

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

Enrolled Actuaries Pension Examination, Segment F

# EA-2, Segment F

Date: Tuesday, November 3, 2020

Time: 8:30 a.m. – 12:30 p.m.

## INSTRUCTIONS TO CANDIDATES

1. Special conditions generally applicable to all questions on this examination are found in a separate .PDF on the computer screen.
2. All questions should be answered in accordance with laws, rules and regulations in effect as of May 31, 2020.
3. This examination consists of 57 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.
4. 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.
5. Do not spend too much time on any one question. If a question seems too difficult, leave it and go on.
6. 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 computer screen.
7. Use the scratch paper booklets provided by Prometric for your scratch work. Extra scratch paper booklets are available if you run out of scratch paper in the booklet provided to you.

**Answer Key EA-2F Fall 2020**  
**August 18, 2020**

<b>Question</b>	<b>Answer</b>		<b>Question</b>	<b>Answer</b>
<b>1</b>	<b>B</b>		<b>31</b>	<b>B</b>
<b>2</b>	<b>B</b>		<b>32</b>	<b>B</b>
<b>3</b>	<b>B</b>		<b>33</b>	<b>A</b>
<b>4</b>	<b>E</b>		<b>34</b>	<b>B</b>
<b>5</b>	<b>B</b>		<b>35</b>	<b>B</b>
<b>6</b>	<b>D</b>		<b>36</b>	<b>C</b>
<b>7</b>	<b>A</b>		<b>37</b>	<b>D</b>
<b>8</b>	<b>B</b>		<b>38</b>	<b>A</b>
<b>9</b>	<b>B</b>		<b>39</b>	<b>B</b>
<b>10</b>	<b>C</b>		<b>40</b>	<b>C</b>
<b>11</b>	<b>B</b>		<b>41</b>	<b>D</b>
<b>12</b>	<b>C</b>		<b>42</b>	<b>B</b>
<b>13</b>	<b>C</b>		<b>43</b>	<b>B</b>
<b>14</b>	<b>C</b>		<b>44</b>	<b>D</b>
<b>15</b>	<b>B</b>		<b>45</b>	<b>A</b>
<b>16</b>	<b>D</b>		<b>46</b>	<b>D</b>
<b>17</b>	<b>A</b>		<b>47</b>	<b>A</b>
<b>18</b>	<b>B</b>		<b>48</b>	<b>C</b>
<b>19</b>	<b>C</b>		<b>49</b>	<b>C</b>
<b>20</b>	<b>B</b>		<b>50</b>	<b>A</b>
<b>21</b>	<b>D</b>		<b>51</b>	<b>A</b>
<b>22</b>	<b>D</b>		<b>52</b>	<b>B</b>
<b>23</b>	<b>D</b>		<b>53</b>	<b>E</b>
<b>24</b>	<b>A</b>		<b>54</b>	<b>B</b>
<b>25</b>	<b>C</b>		<b>55</b>	<b>E</b>
<b>26</b>	<b>A</b>		<b>56</b>	<b>C</b>
<b>27</b>	<b>D</b>		<b>57</b>	<b>B</b>
<b>28</b>	<b>B</b>			
<b>29</b>	<b>C</b>			
<b>30</b>	<b>D</b>			

Data for Question 1 (4 points)

Valuation date: 1/1/2021

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

Assumed rate of termination: 20% at each age, occurring at the beginning of the year

Vesting schedule: Five-year cliff

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

Prefunding balance as of 1/1/2021: \$0

Selected data for sole participant Smith:

Gender	Male
Date of birth	1/1/1976
Date of hire	1/1/2017

Actuarial (market) value of assets as of 1/1/2021: \$15,000

Prior to 1/1/2021, there were no shortfall amortization bases.

$\$X$  equals the **minimum required contribution** for the 2021 plan year.

Question 1

In what range is  $\$X$ ?

- (A) Less than \$4,500
- (B) \$4,500 but less than \$5,000
- (C) \$5,000 but less than \$5,500
- (D) \$5,500 but less than \$6,000
- (E) \$6,000 or more

Data for Question 2 (3 points)

Valuation date: 1/1/2021

FTAP as of 1/1/2019: 100.00%

Selected information:

	<u>1/1/2020</u>	<u>1/1/2021</u>
Prefunding balance	\$50,000	\$35,000
Actuarial (market) value of assets	900,000	1,275,000
Funding target	1,000,000	1,201,750
Target normal cost	150,000	200,000
Effective interest rate	4.50%	4.00%
Seven-year shortfall amortization factor	6.2434	6.3293

$\$X$  is the required quarterly installment for the 2021 plan year.

Question 2

In what range is  $\$X$ ?

- (A) Less than \$35,000
- (B) \$35,000 but less than \$36,500
- (C) \$36,500 but less than \$38,000
- (D) \$38,000 but less than \$39,500
- (E) \$39,500 or more

Data for Question 3 (1 point)

A plan is subject to the liquidity shortfall requirements.

Consider the following statement:

The base amount at the end of a given plan quarter is reduced by the full value of annuities purchased during that quarter.

Question 3

Is the above statement true or false?

- (A) True
- (B) False

Data for Question 4 (3 points)

Type of plan: Multiemployer

Valuation date: 1/1/2021

Actuarial cost method: Entry age normal

Valuation interest rate: 6.00%

Credit balance as of 12/31/2020: \$26,475

On 1/1/2021, the plan is amended to increase the benefit multiplier from \$50 to \$55 for all years of service.

All participants are active employees; none have attained normal retirement age.

Selected information as of 1/1/2021 (prior to amendment):

Actuarial (market) value of assets	\$400,000
Actuarial accrued liability	425,000
Normal cost	40,000
Net amortization charge	5,000
Unamortized credit bases	0

$\$X$  equals the **smallest amount that satisfies the minimum funding standard** as of 12/31/2021.

