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# 2013 EA-2L EXAM SOLUTIONS

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## 2013 EA-2L Exam Solutions

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These solutions were prepared based on the law as in effect at November 30, 2012.

These solutions have been compared with those produced by other technical actuaries, and they represent my best understanding of the correct way to solve these problems. As usual, it seems easy to get an answer in the correct range as long as you are not actually taking the exam!

### Revision History:

May 14, 2019	Added note to solution for problem 48
April 29, 2019	Corrected solution for problem 2
April 2, 2017	Corrected solution for problem 19
January 18, 2017	Corrected solution for problem 28
February 16, 2016	Corrected solutions for problems 10 and 37
March 18, 2015	Corrected solutions for problems 5, 15, 20, 35 and 44
February 26, 2015	Added clarification to solution for problem 41
April 30, 2014	Corrected solutions for problems 20 and 27
January 30, 2014	Original solutions

### **NOTES on 2013 exam**

Based on the percentage of students who passed, the 2013 exam was easier than normal. Both the 2011 and 2012 exams were more difficult than other years' exams. I think the 2011 exam was much trickier than earlier years' exams.

<u>Exam</u> <u>Year</u>	<u>Pass</u> <u>Mark</u>	<u>Percentage</u> <u>Who passed</u>	
2013	72	58.7	(not a typo!)
2012	65	40.0	
2011	63	39.2	
2010	69	43.7	
2009	68	59.1	(not a typo!)
2008	63	37.2	

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### Problem 1 – Page 1

#### I. TRUE

This item is based on the certification that the enrolled actuary signs on the Schedule SB. The language is identical for the Schedule MB as well:

*“To the best of my knowledge, the information supplied in this schedule and accompanying schedules, statements and attachments, if any, is complete and accurate. Each prescribed assumption was applied in accordance with applicable law and regulations. In my opinion, each other assumption is reasonable (taking into account the experience of the plan and reasonable expectations) and such other assumptions, in combination, offer my best estimate of anticipated experience under the plan.”*

#### II. TRUE

It appears that items II and III are not based on anything specific in IRC Section 436 or in the 436 regulations. In the 436 regulation at 1.436-1(h)(4)(i), it gives a list of items that must be furnished, which includes “any other relevant factors”.

Items II and II are based on the idea that an AFTAP certification is subject to the various ASOPs (Actuarial Standards of Practice). Even if you don’t know the details of the ASOPs, you could probably guess the correct answer - this covers material that “all actuaries should know”.

This item is based on section 3.7 of ASOP 23 - Data Quality:

#### *“3.7 Use of Data*

*Because data that are completely accurate, appropriate, and comprehensive are frequently not available, the actuary should make a professional judgment about which of the following is applicable:*

*...*

*c. judgmental adjustments or assumptions can be applied to the data that allow the actuary to perform the analysis. If the actuary judges that the use of the data, even with adjustments and assumptions applied, may cause the results to be highly uncertain or contain a material bias, the actuary may choose to complete the assignment, but should disclose the potential existence of the uncertainty or bias, and, if reasonably determinable, their nature and potential magnitude;”*

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### Problem 1 – Page 2

#### III. TRUE

This item is based on section 3.3.3 of ASOP 41 - Actuarial Communications:

*“3.3 Requirements for Specific Types of Actuarial Communications - The following sections give the actuary guidance regarding specific types of actuarial communications.*

*3.3.3 Actuarial Report ... To the extent the data, assumptions, and methods used have been described in a previous actuarial report that is available to the intended audience, the actuary may, if appropriate under the circumstances, incorporate this information by reference into the actuarial report.”*

All three items are True

**Answer is D**

## 2013 EA-2L Exam Solutions

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### Problem 2

Similar to EA-2F 2011 #33

Revised 04/29/19

In general, the Top Heavy (T-H) determination date is the last day of the preceding plan year. An exception to this is the first plan year, when the determination date is the last day of the first plan year. Based on the default exam conditions, all three plans have a plan year equal to the calendar year. Each plan has a determination date of December 31, 2012.

Two of the three plans are part of a required 416 aggregation group, since they both include at least one key employee. Plan A is not part of the required aggregation group. If Plan A had to be aggregated with the others to allow them to pass coverage and nondiscrimination testing, then Plan A would be part of the required 416 aggregation group.

You must combine both plans B and C to determine the T-H status. If the entire aggregation group is T-H, then each of the plans would also be T-H for the year. Question T-23 of the 1.416-1 regulation requires you to use determination dates that fall within the same calendar year. This problem is simplified compared to earlier versions of this problem. All the plans have the same determination date.

Based on questions T-24 and T-25, the present value of accrued benefits for the DB plan (or account balance for the DC plan) is calculated as of the valuation date in the 12 month period ending on the determination date. All the plans have the same valuation date - which is the same as the determination date.

	Plan B	Plan C	Sum
2013 Determination date	12/31/12	12/31/12	
Valuation date within prior 12 months	12/31/12	12/31/12	
Key employees	14,500,000	17,000,000	31,500,000
Non-key employees	11,500,000	11,500,000	23,000,000

The Top heavy ratio is

$$57.80\% = 31,500 / (31,500 + 23,000)$$

**Answer is E**

## 2013 EA-2L Exam Solutions

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### Problem 3

TRUE

In ERISA 4211, it defines the denominator of the allocation fraction (in general) as

*“... the sum for the plan year in which such change arose and the 4 preceding plan years of all contributions made by employers who had an obligation to contribute under the plan for the plan year ...”*

The PBGC regulations under 4211.4 are more precise:

*“(b) The denominator of the allocation fraction is based on contributions that certain employers have made to the plan for a specified period. For purposes of these methods, and except as provided in §4211.12, "the sum of all contributions made" or "total amount contributed" by employers for a plan year means the amounts considered contributed to the plan for purposes of section 412(b)(3)(A) or section 431(b)(3)(A) of the Code, other than withdrawal liability payments or amounts that an employer is obligated to pay to the plan pursuant to section 305(e)(7) or ERISA or section 432(e)(7) of the Code (automatic employer surcharge).”*

**Answer is A**

### NOTE

Section 4211.12 of the PBGC regulations allows for modifications to the allocation fractions:

- (a) Changing the period for counting contributions
- (b) Excluding contributions of significant withdrawn employers
- (c) "Fresh start" rules under presumptive method
- (d) "Fresh start" rules under modified presumptive method

## 2013 EA-2L Exam Solutions

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### Problem 4

Similar to 2009 #25

Under the Rolling Five Method, the calculation of withdrawal liability is relatively simple. Since the withdrawal occurred during 2012, you should use the unfunded vested benefits at 12/31/2011. This is the first problem where you are given the withdrawal liability, and must solve for the contribution for an earlier year.

There is one thing to be careful of - the problem gives you two sets of data. One set is the total unfunded benefits, and the other is the unfunded vested benefits (UVB).

The next step is calculation of Company A's share of the 12/31/11 UVB. This is based on the ratio of Company A's contributions to the total contributions in the prior five years:

Year:	2007	2008	2009	2010	2011
-------	------	------	------	------	------

$$\text{A's share} = 25,000,000 * \frac{(300 + X/1,000 + 200 + 250 + 200)}{(3,000 + 2,500 + 3,300 + 3,000 + 4,000)}$$

It is easier to avoid arithmetic errors if you get rid of the extra zeroes in the contribution values. But it is a bit confusing when you are solving for the value of X.

$$\text{A's share} = 25,000,000 * (X/1000 + 950)/(15,800)$$

One simplifying factor is that you do not need to allow for the de minimis amount. Since the employer share exceeds 150,000, the deductible is zero (see note below). The employer share is equal to the given withdrawal liability of 1,800,000.

$$\begin{aligned} 1,800,000 &= 1.5823X + 1,503,165 \\ X &= 187,600 \end{aligned}$$

**Answer is B**

### NOTE

The mandatory de minimis is the lesser of 50,000 or 3/4% of the plan's total UVB. The deductible is the de minimis amount reduced by the excess of the allocated UVB over 100,000. Once the employer share reaches 150,000, the deductible becomes zero.

