>Date of birth</th>
<th>Date of hire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smith</td>
<td>1/1/1958</td>
<td>1/1/2003</td>
</tr>
<tr>
<td>Jones</td>
<td>1/1/1950</td>
<td>1/1/1993</td>
</tr>
</tbody>
</table>

Retirement rates and selected annuity factors:

<table>
<thead>
<tr>
<th>Age</th>
<th>$q_r$</th>
<th>$\ddot{a}^{(12)}_x$</th>
</tr>
</thead>
<tbody>
<tr>
<td>62</td>
<td>25%</td>
<td>9.86</td>
</tr>
<tr>
<td>65</td>
<td>100%</td>
<td>9.25</td>
</tr>
</tbody>
</table>

A single contribution of $X$ is made on 12/31/2013 in the smallest amount that satisfies the
minimum funding standard for the 2013 plan year.

Question 45

In what range is $X$?

(A) Less than $5,500
(B) $5,500 but less than $7,000
(C) $7,000 but less than $8,500
(D) $8,500 but less than $10,000
(E) $10,000 or more
Data for Question 46 (3 points)

Valuation date: 1/1/2013.

Selected valuation results for IRC 404 purposes as of 1/1/2013:

- Market value of assets: $14,000,000
- Actuarial value of assets: 12,750,000
- Funding target: 18,000,000
- Funding target with future compensation increases: 19,500,000
- Target normal cost: 600,000
- Funding target (at-risk): 20,250,000
- Target normal cost (at-risk): 800,000
- Minimum required contribution: 1,600,000
- Effective interest rate: 4.00%

Question 46

In what range is the deduction limit for 2013?

(A) Less than $13,000,000
(B) $13,000,000 but less than $14,500,000
(C) $14,500,000 but less than $16,000,000
(D) $16,000,000 but less than $17,500,000
(E) $17,500,000 or more
Data for Question 47 (4 points)

Type of plan: Multiemployer.

Valuation date: 1/1/2013.

Actuarial cost method: Unit credit.

Interest rate: 7.0%.

Credit balance as of 12/31/2011: $100,000.

Selected valuation results:

<table>
<thead>
<tr>
<th></th>
<th>1/1/2012</th>
<th>1/1/2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actuarial (market) value of assets</td>
<td>$4,250,000</td>
<td>$4,280,000</td>
</tr>
<tr>
<td>Accrued liability</td>
<td>5,000,000</td>
<td>5,400,000</td>
</tr>
<tr>
<td>Normal cost</td>
<td>250,000</td>
<td>350,000</td>
</tr>
<tr>
<td>Amortization of outstanding charges/(credits) before any bases established 1/1/2013</td>
<td>500,000</td>
<td>500,000</td>
</tr>
</tbody>
</table>

Contributions of $300,000 for the 2012 plan year were made on 12/31/2012.

A single contribution of $X is made on 12/31/2013 in the smallest amount that satisfies the minimum funding standard for the 2013 plan year.

Question 47

In what range is $X?  

(A) Less than $1,310,000  
(B) $1,310,000 but less than $1,335,000  
(C) $1,335,000 but less than $1,360,000  
(D) $1,360,000 but less than $1,385,000  
(E) $1,385,000 or more
Data for Question 48 (4 points)

Type of plan: Multiemployer.

Actuarial cost method: Entry age normal.

Valuation date: 1/1/2013.

Interest rate: 7.5%.

Selected information for all funding standard account bases as 1/1/2012:

<table>
<thead>
<tr>
<th>Method change</th>
<th>Years remaining</th>
<th>Outstanding balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method change</td>
<td>12</td>
<td>$3,000,000</td>
</tr>
<tr>
<td>Actuarial (gain)</td>
<td>14</td>
<td>(825,000)</td>
</tr>
<tr>
<td>Actuarial loss</td>
<td>15</td>
<td>750,000</td>
</tr>
</tbody>
</table>

The plan experiences an actuarial loss during 2012 of $900,000.

The plan implemented a 5-year extension as of 1/1/2013 for all charge bases established on or before 1/1/2012 under an automatic extension of amortization.

$X$ is the absolute value of the change in the **minimum required contribution** as of 12/31/2013 due to the amortization extension.

Question 48

In what range is $X$?

(A) Less than $65,000

(B) $65,000 but less than $75,000

(C) $75,000 but less than $85,000

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

(E) $95,000 or more
Data for Question 49 (2 points)

Type of plan: Multiemployer.

Funding status on 1/1/2012: Neither critical nor endangered.

Funding status on 1/1/2013: Seriously endangered.