Question 4

In what range is  $\$X$ ?

- (A) Less than \$24,000
- (B) \$24,000 but less than \$25,200
- (C) \$25,200 but less than \$26,400
- (D) \$26,400 but less than \$27,600
- (E) \$27,600 or more

Data for Question 5 (1 point)

Type of plan: Multiemployer

The amount required to be contributed for the 2021 plan year to avoid an accumulated funding deficiency is \$1,000,000.

Consider the following statement:

A contribution in the amount of \$1,000,000 made on 10/15/2022 is sufficient to eliminate an excise tax on the accumulated funding deficiency for the 2021 plan year.

Question 5

Is the above statement true or false?

- (A) True
- (B) False

Data for Question 6 (4 points)

Valuation date: 1/1/2021

Selected information as of 1/1/2020:

Funding standard carryover balance	\$5,000
Prefunding balance	16,500
Minimum required contribution	9,000
Effective interest rate	6.00%

Actual rate of return on assets for 2020: -5.00%

On 1/1/2020, the plan sponsor elected to apply \$11,000 of funding balances against the 2020 minimum required contribution.

Sole contribution for 2020 plan year made on 7/1/2020: \$15,000

On 12/15/2020, the sponsor elected to revoke the election to apply funding balances in excess of the 2020 minimum required contribution.

Question 6

In what range is the prefunding balance as of 1/1/2021?

- (A) Less than \$21,000
- (B) \$21,000 but less than \$23,500
- (C) \$23,500 but less than \$26,000
- (D) \$26,000 but less than \$28,500
- (E) \$28,500 or more



Data for Question 7 (3 points)

Valuation date: 1/1/2021

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

Selected information as of 1/1/2021:

Funding balances at 1/1/2021	\$0
Actuarial (market) value of assets	10,000
Funding target	12,000
Present value of all benefits expected to accrue or be earned during the year	1,000
Administrative expenses expected to be paid directly by the plan sponsor at beginning of year	75
Present value of mandatory employee contributions expected to be made during the year	150
Amortization charges for all bases established before 1/1/2021	0

Question 7

In what range is the **minimum required contribution** for 2021?

- (A) Less than \$1,200
- (B) \$1,200 but less than \$1,300
- (C) \$1,300 but less than \$1,400
- (D) \$1,400 but less than \$1,500
- (E) \$1,500 or more

Data for Question 8 (2 points)

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

Early retirement eligibility: Age 60

Early retirement benefit: Accrued benefit with no reduction

Number of active participants: 5,000

The plan actuary determined that the average actual retirement age for the past three years was 61.

This experience is attributable to normal conditions which are expected to continue in the future.

Consider the following statement:

It is reasonable to assume in the funding valuation that participants retire at the plan's normal retirement age of 65.

Question 8

Is the above statement true or false?

- (A) True
- (B) False

Data for Question 9 (4 points)

Valuation date: 1/1/2021

The plan has always had more than 500 participants.

Before 1/1/2020, the FTAP (without at-risk assumptions) was always greater than 100%.

FTAP (without at-risk assumptions) as of 1/1/2020: 67.00%

Shortfall amortization installment for 2020: \$90,000

Selected information as of 1/1/2021:

Prefunding balance		\$120,000
Actuarial (market) value of assets		8,250,000
	<u>Without at-risk assumptions</u>	<u>At-risk</u>
Funding target	\$12,000,000	\$14,000,000
Target normal cost	1,000,000	1,200,000

Shortfall amortization factors for 2021:

6-year:	5.2932
7-year:	5.9982

**\$X** equals the smallest amount that satisfies the minimum funding standard as of 1/1/2021.

Question 9

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

- (A) Less than \$1,700,000
- (B) \$1,700,000 but less than \$1,850,000
- (C) \$1,850,000 but less than \$2,000,000
- (D) \$2,000,000 but less than \$2,150,000
- (E) \$2,150,000 or more

Data for Question 10 (3 points)

Type of plan: Multiemployer

Valuation date: 1/1/2020

Actuarial cost method: Projected unit credit

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

Valuation interest rate: 6.00%

Assumed rate of compensation increases: 3.50% per year

Smith is assumed to work for only one employer for his entire career.

Data for participant Smith as of 1/1/2020:

Gender	Male
Age	55
Years of service	12
Compensation for 2019 and all prior years:	\$220,000

Question 10

What is the actuarial accrued liability for participant Smith as of 1/1/2020?

- (A) Less than \$450,000
- (B) \$450,000 but less than \$550,000
- (C) \$550,000 but less than \$650,000
- (D) \$650,000 but less than \$750,000
- (E) \$750,000 or more

Data for Question 11 (1 point)

Selected information as of 1/1/2021:

Non-eligible active employees	44
Active participants	56
Vested terminated participants	0
Retirees	105

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

Pre-retirement mortality must be assumed.

Question 11

Is the above statement true or false?

- (A) True
- (B) False

Data for Question 12 (4 points)

Type of plan: Multiemployer

Valuation date: 1/1/2021

Actuarial cost method: Entry age normal

Valuation interest rate: 6.50%

Credit balance as of 12/31/2020: \$42,000

Normal cost as of 1/1/2021: \$325,000

Selected information for all funding standard account bases as of 1/1/2020:

	<u>Years remaining</u>	<u>Outstanding balance</u>
Combined charge base	10	\$1,200,000
Experience gain	12	(550,000)
Experience loss	14	420,000

Experience loss for 2020 as of 1/1/2021: \$275,000

There was a plan amendment on 12/31/2020 to pay each retired participant a one-time additional payment in 2021, which increased the 1/1/2021 plan liability by \$110,000.