## 2013 EA-2L Exam Solutions

### Problem 5 – Page 1

Similar to EA-2F 2009 #37

Revised 03/18/15

This is a relatively straightforward 415 problem. The key point of the problem is knowing that the §415 limits are reduced for service (and participation) less than 10 years.

#### At 12/31/12

Age	58
Service	8 years
Participation	7 years

#### PLAN BENEFIT

The plan benefit is based on the five year final average pay. You need to apply the §401(a)(17) limit to each year of pay. You need to look at the earlier years, since this participant's pay decreased in recent years.

Year	Total Pay	401(a)(17) Limit	Limited Pay
2005	220,000	210,000	210,000
2006	240,000	220,000	220,000
2007	250,000	225,000	225,000
2008	200,000	230,000	200,000
2009	185,000	245,000	185,000
2010	200,000	245,000	200,000
2011	200,000	245,000	200,000
2012	200,000	250,000	200,000

$$\begin{aligned} \text{5 year final average pay at 12/31/09} &= (210,000 + 220,000 + 225,000 + 200,000 + 185,000)/5 \\ &= 208,000 \end{aligned}$$

$$\begin{aligned} \text{Accrued benefit at 12/31/09} &= 208,000 * 5 * 10\% \\ &= 104,000 \end{aligned}$$

$$\begin{aligned} \text{5 year final average pay at 12/31/12} &= (200,000 + 185,000 + 200,000 + 200,000 + 200,000)/5 \\ &= 197,000 \end{aligned}$$

$$\begin{aligned} \text{Accrued benefit at 12/31/12} &= 197,000 * 8 * 10\% \\ &= 157,600 \end{aligned}$$

The accrued benefit based on the lower final average pay is greater, due to the additional years of benefit accrual.



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### Problem 5 – Page 2

#### **415 COMP LIMIT**

The §415(b)(1)(B) compensation limit is reduced when service is less than ten years. This limit is based on the highest three consecutive years of pay. Based on the 415 regulation that became final in 2007, earnings under §415 are subject to the §401(a)(17) limit.

$$\begin{aligned}\text{High 3 year average pay} &= (210,000 + 220,000 + 225,000)/3 \\ &= 218,333\end{aligned}$$

$$\begin{aligned}\text{\$415 compensation limit} &= 218,333 * (8/10) \\ &= 174,667\end{aligned}$$

#### **415 DOLLAR LIMIT**

Under §415(b)(1)(A), the dollar limit is reduced when participation is less than ten years.

$$\begin{aligned}\text{\$415 dollar limit during 2012} &= 200,000 * (7/10) && \text{for ages 62-65} \\ &= 140,000\end{aligned}$$

The 415 limit on a life annuity basis is the lesser of the compensation limit of 174,667 and the dollar limit of 140,000. The final plan benefit is limited to 140,000.

**Answer is C**

## 2013 EA-2L Exam Solutions

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### Problem 6

TRUE

This is the first question testing the details of IRC 436(b) restrictions for Unpredictable Contingent Event (UCE) benefits and shutdown benefits. The main point of the question is that the UCE occurred in 2012, and the 2012 certified AFTAP was 68%. As a result, the 436(b) restriction did not apply for 2012.

The presumed AFTAP at 01/01/2013 is 68%. Since the 2013 AFTAP is not certified by 04/01/2013, the presumed AFTAP drops to 58% at that date. But this does not trigger a 436(b) restriction for the 2012 UCE. This is clarified in the regulation at 1.436-1(b)(4):

*(4) Prior unpredictable contingent event.*

*Unpredictable contingent event benefits attributable to an unpredictable contingent event that occurred within a period during which no limitation under this paragraph (b) applied to the plan are not affected by the limitation described in this paragraph (b) as it applies in a subsequent period.*

**Answer is A**

## 2013 EA-2L Exam Solutions

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### Problem 7

Similar to 2008 #02
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FALSE

In 411(b)(1), there are three different benefit accrual rules. Each defined benefit plan must satisfy at least one of these rules:

- (A) Three percent rule
- (B) 133 1/3% rule
- (C) Fractional rule

Under the 3% rule, each year's accrued benefit must be at least equal to 3% times years of service times the projected benefit. This plan can not satisfy the 3% rule, since the benefit accrues over more than 33.333 years of service.

The 133 1/3% rule for benefit accruals requires that the rate of benefit accrual for any later plan year is not more than 133 1/3% of the accrual rate for an earlier plan year. Since the ratio of 5.25% to 3.75% is more than 4/3, this plan design does not satisfy the 133 1/3% rule.

It should be clear that the benefit formula also fails the fractional rule. The reason is that the accrued benefit is not defined in the manner required by the fractional rule.

**Answer is B**

#### NOTE

You may not be convinced that the plan benefit does not satisfy the fractional rule. In this problem, it is easy to demonstrate this fact.

The first step is to calculate the projected benefit. Assume the participant enters the plan at age 21 with one year of service. The participant will have 44 years of service at normal retirement age 65.

$$\begin{aligned}\text{Projected benefit} &= (\text{Projected pay}) * [10(3.75\%) + 10(4.50\%) + 24(5.25\%)] \\ &= (\text{Projected pay}) * 208.5\%\end{aligned}$$

Under the fractional rule of 411(b)(1)(C), each year's accrued benefit must be at least equal to a pro-rata portion of the projected benefit. The pro-rata portion is the ratio of service at that age divided by total potential service. This plan fails the fractional rule at the end of the first year:

$$\begin{aligned}\text{Accrued benefit} &\geq (1/44) * (\text{Projected pay}) * 208.5\% \\ &\geq (\text{Projected pay}) * 4.74\%\end{aligned}$$

The actual accrued benefit after one year of service is too small - it is only 3.75% of pay.

## 2013 EA-2L Exam Solutions

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### Problem 8

FALSE

This is the first question testing any details regarding mass withdrawal of a multiemployer plan. In ERISA 4219(c)(1)(D)(i), it specifies that the 20 year payment cap does not apply in the event of a mass withdrawal.

**Answer is B**

## 2013 EA-2L Exam Solutions

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### Problem 9

FALSE

This is a simple question on the definition of the annual withdrawal liability payment. In ERISA 4219(c)(1)(C)(i), it defines the annual payment amount as the product of (1) and (2):

- (1) Highest contribution rate in the 10 years including year of withdrawal
- (2) Highest consecutive 3 year average of hours in the 10 years excluding year of withdrawal

**Answer is B**

## 2013 EA-2L Exam Solutions

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### Problem 10

Similar to 2011 #22
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Revised 02/16/16

FALSE

§4980(a) of the Internal Revenue Code states that the excise tax upon reversion is 20%. §4980(d) states that the excise tax increases to 50% unless either

- The employer establishes a “qualified replacement plan”, or
- The employer grants certain benefit increases prior to plan termination.

If there is any reversion to the employer, the excise tax will always be greater than zero.

**Answer is B**

### NOTES

1. The general definition of a qualified replacement plan includes 95% participation by continuing employees from the terminating plan, plus an asset transfer of at least 25% of the excess assets. You can reduce the 25% asset transfer by the value of benefit improvements made within the 60 days ending on the date of plan termination.
2. Instead of establishing a “qualified replacement plan”, the plan can grant benefit increases at plan termination. The benefit improvements must meet three criteria:
  - Present value  $\geq$  20% of the reversion (prior to the benefit changes)
  - Uniform for all participants
  - Benefit increases for non-active participants can not exceed 40% times [20% of the reversion (prior to the benefit changes)]

## 2013 EA-2L Exam Solutions

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### Problem 11

Similar to 2009 #32
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This question is similar to other recent exam questions on the 901.20 regulations. The main difference is that this question covers the newer version of these regulations (updated in 2011).

**I. FALSE**

**II. FALSE**

In 901.20(k), it requires the actuary to report any non-filing of actuarial documents they have signed with the applicable agency. It does not require the actuary to report the possible existence of fraud in connection with performance of actuarial services.

**III. TRUE**

In 901.20(b)(2), it states the actuary should not perform actuarial services for any person or organization which may utilize their services in a fraudulent manner (or in a manner inconsistent with law).

Only item III is True.