Selected data for all participating employers on 3/31/2013:

<table>
<thead>
<tr>
<th>Employer</th>
<th>Number of actives covered by collective bargaining agreement</th>
<th>Collective bargaining agreement expiration date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employer 1</td>
<td>150</td>
<td>10/1/2013</td>
</tr>
<tr>
<td>Employer 2</td>
<td>300</td>
<td>2/15/2014</td>
</tr>
<tr>
<td>Employer 3</td>
<td>500</td>
<td>12/31/2014</td>
</tr>
<tr>
<td>Employer 4</td>
<td>200</td>
<td>3/1/2016</td>
</tr>
</tbody>
</table>

There are no other employees.

All actives are covered by a collective bargaining agreement.

A funding improvement plan is adopted on 10/31/2013.

Question 49

When does the plan’s funding improvement period start?

(A) 1/1/2013

(B) 1/1/2014

(C) 1/1/2015

(D) 1/1/2016

(E) None of the above
Data for Question 50 (1 point)

Consider the following statement:

A multiemployer plan is considered to be in critical status if the plan’s funded percentage is less than 65%.

Question 50

Is the above statement true or false?

(A) True

(B) False
Data for Question 51 (4 points)

Selected information:

<table>
<thead>
<tr>
<th></th>
<th>1/1/2011</th>
<th>1/1/2012</th>
<th>1/1/2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actuarial value of assets</td>
<td>$450,000</td>
<td>$455,075</td>
<td>$549,500</td>
</tr>
<tr>
<td>Funding target</td>
<td>450,000</td>
<td>500,000</td>
<td>550,000</td>
</tr>
<tr>
<td>Target normal cost</td>
<td>45,000</td>
<td>50,000</td>
<td>60,000</td>
</tr>
<tr>
<td>6-year shortfall amortization factor</td>
<td></td>
<td>5.4100</td>
<td></td>
</tr>
<tr>
<td>7-year shortfall amortization factor</td>
<td></td>
<td>5.9900</td>
<td>6.1600</td>
</tr>
</tbody>
</table>

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

A contribution of $45,000 was deposited for the 2011 plan year on 1/1/2011.

The smallest amount that satisfies the minimum funding standard for the 2012 plan year was deposited on 1/1/2012.

$X = \text{the smallest amount that satisfies the minimum funding standard} \text{ for the 2013 plan year as of 1/1/2013.}$

Question 51

In what range is $X$?

(A) Less than $59,500

(B) $59,500 but less than $60,100

(C) $60,100 but less than $60,700

(D) $60,700 but less than $61,300

(E) $61,300 or more
Data for Question 52 (3 points)

Selected valuation results:

<table>
<thead>
<tr>
<th></th>
<th>1/1/2012</th>
<th>1/1/2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Funding standard carryover balance</td>
<td>$100,000</td>
<td>$0</td>
</tr>
<tr>
<td>Prefunding balance</td>
<td>250,000</td>
<td>157,500</td>
</tr>
<tr>
<td>Actuarial (market) value of plan assets</td>
<td>2,250,000</td>
<td>2,362,500</td>
</tr>
<tr>
<td>Funding target</td>
<td>2,000,000</td>
<td>2,300,000</td>
</tr>
<tr>
<td>Target normal cost</td>
<td>200,000</td>
<td>225,000</td>
</tr>
<tr>
<td>6-year shortfall amortization factor</td>
<td>5.4100</td>
<td></td>
</tr>
<tr>
<td>7-year shortfall amortization factor</td>
<td>5.9900</td>
<td>6.1600</td>
</tr>
</tbody>
</table>

The plan did not have a funding shortfall for the 2011 plan year.

The **smallest amount that satisfies the minimum funding standard** was made for the 2012 plan year.

The plan sponsor did not elect to use the prefunding balance to reduce the 2013 minimum required contribution.

**Question 52**

In what range is the **minimum required contribution** for the 2013 plan year?

(A) Less than $221,000
(B) $221,000 but less than $231,000
(C) $231,000 but less than $241,000
(D) $241,000 but less than $251,000
(E) $251,000 or more
Data for Question 53 (3 points)

Type of plan: Multiemployer.

Actuarial cost method: Unit credit.

Annual required employee contributions: $500 payable at end of year.

Accrued benefit: $75 per month for each year of service.

Valuation interest rate: 6.0%.

Data for participant Smith:

<table>
<thead>
<tr>
<th>Date of birth</th>
<th>1/1/1957</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of hire</td>
<td>1/1/1987</td>
</tr>
</tbody>
</table>

Selected annuity value:

\[ a_{65}^{(12)} = 10.85 \]

Valuation and interest crediting rates for employee contributions are assumed to be equal for future years.

Question 53

In what range is the employer normal cost for Smith as of 1/1/2013?

(A) Less than $5,300

(B) $5,300 but less than $5,400

(C) $5,400 but less than $5,500

(D) $5,500 but less than $5,600

(E) $5,600 or more
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