**\$X** is the smallest amount that satisfies the minimum funding standard as of 12/31/2021.

Question 12

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

- (A) Less than \$540,000
- (B) \$540,000 but less than \$580,000
- (C) \$580,000 but less than \$620,000
- (D) \$620,000 but less than \$660,000
- (E) \$660,000 or more

Data for Question 13 (3 points)

Valuation date: 1/1/2021

Normal retirement benefit: 1.00% of the highest consecutive three-year average compensation per year of service

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

No compensation increases are assumed.

Selected data for active participant Smith at the time of the initial valuation:

Gender	Male
Date of birth	1/1/1981
Date of hire	1/1/2011
2018 compensation	\$60,000
2019 compensation	\$60,000
2020 compensation	\$60,000

An error is discovered that leads to changing Smith's 2020 compensation from \$60,000 to \$70,000.

$\$X$  equals the change in the 2021 target normal cost for participant Smith due to the revised compensation.

Question 13

In what range is  $\$X$ ?

- (A) Less than \$750
- (B) \$750 but less than \$1,150
- (C) \$1,150 but less than \$1,550
- (D) \$1,550 but less than \$1,950
- (E) \$1,950 or more

Data for Question 14 (4 points)

Type of plan: Multiemployer

Valuation date: 1/1/2021

Actuarial cost method: Aggregate

Normal retirement benefit: 60% of final three-year average compensation

Valuation interest rate: 7.00%

Assumed rate of compensation increases: 2.00% per year

Credit balance as of 12/31/2020: \$25,000

Actuarial value of assets as of 1/1/2021: \$150,000

Selected data for all 10 participants as of 1/1/2021:

Gender	Male
Current age	55
Status	Active
2020 compensation	\$50,000

$\$X$  is the normal cost as of 1/1/2021.

Question 14

In what range is  $\$X$ ?

- (A) Less than \$210,000
- (B) \$210,000 but less than \$215,000
- (C) \$215,000 but less than \$220,000
- (D) \$220,000 but less than \$225,000
- (E) \$225,000 or more



Data for Question 15 (4 points)

Valuation date: 1/1/2021

Asset valuation method: The average of the market value of assets on the valuation date and the adjusted market values of assets for the dates that are 12 and 24 months before the valuation date.

Market value asset gain for 2019 plan year: \$50,000

Selected information:

	<u>2020 plan year</u>
Segment rates	{4.00%, 5.00%, 6.00%}
Effective interest rate	5.00%

Assumed rate of return on assets for 2020: 8.00%

Selected asset information excluding receivables:

	<u>2020</u>	<u>2021</u>
Market value at 1/1	\$350,000	\$425,000
Benefit payments	30,000	
Expenses paid from plan assets	2,000	

Benefit payments and expenses are assumed to be paid in the middle of the year for each plan year.

No contributions were made during 2020 for the 2019 plan year.

Contribution information for the 2020 plan year:

<u>Date</u>	<u>Amount</u>
7/1/2020	\$50,000
6/1/2021	\$31,000

Question 15

In what range is the actuarial value of assets as of 1/1/2021?

- (A) Less than \$413,000
- (B) \$413,000 but less than \$415,500
- (C) \$415,500 but less than \$418,000
- (D) \$418,000 but less than \$420,500
- (E) \$420,500 or more

Data for Question 16 (3 points)

Type of plan: Multiemployer

Actuarial cost method: Entry age normal

Selected information as of 1/1/2021:

Market value of assets	\$670,000
Actuarial value of assets	684,000
Accrued liability (entry age normal)	1,200,000
Accrued liability (unit credit)	1,000,000

The plan is projected to have its first accumulated funding deficiency in 2027.

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

The plan was not in endangered, seriously endangered, critical, or critical and declining status before 2021.

*X%* is the funded percentage the plan is required to reach as of the close of the funding improvement period.

Question 16

In what range is *X%*?

- (A) Less than 66.00%
- (B) 66.00% but less than 70.00%
- (C) 70.00% but less than 74.00%
- (D) 74.00% but less than 78.00%
- (E) 78.00% or more

Data for Question 17 (1 point)

Valuation date: 1/1/2021

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

The plan sponsor adopts an amendment on 10/1/2020 to increase the benefit rate to \$110 per month per year of service completed after 4/15/2021, effective 5/1/2021.

No action is required under the provisions of IRC section 436 for the amendment to take effect.

Consider the following statement:

The amendment must be reflected in the 2021 target normal cost.

Question 17

Is the above statement true or false?

(A) True

(B) False

Data for Question 18 (2 points)

Plan effective date: 1/1/2000

Valuation date: 1/1/2021

The plan offers a 100% lump sum option.

Selected information as of 1/1/2021:

Funding standard carryover balance	\$300,000
Prefunding balance	600,000
Actuarial (market) value of assets	2,750,000
Funding target	3,200,000

**\$X** is the amount of the prefunding balance after the IRC section 436 deemed reduction as of 1/1/2021.

Question 18

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

- (A) Less than \$150,000
- (B) \$150,000 but less than \$300,000
- (C) \$300,000 but less than \$450,000
- (D) \$450,000 but less than \$600,000
- (E) \$600,000 or more

Data for Question 19 (3 points)

Type of plan: Multiemployer

Actuarial cost method: Entry age normal

Credit balance as of 12/31/2020: \$50,000

Valuation interest rate: 6.00%

Normal cost as of 1/1/2021: \$600,000

Amortization information as of 1/1/2021 for all remaining amortization bases established before 2021:

	<u>Years remaining</u>	<u>Outstanding balance</u>
Plan amendment	11	\$1,200,000
Experience gain	13	(900,000)
Experience loss	14	600,000

Experience loss for 2020 as of 1/1/2021: \$50,000

**\$X** is the **smallest amount that satisfies the minimum funding standard** as of 12/31/2021.

Question 19

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

- (A) Less than \$640,000
- (B) \$640,000 but less than \$690,000
- (C) \$690,000 but less than \$740,000
- (D) \$740,000 but less than \$790,000
- (E) \$790,000 or more

Data for Question 20 (4 points)

Type of plan: Multiemployer

Actuarial cost method: Projected unit credit

Valuation interest rate: 6.00%

RPA '94 current liability interest rate: 4.00%

Selected valuation results as of 1/1/2021:

Actuarial (market) value of assets	\$14,700,000
Actuarial accrued liability	17,500,000
Normal cost	2,100,000
Expected benefit payments	260,000
Minimum required contribution	3,750,000
Amortization of outstanding bases over 10 years	300,000
RPA '94 current liability	20,000,000
Expected increase in RPA '94 current liability due to benefits increasing	2,500,000
Expected release from RPA '94 current liability	270,000

$\$X$  is the deductible limit for 2021 at the end of the plan year.