**Answer is C**

## 2013 EA-2L Exam Solutions

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### Problem 12

Similar to 2012 #35
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TRUE

This question tests your knowledge of the requirements of the Internal Revenue Code and ERISA regarding fiduciary standards. Many similar items have appeared in True/False questions on prior exams.

According to ERISA, a fiduciary is any person so named in the plan document or any person who exercises any discretionary authority or control with respect to the management or administration of the plan or its assets. See IRC Section 4975(e)(3).

Since Smith selects the annuity provider for the plan, they do satisfy the definition of a fiduciary.

**Answer is A**



## 2013 EA-2L Exam Solutions

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### Problem 13

Similar to 2011 #17
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TRUE

IRC Section 411(a)(8) defines normal retirement age as the earlier of

1. Attainment of "normal retirement age" as defined under the plan, or
2. The later of
  - Attainment of age 65 or
  - 5<sup>th</sup> anniversary of participation date

This definition requires that the participant's normal retirement age can be no later than attainment of age 65 and the 5<sup>th</sup> anniversary of participation. The definition in the problem is allowable, since attainment of age 62 is always earlier.

**Answer is A**

NOTE

The definition for early retirement age under the plan is immaterial.

## 2013 EA-2L Exam Solutions

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### Problem 14

Similar to 2009 #40
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This question tests your knowledge of the PBGC premium late payment penalty charges. This is the first question that tested the different calculation when the PBGC has issued a notice of the delinquency.

In that case, the penalty is 5% per month (or portion thereof), with a minimum total penalty of \$25. The period from 10/15/2012 to 02/28/2013 is 4.5 months, so the penalty is 25%:

$$6,250 = 5(5\%)(25,000)$$

**Answer is E**

Here is the description from the PBGC premium package:

#### ***Late Payment Penalty Charges***

*The late payment penalty charge is established by us, subject to ERISA's restriction that the penalty not exceed 100 percent of the unpaid premium amount. Subject to this cap, the penalty is a percentage of the unpaid amount for each month (or portion of a month) it remains unpaid with a minimum penalty of \$25. The monthly rate is higher or lower depending on whether the premium underpayment is "self-corrected."*

*The penalty rate is 1 percent of the late premium payment per month if the late payment is made on or before the date when PBGC issues a written notification indicating that there is or may be a premium delinquency (for example, a statement of account (premium invoice), a past-due-filing notice, or a letter initiating an audit). A penalty rate of 5 percent per month applies to payments made after the PBGC notification date.*

## 2013 EA-2L Exam Solutions

### Problem 15 – Page 1

Similar to 2005 #25

Revised 03/18/15

The key part of the problem is figuring out whether the plans must be aggregated for Top Heavy (T-H) testing under 416. Both plans are part of a required 416 aggregation group, since they both include at least one key employee. You must combine the two plans to determine the T-H status. If the entire aggregation group is T-H, then each of the plans would also be T-H for the year.

You need to calculate the T-H minimum benefit for each employee. You need to figure out which years the plans were Top Heavy to determine the years of T-H service. Since the plans must be aggregated for T-H testing, you should use the T-H ratio shown for both plans.

The trick to the question is that you do NOT use the T-H ratio of 70% for Plan A for 2005. The reason is that Plan A was effective at 01/01/06. There was no participation service prior to 2006.

Smith is covered by Plan A and was hired in 2005. Smith's T-H service is only three years: 2010 through 2012. Jones is covered by Plan B and was hired in 2008. Jones' T-H service is also three years: 2010 through 2012.

The problem asks for the vested accrued benefits. These plans both use the mandatory minimum graded vesting schedule. Now you can calculate the plan benefits for both employees:

Plan	Smith A	Jones B
Hire date	01/01/2005	01/01/2008
"01/01/13" service	8	5
Annual pay	50,000	50,000
Plan accrued benefit	$1.5\% \times (8) \times 50,000$ = 6,000	$5(250)$ = 1,250

Neither Smith nor Jones is a key employee, so they are both eligible for the T-H minimum benefit. For DB plans, the T-H minimum is 2% times T-H service times T-H pay.

	Smith	Jones
Top Heavy service	3	3
T-H minimum	$2\% \times (3) \times 50,000$ = 3,000	$2\% \times (3) \times 50,000$ = 3,000
Final accrued benefit	6,000	3,000
Graded vested percentage	100%	60%
T-H Vested percentage	100%	80%
Final vested benefit	6,000	2,400

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### Problem 15 – Page 2

Another trick to this question is the effect of the T-H vesting schedule. Jones was 60% vested under the mandatory minimum graded vesting schedule, but 80% vested under the T-H vesting schedule.

The sum of the annual vested benefits is 8,400.

**Answer is B**

#### NOTE

In the 2005 version this problem, benefit accruals were based on participation service. In this problem, you could ignore the effective date of the plan for calculating the plan benefits.

## 2013 EA-2L Exam Solutions

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### Problem 16

Similar to 2011 #25

FALSE

This is a very simple problem on calculating the variable rate premium (VRP). The key point is knowing the definition of the variable rate premium cap.

The plan is eligible for the cap if there are 25 or less employees on the first day of the plan year. For the 2013 filing, you are told there are 12 employees and 10 participants, so the plan is eligible for the VRP cap.

The variable rate premium cap is calculated based on the number of plan participants, and it is equal to  $\$5 \times (\text{participant count})^2$ . Based on the 2013 data, the participant count is 10:

$$\begin{aligned}\text{VRP cap} &= 5(10)^2 \\ &= 500\end{aligned}$$

The VRP cap of 500 is less than the premium value of 540 given in the problem.

**Answer is B**

### NOTE

You can verify the premium value given in the problem. Ignoring the cap, you calculate the variable rate premium as .009 times the UVB. The UVB must be rounded up to the next higher multiple of 1,000:

$$\begin{aligned}\text{UVB} &= 240,000 - 180,000 \\ &= 60,000\end{aligned}$$

$$\begin{aligned}\text{VRP} &= 60,000 * .009 \\ &= 540\end{aligned}$$

## 2013 EA-2L Exam Solutions

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### Problem 17

Similar to 2011 #15
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FALSE

In a standard termination, the assets must be sufficient to cover all benefit liabilities at the date of distribution of assets. But it is possible for assets to be insufficient at the termination date.

There are two ways to make the plan sufficient:

- The plan sponsor can sign a commitment to make the plan sufficient
- A majority owner can elect to forgo receipt of plan benefits to the extent necessary to make the plan sufficient

Since Smith is not a majority owner, they can not make the election to forgo receipt of plan benefits.

**Answer is B**

NOTE

A majority owner is someone who owns 50% or more of the company.

## 2013 EA-2L Exam Solutions

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### Problem 18 – Page 1

Similar to 2012 #43

The main point of this problem is calculating the additional contribution under IRC 436 to allow the plan amendment to go into effect. To do this, you must know the rules in the 436 regulation regarding computation of adjusted funding target attainment percentage (AFTAP).

The amount of the additional contribution under IRC 436 is different based on the value of the AFTAP prior to the amendment. If that value is less than 80%, then the contribution must be equal to the increase in the funding target due to the plan amendment. If the AFTAP is at least 80% prior to the amendment, then the contribution must be sufficient to bring the AFTAP up to 80% after reflecting the amendment.

The AFTAP is defined in IRC 436(j)(2), and it is similar to the funding target attainment percentage (FTAP) defined in 430(d)(2). The AFTAP has an adjustment for any non-HCE annuity purchases (NHAP) in the prior two years. The calculation uses the actuarial asset value (AAV), the carryover balance (CB), the prefunding balance (PB), and the non At-Risk funding target:

$$\text{AFTAP} = \frac{\text{NHAP} + \text{AAV} - \text{CB} - \text{PB}}{\text{NHAP} + \text{Funding Target (non At-Risk)}}$$

First you need to calculate the AFTAP prior to the plan amendment. This is the second exam problem which provides information about annuity purchases for prior years. You should ignore the NHCE annuity purchases during 2013:

$$\begin{aligned} \text{2013} \\ \text{AFTAP} &= \frac{90,000 + 1,750,000 - 0 - 0}{90,000 + 2,175,000} \\ \text{Pre-amend} \\ &= 81.2\% \end{aligned}$$

Now you need to calculate the AFTAP after the plan amendment. In some cases, no additional 436 contribution will be required. This is unlikely for an exam question - however, see 2012 exam problem 8.

$$\begin{aligned} \text{2013} \\ \text{AFTAP} &= \frac{90,000 + 1,750,000 - 0 - 0}{90,000 + 2,175,000 + 175,000} \\ \text{Post-amend} \\ &= 75.4\% \end{aligned}$$

The plan sponsor will make an additional IRC 436 contribution to allow the plan amendment to take effect. Assume the contribution is equal to Y, paid at the valuation date. One point of the problem is that the required contribution (X in this problem) is larger than Y, since it is not paid at the valuation date. The IRC 436 contribution is discounted to reflect the later date of payment.

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### Problem 18 – Page 2

2013

$$\begin{array}{lcl} \text{AFTAP} & = & \frac{90,000 + (1,750,000 + Y - 0 - 0)}{90,000 + 2,175,000 + 175,000} \\ \text{Post-amend} & & \end{array}$$

$$= 80.0\%$$

$$Y + 1,840,000 = .80(2,440,000)$$

$$Y = 112,000$$

If the IRC 436 contribution was paid at 01/01/2013, it would be 112,000. You need to reflect the actual payment date of 09/30/2013. The question asks for X, which is the IRC 436 contribution paid at 09/30/2013. Since this is a 2013 plan year contribution, you must adjust the contribution value with the 2013 effective interest rate:

$$\begin{array}{lcl} 112,000 & = & X(1.052)^{-9/12} \\ X & = & 112,000(1.052)^{9/12} \\ & = & 116,340 \end{array}$$

**Answer is C**

#### NOTE

You could use simple interest to adjust the IRC 436 contribution. This produces a slightly higher result, which also falls in answer range C:

$$\begin{array}{lcl} 112,000 & = & X / [1 + (.052)(9/12)] \\ X & = & 112,000[1 + (.052)(9/12)] \\ & = & 116,368 \end{array}$$



### Problem 19

Revised 04/02/17

#### REASON - TRUE

Based on the information given, the plan must make a 4010 filing for the 2013 plan year.

#### ASSERTION - NOT CORRECT EXPLANATION

Plans are exempt from 4010 reporting if they satisfy the exemption at 4010.11. All the plans in the controlled group must satisfy these conditions:

- The aggregate 4010 funding shortfall for all plans maintained by the controlled group is less than \$15 million, and
- Plan sponsor has made their quarterly contributions timely, and
- No minimum funding waivers

The reason the plan is not exempt is that they did not make their quarterly contributions on a timely basis.

**Answer is B**

## 2013 EA-2L Exam Solutions

### Problem 20

Similar to 2010 #42

Revised 03/18/15

This problem asks for the qualified pre-retirement spouse annuity (QPSA), payable at the earliest date. This is an annuity type similar to a qualified joint and survivor annuity (QJSA), which is defined in 417(b)(1) as a joint and survivor annuity of at least 50%.

The problem defines the QJSA with a 50% benefit to the spouse. Under IRC 417(g), the qualified optional survivor annuity (QOSA) must have a continuation percentage of 75%. Under IRC 417(c), the QPSA must have a continuation percentage at least as large as the QJSA. Since you are not given 100% J&S factors, the QPSA must equal 50%, and the QOSA is equal to 75%.

In 417(c)(1)(A)(ii), if the participant dies after their earliest retirement age, the annuity should commence at current age. Based on the plan provisions, Smith's earliest retirement age is their current age, which is age 60. The calculations below are based on benefit commencement at 60.

You are told the participant has been married for more than one year, so it is necessary to provide the QPSA (see 417(d)). The majority of the problem solution is a benefit calculation.

#### As of 01/01/2013

Age	60
Service	12
Earliest Retirement Age	60

Monthly accrued Benefit	800
Vesting percentage	100%
Vested benefit	800

Early Retirement reduction	.75
	$= 1 - 5.0\% * (65 - 60)$
Early Retirement benefit payable at age 60	600
	$= .75 * 800$

50% J&S Reduction	92%
50% J&S Benefit	552
50% J&S Death benefit	276

**Answer is B**

#### NOTE

One potential area for confusion is that you should consider both the vesting percentage and the early retirement reduction. Based on IRC 411, the participant becomes 100% vested when they reach normal retirement age. Depending on the plan design, they may not become 100% vested at early retirement age.

## 2013 EA-2L Exam Solutions

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### Problem 21

Similar to 2011 #05
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TRUE

In general, any transfer to, or use by or for the benefit of, a disqualified person of the income or assets of a plan is a prohibited transaction under 4975(c)(1)(D).

**Answer is A**

## 2013 EA-2L Exam Solutions

### Problem 22 – Page 1

Identical to 2008 #19

This problem asks for the aggregate most valuable accrual rate (MVAR). First you should calculate the MVAR for the defined benefit plan. Then you determine the normal accrual rate (NAR) for the DC plan, cross tested on a benefits basis. The aggregate MVAR is the sum of the DB plan MVAR and the DC plan NAR.

### **DB PLAN**

Based on the measurement period, the method to calculate accrual rates is the “Annual method”. You should use the given increase in the accrued benefit (“annual accrual”) for 2013. You must determine the most valuable form of payment at each benefit commencement age up to testing age (65). The Qualified J&S form is always the most valuable form of benefit payment (as defined in the 1.401(a)(4) regulation).

You calculate the most valuable accrual rate (MVAR) by dividing the greatest normalized change in the accrued benefit by (testing service)\*(average annual compensation). In this problem, you should use the "testing compensation" given.

Smith is age 60 at 12/31/2013, and is not eligible for early retirement until age 62. To calculate the most valuable accrual rate, you need to allow for payment at ages 62 to 65, converted to a QJ&S form. The normalized benefit reflects a life annuity payment form at testing age 65:

$\Delta$							
<b>Accrued</b>		<b>Early ret</b>		<b>100% J&amp;S</b>		<b>Normalized</b>	
<b>Age</b>	<b>Benefit</b>	<b>ERF</b>	<b>J&amp;S</b>	<b>J&amp;S benefit</b>	<b>Annuity</b>	<b>Interest</b>	<b><math>\Delta</math> Benefit</b>
	(1)	(2)	(3)	(4)=(1)(2)(3)	(5)	(6)	(4)(5)(6) / 8.38
62	5,000	.88	.90	3,960	10.60	$(1.085)^3$	6,398
63	5,000	.94	.90	4,230	10.48	$(1.085)^2$	6,228
64	5,000	.98	.90	4,410	10.35	$(1.085)^1$	5,910
65	5,000	1.00	.90	4,500	10.22	1.00	5,488

In most problems of this type, the most valuable benefit is at the earliest retirement age. The wrinkle here is the unusual pattern of early retirement factors. If the early retirement factor was linear (e.g. X% per year prior to age 65), then you would not need to do any calculations after age 62.

## 2013 EA-2L Exam Solutions

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### Problem 22 – Page 2

Now use the greatest normalized benefit, and divide by both testing service and testing compensation to determine the accrual rate:

$$\begin{aligned}\text{MVAR} &= \frac{6,398}{(1) \cdot (50,000)} \\ &= 12.80\%\end{aligned}$$

### DC PLAN

The problem states that the DB and DC plans are aggregated for nondiscrimination testing. In addition, the plans are tested on a benefits basis.

You need to convert the Profit sharing plan allocation to an equivalent annual benefit. One minor trick to the problem is that you do not include the 401(k) deferral. The 401(k) deferral is tested for nondiscrimination using the ADP / ACP test.

Age 60 alloc	4,000
Accum to 65	$6,015 = 4,000(1.085)^5$
Annual benefit	$718 = 6,015 / 8.38$
NAR	$1.44\% = 718 / 50,000$

The aggregate MVAR is the sum of the DB plan MVAR and the DC plan NAR:

$$\text{AGG MVAR } 14.24\% = 1.44\% \text{ NAR} + 12.80\% \text{ MVAR}$$

**Answer is D**

### NOTES

1. If the problem said the accrual rate calculations were for the 410(b) average benefit percentage test, then you would include the 401(k) deferral in the DC plan NAR.
2. This problem may produce a feeling of déjà vu - it is IDENTICAL to 2008-19.