Question 20

In what range is  $\$X$ ?

- (A) Less than \$17,000,000
- (B) \$17,000,000 but less than \$17,500,000
- (C) \$17,500,000 but less than \$18,000,000
- (D) \$18,000,000 but less than \$18,500,000
- (E) \$18,500,000 or more

Data for Question 21 (2 points)

Valuation date: 1/1/2021

Selected information as of 1/1/2021:

Prefunding balance	\$60,000
Market value of assets	1,275,000
Actuarial value of assets	1,300,000
Funding target	1,200,000
Target normal cost	200,000

$\$X$  is the **minimum required contribution** for the 2021 plan year.

Question 21

In what range is  $\$X$ ?

- (A) Less than \$115,000
- (B) \$115,000 but less than \$135,000
- (C) \$135,000 but less than \$155,000
- (D) \$155,000 but less than \$175,000
- (E) \$175,000 or more

Data for Question 22 (3 points)

Selected segment rates for the 2021 plan year:

IRC section 430 24-month average segment rates: {2.70%, 3.00%, 3.20%}  
25-year average segment rates: {3.50%, 4.30%, 5.20%}

$X\%$  is the stabilized first segment rate applicable for the 2021 plan year.

Question 22

In what range is  $X\%$ ?

- (A) Less than 2.75%
- (B) 2.75% but less than 2.85%
- (C) 2.85% but less than 2.95%
- (D) 2.95% but less than 3.05%
- (E) 3.05% or more



Data for Question 23 (3 points)

Valuation date: 1/1/2021

Selected information as of 1/1/2021:

Prefunding balance	\$200,000
Minimum required contribution	500,000
Effective interest rate	4.00%

Actual rate of return on assets during 2021: 17.00%

Sole contribution for the 2021 plan year made on 4/15/2021: \$590,000

For the 2021 plan year, the plan sponsor does not elect to apply the prefunding balance against the 2021 minimum required contribution.

**\$X** is the prefunding balance as of 1/1/2022.

Question 23

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

- (A) Less than \$270,000
- (B) \$270,000 but less than \$290,000
- (C) \$290,000 but less than \$310,000
- (D) \$310,000 but less than \$330,000
- (E) \$330,000 or more

Data for Question 24 (1 point)

For a single employer plan, the plan sponsor will apply for a waiver of the plan's minimum required contribution for the plan year beginning 1/1/2021.

Consider the following statement:

The application for waiver of minimum required contribution for the plan year beginning 1/1/2021 is due no later than 3/15/2022.

Question 24

Is the above statement true or false?

- (A) True
- (B) False

Data for Question 25 (3 points)

Valuation date: 1/1/2021

There are no required quarterly installments for the 2021 plan year.

Selected information as of 1/1/2021:

Prefunding balance	\$100,000
Minimum required contribution	200,000
Effective interest rate	5.00%

Actual rate of return on assets during 2021: 11.00%

No contributions were made, or funding balance applied, to the 2021 minimum required contribution during 2021.

On 1/1/2022, the plan sponsor elected to reduce the prefunding balance by \$80,000 for the 2022 plan year.

On 9/15/2022, the plan sponsor elected to apply all of the available prefunding balance against the 2021 minimum required contribution.

**\$X** equals a contribution to be made on 9/15/2022, for the 2021 plan year, in the **smallest amount that satisfies the minimum funding standard.**

Question 25

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

- (A) Less than \$170,000
- (B) \$170,000 but less than \$180,000
- (C) \$180,000 but less than \$190,000
- (D) \$190,000 but less than \$200,000
- (E) \$200,000 or more

Data for Question 26 (1 point)

Valuation date: 1/1/2021

Type of plan: Multiemployer

The plan has an accumulated funding deficiency as of 12/31/2021.

Consider the following statement:

The tax for failing to meet the minimum funding requirements for the 2021 plan year is equal to 5% of the accumulated funding deficiency, determined as of the end of the plan year.

Question 26

Is the above statement true or false?

- (A) True
- (B) False

Data for Question 27 (4 points)

Valuation date: 1/1/2021

Normal retirement benefit: \$25 per month per year of service

Early retirement benefit: Accrued benefit reduced by 10.00% for each year that the benefit commencement date precedes age 65

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

Assumed retirement rates:

<u>Age</u>	<u>Rate</u>
63	20%
65	100%

The assumed retirement rate is 0% at all other ages.

There are no pre-retirement decrements.

Selected data for participant Smith as of 1/1/2021:

Gender	Male
Date of birth	1/1/1977
Date of hire	1/1/2011
Status	Active

$\$X$  is the 2021 funding target for Smith as of 1/1/2021.

Question 27

In what range is  $\$X$ ?