## 2013 EA-2L Exam Solutions

### Problem 23

This problem is a straightforward benefit calculation. There is nothing very tricky about it, since it clearly describes the late retirement benefit under the plan. It is the greater of continued accrual and the actuarial equivalent of the normal retirement benefit.

You should calculate benefits at both normal retirement age (which is 65 by default) and at current age. One minor point of the problem is that benefit accrual service is limited to 20 years.

Retirement date	01/01/12	01/01/13
Retirement age	65	66
Past service	21 years	22 years
Final compensation	44,000	47,000
Benefit service	20 years	20 years
Plan benefit	$2\%(20)(44,000)$ $=17,600$	$2\%(20)(47,000)$ $= 18,800$

The next step is calculation of the actuarial increase factor. In general, the theoretically correct definition of the actuarial increase factor depends on the death benefit under the plan. This is the same basic idea used to develop the formulas for the actuarial adjustment of the IRC 415 dollar limit after age 65.

If there is no death benefit, then there is a full forfeiture upon death. The actuarial increase factor should include mortality and interest. If there is a 100% death benefit, then there is no forfeiture upon death. The actuarial increase factor should exclude mortality and only reflect interest.

Death benefit definition	Actuarial Increase factor
Waived QPSA, or NO death benefit (complete forfeiture on death)	$N_{65}^{(12)} / N_X^{(12)} = [D_{65} \ddot{a}_{65}^{(12)}] / [D_X \ddot{a}_X^{(12)}]$
100% of PV of accrued benefit (no forfeiture on death)	$(1+i)^{x-65} (\ddot{a}_{65}^{(12)} / \ddot{a}_X^{(12)})$

This problem does not give you the interest rate, so you can't use the second expression. You can use the factors given in the problem to calculate the actuarial increase using the first expression:

$$\begin{aligned} [D_{65} \ddot{a}_{65}^{(12)}] / [D_X \ddot{a}_X^{(12)}] &= [D_{65} / D_X] [\ddot{a}_{65}^{(12)} / \ddot{a}_X^{(12)}] \\ [D_{65} / D_{66}] [\ddot{a}_{65}^{(12)} / \ddot{a}_{66}^{(12)}] &= 1.07[10.87/10.61] \\ &= 1.096 \end{aligned}$$

The actuarially increased benefit at age 66 is  $19,293 = 1.096 \times 17,600$ . The final retirement benefit at age 66 is 19,293 (the greater of 19,293 and 18,800).

**Answer is D**

## 2013 EA-2L Exam Solutions

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### Problem 24

Similar to 2012 #32

Under the Rolling Five Method, the calculation of withdrawal liability is relatively simple. In this problem you don't have to calculate the employer share of the UVB, since it is given as 115,000.

After determining Employer A's share of the UVB, the next step is calculation of the de minimis amount. Then a deductible is calculated based on the amount of the de minimis and the employer's share of the UVB. The final withdrawal liability is calculated as the employer's share less the deductible.

The regular de minimis is the lesser of 50,000 or 3/4% of the plan's total UVB:

$$\begin{aligned}\text{De minimis} &= \text{Lesser of } 50,000 \text{ and } .0075 * 5,000,000 \\ &= 37,500\end{aligned}$$

The deductible is the de minimis amount reduced by the excess of the allocated UVB over 100,000:

$$\begin{aligned}\text{Deductible} &= 37,500 - (115,000 - 100,000) \\ &= 22,500\end{aligned}$$

The final employer withdrawal liability is the employer share minus the deductible:

$$\begin{aligned}\text{W/D liability} &= 115,000 - 22,500 \\ &= 92,500\end{aligned}$$

**Answer is D**

## 2013 EA-2L Exam Solutions

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### Problem 25 – Page 1

Similar to 2011 #29

The problem gives you the 01/01/2012 valuation results, but does not specify when the adjusted funding target attainment percentage (AFTAP) was certified. The first step in the problem is to calculate the 2012 AFTAP.

The AFTAP is defined in IRC 436(j)(2), and it is similar to the funding target attainment percentage (FTAP) defined in 430(d)(2). The AFTAP has an adjustment for any non-HCE annuity purchases (NHAP) in the prior two years. The calculation uses the actuarial asset value (AAV), the carryover balance (CB), the prefunding balance (PB), and the non At-Risk funding target:

$$\text{AFTAP} = \frac{\text{NHAP} + \text{AAV} - \text{CB} - \text{PB}}{\text{NHAP} + \text{Funding Target (non At-Risk)}}$$

The problem tells you nothing about annuity purchases for prior years, so you can safely assume they are zero.

$$\begin{aligned} \text{2012 AFTAP} &= \frac{0 + 735,000 - 50,000 - 0}{0 + 800,000} \\ &= 85.62\% \end{aligned}$$

Since this plan offers a lump sum payment option, it is subject to the IRC 436(d) benefit restrictions on accelerated benefit distributions. Since the AFTAP is at least 80%, this plan could pay lump sums in 2012.

In order for the plan to pay lump sum benefits in 2013, the AFTAP must be at least 80%. You need to determine the 2013 presumed AFTAP to see if it satisfies IRC 436(d). The trick to the question is that the “deemed reduction” rules may require a decrease in the CB to occur at 04/01/2013.

At 01/01/2013, the presumed AFTAP for 2013 is the same as the 2012 value of 85.6%. The problem states that the 2013 AFTAP was not certified, and asks for the deemed reduction in the CB at 04/01/2013.

You need to determine the presumed value of the funding target (PFT) at 04/01/2013. This calculation is based on the presumed AFTAP at 04/01/2013. There is a 10% reduction in the presumed AFTAP at that date, which triggers the IRC 436(d) benefit restrictions on accelerated benefit distributions. The presumed AFTAP at 04/01/2013 is equal to 75.62%.



## 2013 EA-2L Exam Solutions

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### Problem 25 – Page 2

$$\begin{array}{l} \text{Presumed} \\ \text{AFTAP} \end{array} = \frac{\text{NHAP} + \text{AAV} - \text{CB} - \text{PB}}{\text{NHAP} + \text{Presumed Funding Target (non At-Risk)}}$$

$$\begin{array}{l} 04/01/2013 \\ \text{Presumed} \\ \text{AFTAP} \end{array} = \frac{0 + 730,000 - 50,000 - 0}{0 + \text{PFT}} = 75.62\%$$

$$\begin{array}{l} \text{PFT} \end{array} = (730,000 - 50,000) / 75.62\% = 899,233$$

Since the presumed AFTAP is less than 80%, there may be a deemed reduction under IRC 436(f)(3). If it is possible to reduce the CB (and PB) enough to increase the AFTAP to 80%, then this reduction must occur as if the employer had elected to do so under IRC 430(f). The simplest approach is to calculate the final value of the CB that produces a presumed AFTAP that is equal to 80%:

$$\begin{array}{l} \text{Desired Presumed} \\ \text{AFTAP} \end{array} = \frac{0 + 730,000 - 0 - (50,000 - X)}{0 + 899,233} = 80.0\%$$

$$\begin{array}{l} .80(899,233) = 730,000 - (50,000 - X) \\ 719,386 = 680,000 + X \\ X = 39,386 \end{array}$$

**Answer is D**

## 2013 EA-2L Exam Solutions

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### Problem 26

FALSE

This is the second question asked on calculating the 415 limit for a participant covered by multiple DB plans. The key point to the question is that companies A and B constitute a controlled group of corporations. These plans must be aggregated for calculating the 415 limits.

Smith owns more than 50% of Company A and 100% of Company B. Based on the 415 regulation, the controlled group rules must be applied using a 50% threshold instead of the usual 80% threshold. As a result, for 415 purposes, both Company A and Company B are members of the same controlled group.

Here is the applicable language from the 415 regulation:

*1.415(f) Special rules--*

*(1) Affiliated employers. Pursuant to section 414(b) and §1.414(b)-1, all employees of all corporations that are members of a controlled group of corporations (within the meaning of section 1563(a), as modified by section 1563(f)(5), and determined without regard to section 1563(a)(4) and (e)(3)(C)) are treated as employed by a single employer for purposes of section 415. ... Pursuant to section 415(h), for purposes of section 415, sections 414(b) and 414(c) are applied by using the phrase "more than 50 percent" instead of the phrase "at least 80 percent" each place the latter phrase appears in section 1563(a)(1) and in the regulations under section 414(c) (except for purposes of determining whether two or more organizations are a brother-sister group of trades or businesses under common control under the rules in §1.414(c)-2(c)).*

**Answer is B**

NOTE:

This problem is vaguely similar to an earlier problem on 415 limits for a participant covered by multiple DB plans. That problem was 2006 #18, which tested aggregation of a multiemployer plan with non-multiemployer plan.

## 2013 EA-2L Exam Solutions

### Problem 27

Similar to 2010 #35

Revised 04/30/14

This problem tests the 2008 changes (due to PPA 2006) in the method for calculating the Variable Rate Premium (VRP) on the PBGC-1 Form, Schedule A. This calculation is similar to the old General rule calculation of the variable rate premium.

In this problem, you are given values of the Standard and Alternative Premium Funding Target at 01/01/2013. The problem states that an election was made to use the Alternative Premium Funding Target.

The variable rate premium is calculated based on the unfunded vested benefits liability. This is defined as the excess of the premium funding target over the adjusted market value of assets.

You must use the market value of assets at 01/01/2013. Since the market value excludes receivable contributions, you must add the discounted value of contributions paid for plan years prior to the premium payment year. You only include the receivable if it has been deposited on or before the date the variable rate premium is paid.

There is a potential trick to this problem, since it does not tell you the actual filing date. The filing deadline for this plan varies depending on the plan size. This is a large plan (500 or more participants), so the filing date is 10/15/2013. Since both of the 2012 receivable contributions are paid prior to that date, they both should be included in the asset value.

The interest rate used for discounting the receivable contribution is the Effective Interest Rate for the plan year that corresponds to the contribution. In this problem, that is the 2012 plan year. The interest rate used for discounting is 5.75%:

$$\begin{aligned}\text{Unadjusted Market value} &= 44,000,000 \\ \text{Adjusted market value} &= 44,000,000 + 900,000(1.0575)^{-5/12} \\ &\quad + 1,000,000(1.0575)^{-8.5/12} \\ &= 45,859,079 \\ \text{ALT premium funding target} &= 54,500,000 \\ \text{Unfunded vested liability} &= 54,500,000 - 45,859,079 \\ &= 8,640,921\end{aligned}$$

The unfunded vested liability must be rounded up to the next multiple of 1,000. The last step is to multiply the adjusted value of the unfunded vested liability by .009:

$$\begin{aligned}\text{Variable rate premium} &= 8,641,000 * .009 \\ &= 77,769\end{aligned}$$

**Answer is D**

#### NOTE

You could use simple interest, which gives an adjusted market value of 45,858,714. The resulting unfunded vested liability is 8,641,286, and the variable rate premium is 77,778. As expected, this also is in answer range D.

## 2013 EA-2L Exam Solutions

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### Problem 28 – Page 1

Similar to 2012 #25
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This is not a typical PBGC guaranteed benefits question. This question tests your knowledge of the five year phase-in calculations. The key point of the question is how to do the asset allocation.

The solution requires you to determine the benefits in each PBGC Priority Category. The first part of the problem is calculation of the Priority Category 3 (PC3) benefit. The date of plan termination (DOPT) is 01/01/2013. Participants in PC3 are those who were (or could have been) in pay status at DOPT-3, or 01/01/2010. The early retirement eligibility that is used is based on the plan provisions in effect at DOPT-3.

Priority Category 3 benefits are the lowest amount payable in the three years preceding DOPT, determined based on lowest level of plan benefits in effect for the five years preceding DOPT. There are no maximum benefit limits on PC3 benefits. For participants who were not in pay status at DOPT-3, the PC3 benefit is calculated as if they retired at DOPT-3.

<b>Smith: PC3 benefit</b>	
Date of birth	01/01/53
Date of hire	01/01/83
01/01/2010 age	57
01/01/2010 service	27
01/01/2010 final average compensation	100,000.00 (assumed)
01/01/2010 plan Early retirement factor	60% = 1 - 5%(65-57)
01/01/1990 plan accrual rate	1.00%
01/01/1990 plan accrued benefit at 01/01/10	27,000.00 = (27)(1.0%)(100,000)
01/01/1990 plan retirement benefit at 01/01/10	1,350.00 = 60%(27,000.00)/12

The present value of Smith's PC3 benefit at their current age is  $260,658 = 12(1,350)(16.09)$ . This is far less than the market value of 450,000, so you need to look at the benefits in Priority Category 4 (PC4).

PC4 is defined based on the five year phase-in of guaranteed benefits (for all employees). After you subtract the benefit in Priority Category 3, you will have the remaining benefit allocated to Priority Category 4.

Guaranteed benefits are based on the vested accrued benefits of the plan participants. In calculating the guaranteed benefit, changes in vesting schedule, normal retirement age, and normal form of annuity payment are all considered as changes in benefit amount that are subject to the phase in rules.

The PBGC maximum monthly guaranteed benefit (MGB) is defined as the lesser of the adjusted ERISA §4022(b) value, or the highest five year consecutive compensation. The MGB is defined assuming payment on a life annuity basis at age 65.

## 2013 EA-2L Exam Solutions

### Problem 28 – Page 2

Revised 01/18/17

You should use the 2013 MGB value, since the date of plan termination is 01/01/2013. The 2013 MGB at 65 is 4,789.77 (from the tables given with the exam). You must reduce the MGB for benefit commencement ages before 65. The MGB should be adjusted based on the later of the age at DOPT, or the age at benefit commencement. Based on the PBGC study note, it is correct to adjust the MGB for age, even when it is based on the highest five year compensation.

The 2010 plan amendment was effective on 10/01/2010. For purposes of measuring the years that each plan was effective, you use the later of the effective date and the adoption date. The 10/01/2010 plan has been in effect for two full years at DOPT, from 10/01/2010 to 10/01/2012.

The problem states that participants can receive early retirement benefits at age 55, if they have at least 10 years of service. The problem gives the PBGC expected retirement age (XRA) for each participant, as well as present value factors at current age for each participant's XRA.

	Smith	Jones
Date of birth	01/01/53	01/01/68
01/01/13 age	60	45
Date of hire	01/01/83	01/01/93
Vesting service	30	20
Eligible for early retirement?	YES	NO
Assumed retirement age	60	58
Majority owner?	NO	NO
Vesting percentage	100%	100%

One point of the problem is that you should use an assumed retirement at age 58 for Jones, even though they are only age 45 at DOPT. This is because the problem gives Jones' XRA as age 58. The reduction factor for the MGB at ages 58 and 60 is from the tables given with the exam.