- (A) Less than \$7,075
- (B) \$7,075 but less than \$7,275
- (C) \$7,275 but less than \$7,475
- (D) \$7,475 but less than \$7,675
- (E) \$7,675 or more

Data for Question 28 (2 points)

Valuation date: 1/1/2021

Selected valuation information as of 1/1/2021:

Actuarial (market) value of assets	\$150,000
Funding target	200,000
Present value of all benefits expected to accrue in 2021	4,000
Plan-related expenses expected to be paid from plan assets in 2021	2,000
Present value of mandatory employee contributions expected to be made in 2021	8,000
Shortfall and waiver amortization charges	12,000

Consider the following statement:

The minimum required contribution as of 1/1/2021 is \$10,000.

Question 28

Is the above statement true or false?

- (A) True
- (B) False

Data for Question 29 (3 points)

Valuation date: 1/1/2021

Selected information for the 2021 plan year:

Funding standard carryover balance as of 1/1/2021	\$225,000
Required quarterly installments	225,000
Effective interest rate	6.00%

The plan sponsor makes an election on 7/1/2021 to apply funding standard carryover balance against the 4/15/2021 required quarterly installment.

As of 1/1/2021, **\$X** is the amount by which the funding standard carryover balance is reduced to satisfy the 4/15/2021 quarterly installment.

Question 29

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

- (A) Less than \$215,000
- (B) \$215,000 but less than \$217,000
- (C) \$217,000 but less than \$219,000
- (D) \$219,000 but less than \$221,000
- (E) \$221,000 or more

Data for Question 30 (3 points)

Valuation date: 1/1/2021

Selected information as of 1/1/2021:

Actuarial (market) value of assets	\$800,000
Funding target	880,000
Target normal cost	15,000
Funding target with future compensation increases	940,000
At-risk funding target for IRC section 404 purposes	970,000
At-risk target normal cost for IRC section 404 purposes	20,000
At-risk funding target with future earnings increases	1,020,000
Minimum required contribution	155,000
Effective interest rate	5.50%

$\$X$  equals the deduction limit for 2021.

Question 30

In what range is  $\$X$ ?

- (A) Less than \$300,000
- (B) \$300,000 but less than \$440,000
- (C) \$440,000 but less than \$580,000
- (D) \$580,000 but less than \$720,000
- (E) \$720,000 or more



Data for Question 31 (1 point)

Type of plan: Multiemployer

IRC section 431(d) automatic amortization extension was granted in 2019.

Consider the following statement:

The charge bases that were part of the amortization extension that was granted can be extended an additional ten years.

Question 31

Is the above statement true or false?

- (A) True
- (B) False

Data for Question 32 (5 points)

Type of plan: Multiemployer

Valuation date: 1/1/2021

Current actuarial cost method: Entry age normal

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

Credit balance as of 12/31/2020: \$30,000

Selected information as of 1/1/2021:

Market value of assets	\$1,460,000
Actuarial value of assets	1,580,000
Entry age actuarial accrued liability	2,050,000
Entry age normal cost	20,000
Present value of future benefits	2,400,000
Present value of expected future compensation	4,500,000
Present value of expected plan compensation for 2021	450,000
Valuation interest rate	7.50%

Funding standard account information as of 1/1/2021:

Amortization charges	\$90,000
Amortization credits	40,000

**\$X** is the smallest amount that satisfies the minimum funding standard as of 12/31/2021, using the entry age normal cost method.

**\$Y** is the smallest amount that satisfies the minimum funding standard as of 12/31/2021, if the cost method were changed to aggregate cost method.

Question 32

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

- (A) Less than \$15,500
- (B) \$15,500 but less than \$23,000
- (C) \$23,000 but less than \$30,500
- (D) \$30,500 but less than \$38,000
- (E) \$38,000 or more

Data for Question 33 (2 points)

Valuation date: 1/1/2021

Employer A and Employer B are part of the same controlled group.

Employer A sponsors Plan A.

Employer B sponsors Plan B.

Plan B has always had more than 400 participants.

Selected information for Plan A:

	<u>2020</u>	<u>2021</u>
Plan participants at all times during the plan year	150	150
FTAP (without regard to at-risk assumptions)	75%	79%
FTAP (determined using at-risk assumptions)	67%	71%

Consider the following statement:

Plan A is considered at-risk for the 2021 plan year.

Question 33

Is the above statement true or false?

- (A) True
- (B) False

Data for Question 34 (4 points)

Valuation date: 1/1/2021

Normal form of payment: Single life annuity

Optional form of payment: Single sum based on IRC section 417(e) applicable mortality tables and section 417(e) applicable interest rates.

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

Section 417(e) segment rates: {2.00%, 3.00%, 4.00%}

The plan actuary assumes that 80% of participants elect a single sum and 20% elect a single life annuity.

Selected information for active participant Smith:

Gender	Female
Age	45
Monthly accrued single life annuity payable at 65	\$2,500

Age 65 immediate annuity factor using 417(e) mortality and 4.00% interest: 13.839

Age 65 immediate annuity factor using 417(e) mortality and 5.00% interest: 12.614

Age 65 immediate annuity factor using 417(e) mortality and 7.00% interest: 10.658

$\$X$  is the funding target for Smith as of 1/1/2021.

Question 34

In what range is  $\$X$ ?

- (A) Less than \$83,000
- (B) \$83,000 but less than \$102,000
- (C) \$102,000 but less than \$121,000
- (D) \$121,000 but less than \$140,000
- (E) \$140,000 or more

Data for Question 35 (4 points)

Valuation date: 1/1/2021

Normal retirement benefit before amendment: \$50.00 per month per year of service

A plan amendment is adopted on 12/15/2020 that increases the multiplier for all years of service:

Effective 1/1/2021:	\$55.00 per month per year of service
Effective 1/1/2023:	\$60.00 per month per year of service

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

The plan is sufficiently funded in all years to permit plan amendments to take effect.

Selected information (prior to plan amendment recognition):

	<u>1/1/2021</u>
Prefunding balance	\$100,000
Actuarial (market) value of assets	1,060,000
Funding target	1,000,000
Target normal cost	90,000

No shortfall amortization bases were established prior to 2021.

The plan does not have any inactive participants as of 1/1/2021.

**$\$X$**  equals **the smallest amount that satisfies the minimum funding standard** as of 1/1/2021 for the 2021 plan year.

Question 35

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

- (A) Less than \$20,000
- (B) \$20,000 but less than \$45,000
- (C) \$45,000 but less than \$70,000
- (D) \$70,000 but less than \$95,000
- (E) \$95,000 or more

Data for Question 36 (4 points)

Valuation date: 1/1/2021

Normal retirement benefit: 2.50% of final compensation per year of service  
(not greater than 20 years of service)

The death benefit is a single sum payable immediately equal to the greater of 2 times the normal retirement benefit and \$300,000.

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

Assumed rate of compensation increases: 3.00% per year

No pre-retirement decrements other than death are assumed.

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

Selected information for participant Smith:

Gender	Male
Date of birth	1/1/1966
Date of hire	1/1/1996
2020 compensation	\$140,000

Selected actuarial information:

$D_{55}$ at 6.00%	39,644
$q_{60}$	0.005087

$\$X$  is the portion of the funding target for Smith as of 1/1/2021 attributable to the death benefit payable at age 60.

Question 36

In what range is  $\$X$ ?

- (A) Less than \$930
- (B) \$930 but less than \$980
- (C) \$980 but less than \$1,030
- (D) \$1,030 but less than \$1,080
- (E) \$1,080 or more

Data for Question 37 (4 points)

Valuation date: 1/1/2021

Normal retirement benefit: 1.00% of final three-year average compensation per year of service

Disability eligibility: Age 55 with 10 years of service

Disability benefit: Immediate benefit equal to the projected benefit at normal retirement age assuming projected service to normal retirement and final compensation in year of disability

Selected valuation assumptions:

Disabled mortality is the same as healthy mortality  
Segment rates: {5.00%, 6.00%, 7.00%}

The plan actuary identifies a participant Smith who became disabled on the last day of the prior plan year but had been valued as active with a funding target of \$80,890 as of 1/1/2021.

Selected participant information for Smith:

Gender	Male
Date of birth	1/1/1961
Date of hire	1/1/2001
2018 compensation	\$49,000
2019 compensation	50,000
2020 compensation	51,000

$\$X$  is the increase in the 1/1/2021 funding target for Smith to reflect his disability status.

Question 37

In what range is  $\$X$ ?

- (A) Less than \$66,000
- (B) \$66,000 but less than \$69,000
- (C) \$69,000 but less than \$72,000
- (D) \$72,000 but less than \$75,000
- (E) \$75,000 or more

Data for Question 38 (1 point)

Type of plan: Multiemployer

Actuarial assumptions include pre-retirement probabilities of termination, disability, and death.

The plan provisions include a pre-retirement death benefit that is provided and guaranteed under an insurance contract.

Consider the following statement regarding ancillary benefits:

When determining the costs of the pre-retirement death benefit, the plan actuary may set them equal to the premiums paid for that benefit.

Question 38

Is the above statement true or false?

- (A) True
- (B) False



Data for Question 39 (4 points)

Type of plan: Multiemployer

Valuation date: 1/1/2021

Actuarial cost method: Projected unit credit

Normal retirement benefit: 1.50% of the final three-year average compensation per year of service

Early retirement benefit: Accrued benefit reduced by 3.00% for each year that the benefit commencement date precedes age 65

Valuation interest rate: 6.00%

Assumed rate of compensation increases: 2.50% per year

Pre-retirement decrements other than mortality: None

<u>Age</u>	<u>Assumed rate of retirement</u>
62	15%
65	100%

The assumed retirement rate is 0% at all other ages.

Selected data for participant Smith:

Gender	Male		
Date of birth	1/1/1959		
Date of hire	1/1/2013		
	<u>2018</u>	<u>2019</u>	<u>2020</u>
Compensation	\$50,000	\$51,500	\$53,000

$\$X$  is the actuarial accrued liability for participant Smith as of 1/1/2021.

Question 39

In what range is  $\$X$ ?

- (A) Less than \$60,000
- (B) \$60,000 but less than \$63,000
- (C) \$63,000 but less than \$66,000
- (D) \$66,000 but less than \$69,000
- (E) \$69,000 or more

Data for Question 40 (4 points)

Type of plan: Multiemployer

Valuation date: 1/1/2021

Actuarial cost method: Entry age normal

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

Valuation interest rate: 6.00%

Assumed rate of compensation increases: 2.50% per year

Selected data for participant Smith:

Gender	Female
Date of birth	1/1/1966
Date of hire	1/1/2011
2020 compensation	\$70,000

$\$X$  is the normal cost for Smith as of 1/1/2021.

Question 40

In what range is  $\$X$ ?

- (A) Less than \$10,800
- (B) \$10,800 but less than \$11,300
- (C) \$11,300 but less than \$11,800
- (D) \$11,800 but less than \$12,300
- (E) \$12,300 or more

Data for Question 41 (4 points)

Type of plan: Multiemployer

Valuation date: 1/1/2021

Actuarial cost method: Entry age normal

Valuation interest rate: 7.00%

Credit balance as of 12/31/2020: \$100,000

Selected valuation results:

	<u>1/1/2020</u>	<u>1/1/2021</u>
Actuarial value of assets	\$300,000	\$350,000
Actuarial accrued liability	400,000	425,000
Normal cost	40,000	42,000
Amortization charges for all bases established before 1/1/2021		40,000

Sole contribution for the 2020 plan year made on 12/31/2020: \$25,000

Sole contribution for the 2021 plan year made on 12/31/2021: \$35,000

**\$X** is the credit balance as of 12/31/2021.

Question 41

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

- (A) Less than \$48,000
- (B) \$48,000 but less than \$52,000
- (C) \$52,000 but less than \$56,000
- (D) \$56,000 but less than \$60,000
- (E) \$60,000 or more

Data for Question 42 (4 points)

Type of plan: Multiemployer

Valuation date: 1/1/2021

Actuarial cost method: Unit credit

Valuation interest rate: 7.00%

Normal retirement benefit: \$120 per month per year of service

Early retirement benefit: Accrued benefit reduced by 3.00% for each year that the benefit commencement date precedes age 65

Normal and assumed form of payment: Single life annuity

Pre-retirement decrements other than mortality: None

Selected data for participant Smith:

Gender	Male
Date of birth	1/1/1960
Date of hire	1/1/2005

Smith retires on 12/31/2020 and elects a 5-year certain and life benefit.