	Smith	Jones
5 year average compensation	100,000.00/12	80,000.00/12
MGB at 65 (life annuity)	4,789.77	4,789.77
Assumed retirement age	60	58
MGB reduced for retirement age	$4,789.77 * .65$ $= 3,113.35$	$4,789.77 * .57$ $= 2,730.17$
01/01/90 plan benefit	$1.0\%(30)(100,000)/12$ $= 2,500.00$	$1.0\%(20)(80,000)/12$ $= 1,333.33$
Early retirement benefit, reduced 5% per year before 65	$2,500.00 * (1 - 5\%*5)$ $= 1,875.00$	$1,333.33 * (1 - 5\%*7)$ $= 866.67$
Early retirement benefit < MGB	1,875.00	866.67

## 2013 EA-2L Exam Solutions

### Problem 28 – Page 3

	Smith	Jones
Guaranteeable benefit increase	1,875.00	866.67
Years plan has been in effect	5	5
Phase-in at 100%	1,875.00	866.67
10/01/10 plan benefit	$2.0\%(30)(100,000)/12$ $= 5,000.00$	$2.0\%(20)(80,000)/12$ $= 2,666.67$
Early retirement benefit, reduced 5% per year before 65	$5,000.00 * (1 - 5\%*5)$ $= 3,750.00$	$2,666.67 * (1 - 5\%*7)$ $= 1,733.33$
Early retirement benefit < MGB	3,113.35	1,733.33
Guaranteeable benefit increase	$3,113.35 - 1,875.00$ $= 1,238.35$	$1,733.33 - 866.67$ $= 866.67$
Years plan has been in effect	2	2
Phase-in: Greater of \$40 or 40%(GBI)	$\$40 \text{ or } 1,238.35(40\%)$ $= 495.34$	$\$40 \text{ or } 866.67(40\%)$ $= 346.67$
Total guaranteed benefit	$1,875.00 + 495.34$ $= 2,370.34$	$866.67 + 346.67$ $= 1,213.33$
PC3 benefit	1,350.00	zero
PC4 benefit	$2,370.34 - 1,350.00$ $= 1,020.34$	$1,213.33 - \text{zero}$ $= 1,213.33$

The final step is doing the PBGC 4044 asset allocation. The question asks for “the present value of the PBGC guaranteed benefit not provided by assets for Jones”. There was some confusion among students as to what this means.

Looking at the present value factors given, the plan assets will not cover 100% of the guaranteed benefit for Jones. What the question is asking for is the excess of the present value of Jones’ guaranteed benefit over the assets allocated to PC4 for Jones.

	Smith	Jones
Assumed retirement age	60	58
PV of PC3 benefit	$1,350.00(12)(16.09)$ $= 260,658$	zero
PV of PC4 benefit	$1,020.34(12)(16.09)$ $= 197,007$	$1,213.33(12)(10.93)$ $= 159,141$

The market value of assets is greater than the present value of the PC3 benefits by 189,342 (equal to 450,000 - 260,658). This amount is allocated to the PC4 benefits for Smith and Jones on a pro-rata basis. The total liability for PC4 benefits is 356,148 = 197,007 + 159,141.

## 2013 EA-2L Exam Solutions

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### Problem 28 – Page 4

	Smith	Jones
PV of PC4 benefit	$1,020.34(12)(16.09)$ $= 197,007$	$1,213.33(12)(10.93)$ $= 159,141$
Allocated assets	$189,342(197,007/356,148)$ $= 104,737$	$189,342(159,141/356,148)$ $= 84,605$
Excess of PV of guaranteed benefit over allocated assets		$159,141 - 84,605$ $= 74,535$

**Answer is A**

#### NOTE

The PC4 benefit is defined as the guaranteed benefit under the 5 year phase-in rules. If either participant was a majority owner, and the original plan was in effect less than 10 full years, then their guaranteed benefit would be smaller than the PC4 benefit.

## 2013 EA-2L Exam Solutions

### Problem 29 – Page 1

Similar to 2010 #36

The key to working this question is understanding the cross testing rules. The problem states that the testing method is "benefits basis".

This problem asks about the average benefit percentage test (ABPT) result, which requires you to aggregate the DB and DC plans. Since you have no choice about aggregating the plans for the ABPT, you do not have to satisfy the DB/DC gateways.

You need to cross test the DC plan on a benefits basis and determine the equivalent accrual rate. When you add the DB plan accrual rate to the DC plan equivalent accrual rate, you have the aggregate accrual rate for the ABPT.

For purposes of the ABPT, the 410(b) regulation requires that you ignore the mandatory disaggregation rule. You include the 401(k) deferrals with the profit sharing allocation to calculate the ABPT result.

This problem does not define the testing age. The 401(k) plan has a normal retirement age of 62. The DB plan has a normal retirement age of 65 (based on the exam conditions). This means that there is no uniform normal retirement age for the aggregated plans. The testing age is 65 by default. This is the third exam question that touched on the relationship between uniform normal retirement age and the testing age.

You need to perform cross-testing calculations for all employees to determine the aggregate benefit accrual percentage. Then you can use those percentages to calculate the ABPT result.

	NHCE1	NHCE2	HCE1
12/31/2013 age	35	30	55
401(k) deferral	4,500	4,400	9,000
Profit sharing allocation	2,500	2,000	X
Lump sum value at testing age 65	$7,000(1.08)^{30}$ = 70,439	$6,400(1.08)^{35}$ = 94,626	$(X+9,000)(1.08)^{10}$ = $(X+9,000)*2.1589$
Equivalent benefit accrual at testing age 65	$70,439/8.89$ = 7,923	$94,626/8.89$ = 10,644	$(X+9,000)*2.1589/8.89$ = $(X+9,000)*.2428$
DB Annual accrual	7,500	2,700	28,200
Total Annual accrual at testing age 65	15,423	13,344	$(X+9,000)*.2428+28,200$
Pay limited by 401(a)(17)	75,000	55,000	125,000
Aggregate equivalent accrual rate	$15,423 / 75,000$ = 20.56%	$13,344 / 55,000$ = 24.26%	$\frac{(X+9,000)*.2428+28,200}{125,000}$

One minor point is that the factor given in the problem is the annual annuity due at age 65. You need to adjust this to a monthly annuity due:

$$\ddot{a}_{65}^{(12)} = \ddot{a}_{65} - 11/24 \rightarrow \ddot{a}_{65}^{(12)} = 9.35 - 11/24 = 8.89$$



## 2013 EA-2L Exam Solutions

### Problem 29 – Page 2

The average benefit percentage test result is the ratio of the average benefit percentage for the NHCEs divided by the average benefit percentage for the HCEs:

$$\text{ABPT} = \frac{(20.56\% + 24.26\%) / 2}{[(X+9,000)*.2428+28,200] / 125,000}$$

Now you should set this result equal to 70%, and solve for the value of X:

$$70.0\% = 22.41\% / \{[(X+9,000)*.2428 + 28,200] / 125,000\}$$

$$[(X+9,000)*.2428 + 28,200] / 125,000 = 22.41\%/.70$$

$$(X+9,000) = [(.3201)*125,000 - 28,200] / .2428$$

$$X = 39,687$$

**Answer is E**

### NOTES

1. The 401(k) deferrals would be disaggregated for testing under 401(a)(4). The reason is that the 401(k) plan uses ADP testing under 401(a)(4).
2. The answer sheet shows that credit was also given for answer range D. The reason is that the original “correct” answer used the annual annuity due of 9.35 at age 65:

	NHCE1	NHCE2	HCE1
Equivalent benefit	70,439/9.35	94,626/9.35	(X+9,000)*2.1589/9.35
accrual at testing age 65	= 7,534	= 10,120	= (X+9,000)*.2309
DB Annual accrual	7,500	2,700	28,200
Total Annual accrual at testing age 65	15,034	12,820	(X+9,000)*.2309+28,200
Pay limited by 401(a)(17)	75,000	55,000	125,000
Aggregate equivalent	15,034 / 75,000	12,820 / 55,000	(X+9,000)*.2309+28,200
accrual rate	= 20.04%	= 23.31%	125,000

$$\text{ABPT} = \frac{(20.04\% + 23.31\%) / 2}{[(X+9,000)*.2309+28,200] / 125,000}$$

$$70.0\% = 21.68\% / \{[(X+9,000)*.2309 + 28,200] / 125,000\}$$

$$[(X+9,000)*.2309 + 28,200] / 125,000 = 21.68\%/.70$$

$$(X+9,000) = [(.3097)*125,000 - 28,200] / .2309$$

$$X = 36,515$$

**Answer is D**

## 2013 EA-2L Exam Solutions

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### Problem 30

TRUE

A plan is Top Heavy if the ratio of the present value of accrued benefits for the DB plan (or account balance for the DC plan) for key employees is more than 60% of the total.

$$\begin{aligned}\text{T-H ratio} &= 2,800,000 / (2,800,000 + 1,600,000) \\ &= 63.64\%\end{aligned}$$

**Answer is A**

NOTE

If you incorrectly use the accrued benefits, the ratio is only 55.56%.