Plan conversion factor for 5-year certain and life annuity for participant Smith: 0.97

5-year certain and life annuity factor for participant Smith: 11.26

$\$X$  is the absolute value of the experience gain/loss as of 1/1/2021 associated with Smith's retirement and benefit election.

Question 42

In what range is  $\$X$ ?

- (A) Less than \$40,000
- (B) \$40,000 but less than \$50,000
- (C) \$50,000 but less than \$60,000
- (D) \$60,000 but less than \$70,000
- (E) \$70,000 or more

Data for Question 43 (2 points)

Valuation date: 1/1/2021

Selected information:

	<u>1/1/2020</u>	<u>1/1/2021</u>
Funding shortfall	Yes	Yes
Minimum required contribution	\$50,000	\$60,000
Effective interest rate	4.00%	4.00%

Contributions for the 2021 plan year:

<u>Date</u>	<u>Amount</u>
04/15/2021	\$15,000
07/15/2021	\$15,000
10/15/2021	\$15,000
01/31/2022	\$25,000

No other contributions were made for the 2021 plan year.

Consider the following statement:

All contributions made toward the 2021 plan year minimum required contribution are discounted at 4.00%.

Question 43

Is the above statement true or false?

- (A) True
- (B) False

Data for Question 44 (4 points)

Valuation date: 1/1/2021

Normal retirement benefit: 3.00% of final three-year average compensation per year of service

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

Assumed rate of compensation increases: 4.00% per year

Assumed IRC section 415(b) limit for 2021: \$230,000

Selected data for participant Smith:

Gender	Female
Date of birth	1/1/1981
Date of hire	1/1/2018
Date of participation	1/1/2020
2018 compensation	\$300,000
2019 compensation	320,000
2020 compensation	267,000

Question 44

In what range is the target normal cost for Smith as of 1/1/2021?

- (A) Less than \$13,000
- (B) \$13,000 but less than \$16,000
- (C) \$16,000 but less than \$19,000
- (D) \$19,000 but less than \$22,000
- (E) \$22,000 or more

Data for Question 45 (2 points)

Type of plan: Statutory hybrid (cash balance)

Plan experience indicates that all participants elect a lump sum distribution at retirement.

For the valuation, the plan actuary has assumed that 100% of participants will be paid in the form of a lump sum distribution.

Consider the following statements with respect to actuarial assumptions used when calculating the funding target.

- I. When calculating the lump sum in the valuation, the plan actuary must substitute the applicable mortality table for the valuation mortality table.
- II. When calculating the lump sum in the valuation, the plan actuary must substitute the applicable interest rates for the valuation interest rates.

Question 45

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

- (A) None
- (B) I only
- (C) II only
- (D) I and II

Data for Question 46 (3 points)

Valuation date: 1/1/2021

Selected information as of 1/1/2021:

Prefunding balance	\$30,000
Minimum required contribution	200,000
Required quarterly installment	45,000
Effective interest rate	5.00%

On 6/30/2021, the plan sponsor elects to apply the entire prefunding balance against the 2021 minimum required contribution.

A single contribution of  $\$X$  is also made on 6/30/2021 in the **smallest amount that satisfies the minimum funding standard** for the 2021 plan year.

Question 46

In what range is  $\$X$ ?

- (A) Less than \$173,500
- (B) \$173,500 but less than \$174,000
- (C) \$174,000 but less than \$174,500
- (D) \$174,500 but less than \$175,000
- (E) \$175,000 or more



Data for Question 47 (2 points)

Plan effective date: 1/1/2015

Valuation date: 1/1/2021

The plan actuary uses the alternative mortality table for disabled participants as permitted under Revenue Ruling 96-7.

An amendment adopted and effective on 1/1/2021 changed the plan's definition of disability from Social Security disability to a more liberal definition.

As of 1/1/2021, the plan covers employees who meet the new definition of disability, but not the Social Security disability definition.

Consider the following statement:

The plan actuary must use the healthy mortality assumption in the calculation of the 1/1/2021 funding target for individuals not eligible nor expected to be eligible for Social Security disability.

Question 47

Is the above statement true or false?

- (A) True
- (B) False

Data for Question 48 (3 points)

Type of plan: Multiemployer

Valuation date: 1/1/2021

Asset valuation method: Smoothed market value using a smoothing period of four years (smoothing of difference between expected and actual market value of assets), as described in Rev. Proc. 2000-40

Market value of assets as of 1/1/2021: \$80,000

Market value asset gain/loss amounts:

	<u>Type</u>	<u>Amount</u>
During 2017	Gain	\$45,000
During 2018	Loss	4,000
During 2019	Gain	500
During 2020	Loss	25,000

$\$X$  is the actuarial value of assets as of 1/1/2021.

Question 48

In what range is  $\$X$ ?

- (A) Less than \$91,000
- (B) \$91,000 but less than \$94,000
- (C) \$94,000 but less than \$97,000
- (D) \$97,000 but less than \$100,000
- (E) \$100,000 or more

Data for Question 49 (2 points)

Consider the following statements regarding a waiver of the minimum required contribution:

- I. Amortization installments are determined by applying the first segment rate for the five installments.
- II. If the funding shortfall for determining the minimum required contribution is zero, waiver amortization bases for all preceding years are reduced to zero.
- III. Amortization installments are redetermined in subsequent plan years to reflect changes in the segment rates.

Question 49

Which, if any, of the above statements(s) 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

Data for Question 50 (1 point)

Valuation date: 1/1/2021

Prefunding balance as of 1/1/2020: \$100,000

Prefunding balance was not applied, and no excess contributions were made, for the 2020 plan year.

Question 50

Which of the following interest rates should be applied to the 1/1/2020 prefunding balance to calculate the 1/1/2021 prefunding balance?

- (A) Actual rate of return on market value of assets during the 2020 plan year
- (B) Actual rate of return on actuarial value of assets during the 2020 plan year
- (C) Effective interest rate for the 2020 plan year
- (D) First segment rate for the 2020 plan year
- (E) The correct answer is not given by (A), (B), (C), or (D) above.

Data for Question 51 (4 points)

Plan type: Statutory hybrid (cash balance)

Valuation date: 1/1/2021

Optional form of payment: Lump sum payment equal to the participant's hypothetical account balance

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

Form of payment assumption:

	<u>Current</u>	<u>Proposed</u>
Single life annuity	0%	40%
Lump sum	100%	60%

Fixed annuity conversion factor to single life annuity at normal retirement age: 12.50

Selected data for participant Smith:

Gender	Male
Date of birth	1/1/1961
Projected account balance at normal retirement age	\$120,000

$\$X$  is the absolute value of the change in the funding target for Smith if the proposed form of payment assumption is adopted.

Question 51

In what range is  $\$X$ ?

- (A) Less than \$5,000
- (B) \$5,000 but less than \$5,500
- (C) \$5,500 but less than \$6,000
- (D) \$6,000 but less than \$6,500
- (E) \$6,500 or more

Data for Question 52 (1 point)

Consider the following statement:

The Secretary of the Treasury may waive the initial excise tax on unpaid minimum required contributions in appropriate cases.

Question 52

Is the above statement true or false?

- (A) True
- (B) False

Data for Question 53 (3 points)

Type of plan: Multiemployer

Actuarial cost method: Projected unit credit

Valuation interest rate: 6.00%

Credit balance as of 12/31/2020: \$0

Selected information as of 1/1/2021:

Market value of assets	\$3,500,000
Actuarial value of assets	3,000,000
Actuarial accrued liability	3,700,000

Changing the asset valuation method from a smoothed method to market value is being considered.

**\$X** is the absolute value of the change in the **smallest amount that satisfies the minimum funding standard** for 2021 as of 12/31/2021 due to the proposed change in the asset valuation method.

Question 53

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

- (A) Less than \$35,000
- (B) \$35,000 but less than \$45,000
- (C) \$45,000 but less than \$55,000
- (D) \$55,000 but less than \$65,000
- (E) \$65,000 or more

Data for Question 54 (1 point)

Type of plan: Statutory hybrid (cash balance)

Valuation date: 1/1/2021

The plan actuary assumes 50% of participants will elect a single life annuity at retirement and 50% will elect a lump sum at retirement.

The plan converts the projected account balance to an annuity using the applicable interest rates and applicable mortality table under IRC section 417(e).

Consider the following statement:

When determining the minimum required contribution, the IRC section 417(e) segment rates are used to determine the present value of a participant's annuity.

Question 54

Is the above statement true or false?

- (A) True
- (B) False



Data for Question 55 (2 points)

Consider the following statements:

- I. The determination of the funding target and the target normal cost must take into account any limitation on prohibited payments under IRC section 436(d) with respect to any annuity starting date that was before the valuation date.
- II. The determination of the funding target and the target normal cost must take into account anticipated funding-based limitations on unpredictable contingent event benefits under IRC section 436(b) with respect to unpredictable contingent events that are expected to occur on or after the valuation date.
- III. The determination of the target normal cost must ignore any limitation on benefit accruals under IRC section 436(e) with respect to benefit accruals that are expected to occur on or after the valuation date.

Question 55

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.

Data for Question 56 (3 points)

Type of plan: Multiemployer

Valuation date: 1/1/2021

Actuarial cost method: Entry age normal

Valuation interest rate: 6.00%

Selected information as of 1/1/2021:

Market value of assets	\$290,000
Actuarial value of assets	240,000
Accrued liability	300,000
Current liability	325,000
Outstanding balance of charge bases for minimum required contribution	210,000
Outstanding balance of credit bases for minimum required contribution	90,000

$\$X$  is the credit balance as of 12/31/2020.

Question 56

In what range is  $\$X$ ?

- (A) Less than \$30,000
- (B) \$30,000 but less than \$55,000
- (C) \$55,000 but less than \$80,000
- (D) \$80,000 but less than \$105,000
- (E) \$105,000 or more

Data for Question 57 (4 points)

Type of plan: Multiemployer

Valuation date: 1/1/2021

Actuarial cost method: Entry age normal

Normal retirement benefit: 60% of final compensation

Valuation interest rate: 6.00%

Assumed rate of compensation increases: 2.00% per year

Selected data for participant Smith:

Gender	Male
Date of birth	1/1/1961
Date of hire	1/1/2011
2020 compensation	\$40,000

$\$X$  is the normal cost for Smith as of 1/1/2021.

Question 57

In what range is  $\$X$ ?

- (A) Less than \$13,000
- (B) \$13,000 but less than \$13,500
- (C) \$13,500 but less than \$14,000
- (D) \$14,000 but less than \$14,500
- (E) \$14,500 or more

**\*\*END OF EXAMINATION\*\***