## 2013 EA-2L Exam Solutions

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### Problem 31

Similar to 2012 #04
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FALSE

In general, a loan from a plan is a prohibited transaction. There is an exemption for typical loans to participants of defined contribution plans in IRC 4975(d)(1).

This loan to Smith does satisfy that exemption.

**Answer is B**

## 2013 EA-2L Exam Solutions

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### Problem 32 – Page 1

Similar to 2012 #37

This is a straightforward problem on calculating the Top Heavy (T-H) minimum. The first step in the problem is calculating the accrued benefit under the plan formula. Then you calculate the T-H minimum to see if it is larger.

#### 01/01/2013 data

Age	43
Past service	10

The plan benefit is calculated using the final year of earnings:

$$\begin{aligned}\text{Plan benefit} &= 41,000 * (1.5\%) * (10) \\ &= 6,150\end{aligned}$$

The T-H minimum is based on years the plan has been T-H. The problem says the plan has been T-H in every year. The trick to the question is that the plan has only been T-H for eight years - it could not be T-H for years prior to 01/01/2005 (the effective date).

The problem does not tell you the T-H averaging period. Based on IRC 416(c)(1)(D)(1), the T-H averaging period can not exceed five consecutive years. In the absence of any specific data in the problem, you should assume the plan uses a T-H averaging period of five years.

The T-H minimum benefit is calculated using the highest five year average earnings from hire date up through the end of the last year that the plan was Top Heavy. It appears the T-H pay is based on the five years from 2005 through 2009:

2005-2009

$$\begin{aligned}\text{FAE5} &= (42,000 + 42,000 + 42,000 + 45,000 + 41,000) / 5 \\ &= 42,400\end{aligned}$$

The participant has been employed for all years that the plan was T-H. The T-H minimum is based on years the plan has been T-H, with a maximum of 10 years:

$$\begin{aligned}\text{T-H min} &= 42,400 * (2.0\%) * (8) \\ &= 6,784\end{aligned}$$

Smith's final accrued benefit is the greater of the plan benefit and the T-H minimum, or 6,784.

**Answer is C**

(see notes on next page)

### Problem 32 – Page 2

#### NOTES

1. The definition of T-H pay in IRC 416(c)(D) is really vague. My interpretation has always been that the T-H pay is updated each time the plan is found to be T-H. You look back at ALL years prior to the last year that the plan was Top Heavy, and find the five highest consecutive years. This period includes years that the plan is NOT Top Heavy.
2. The code (and regulation) state that if any service is disregarded under IRC sections 411(a)(4), (5), or (6), then for the top heavy minimum benefit, salary paid for those years is ignored. But 411(a) concerns vesting service – not benefit accrual service.
3. Questions can get tricky when they specify the plan's effective date. Years of service before the plan effective date can be excluded for vesting purposes, and this would affect the T-H pay calculation. You need to read the question carefully - for example, the problem could use language similar to this: "the plan credits the minimum amount of vesting service" or "the plan credits vesting service using the most restrictive rules allowed".
4. If you incorrectly use 10 years to calculate the T-H minimum, you can still get lucky on this question. The resulting benefit of 8,480 is a bit too large - and it falls outside the "implied range" for answer E.

## 2013 EA-2L Exam Solutions

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### Problem 33

Similar to 2008 #06
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FALSE

There are several options in the 1.411(b)-2 regulation regarding benefit commencement after NRA. See 1.411(b)-2(b)(4)(iii)(B).

The most commonly used options are:

- Commence benefit at NRA, with no post-NRA benefit accruals (no suspension of benefits notice is required)
- Continued accrual of benefits after NRA, and provide suspension of benefits notice
- Actuarial increase of the normal retirement benefit (no suspension of benefits notice is required)
- Give greater of continued accrual of benefits after NRA and an actuarial increase of the normal retirement benefit (no suspension of benefits notice is required)

**Answer is B**

## 2013 EA-2L Exam Solutions

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### Problem 34

Similar to 2011 #25
---------------------

This is a very simple problem on calculating the variable rate premium (VRP). The key point is knowing the definition of the variable rate premium cap.

The unfunded vested benefits liability (UVB) is calculated as the excess of the premium funding target over the market value of assets. The market value includes the present value of any prior year contributions that are received by the date the premium filing. The contributions are discounted using the prior year's effective interest rate.

Ignoring the cap, you calculate the variable rate premium as .009 times the UVB. The UVB must be rounded up to the next higher multiple of 1,000:

$$\begin{aligned}\text{UVB} &= 355,000 - 285,000 \\ &= 70,000\end{aligned}$$

$$\begin{aligned}\text{VRP} &= 70,000 * .009 \\ &= 630\end{aligned}$$

The plan is eligible for the VRP cap if there are 25 or less employees on the first day of the plan year. On 12/31/2012, you are told there are 9 active participants, plus 2 non-active participants. In addition, there are 4 employees who are not participants.

Since the total employee count is not more than 25, the plan is eligible for the VRP cap. The variable rate premium cap is calculated based on the number of plan participants, and it is equal to  $5 * (\text{participant count})^2$ . Based on the 12/31/2012 data, the total participant count is 11, which is  $9 + 2$ :

$$\begin{aligned}\text{VRP cap} &= 5(11)^2 \\ &= 605\end{aligned}$$

The VRP cap of 605 is less than the previously calculated value of 630. The problem asks for the total PBGC premium, which is the sum of the flat rate premium (FRP) and the VRP. The JBEA tables given with the exam stated that the 2013 flat rate premium is \$42 per participant:

$$\begin{aligned}\text{FRP} &= \$42(11) \\ &= 462\end{aligned}$$

$$\begin{aligned}\text{FRP+VRP} &= 462 + 605 \\ &= 1,067\end{aligned}$$

**Answer is D**

### Problem 35

Revised 03/18/15

FALSE

The point of the problem is that you can receive the maximum 415 dollar limit for a straight life annuity form. Under 415(b)(2)(B), the dollar limit must be reduced for most optional forms. This includes the "J&S" benefit described in the problem.

The last sentence of 415(b)(2)(B) has an exception for a Qualified Joint and Survivor form of payment:

*"For purposes of this subparagraph, ... that portion of any joint and survivor annuity which constitutes a qualified joint and survivor annuity (as defined in section 417) shall not be taken into account."*

In this problem, the J&S benefit payable to Smith's sister is not a Qualified Joint and Survivor. A Qualified Joint and Survivor annuity requires that the annuity be payable during the joint lives of the participant and their spouse. See IRC 417(b).

**Answer is B**



## 2013 EA-2L Exam Solutions

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### Problem 36

This is a short question on the calculation of the 415 limit when the form of payment is a lump sum option. At 1.415(b)-1(c)(3), it states Section 415 is satisfied if the following benefit is less than the final limit under 415(b):

Actuarially equivalent plan benefit on a straight life annuity form limit is the greater of three values, as of the participant's annuity starting date:

1. Actuarially equivalent straight life annuity benefit using plan basis for actuarial equivalence
2. Actuarially equivalent straight life annuity benefit using 5.5% interest rate and 417(e) applicable mortality
3. Actuarially equivalent straight life annuity benefit using 417(e) applicable interest rate and applicable mortality, divided by 1.05

This problem gives you various annuity values, as well as the lump sum (after applying the 415 limit). To convert the lump sum back into a straight life annuity benefit, you should divide the lump sum by the lesser of these annuity values:

1. Straight life annuity using plan basis for actuarial equivalence
2. Straight life annuity using 5.5% interest rate and 417(e) applicable mortality
3. 1.05 times [straight life annuity using 417(e) applicable interest rate and applicable mortality]

The lesser of these three values is 11.55. The resulting straight life annuity benefit is 198,156, which is equal to 2,288,700 divided by 11.55.

**Answer is D**

### NOTE

There is a slightly different calculation for some small plans. In 415(b)(2)(E)(ii), it says you should not use the third annuity definition above for plans of an eligible employer under IRC 408(p)(2)(C)(i). This is defined as an employer with 100 or less employees who earn 5,000 or more in the prior year.

## 2013 EA-2L Exam Solutions

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### Problem 37

Similar to 2011 #22

Revised 02/16/16

§4980(a) of the Internal Revenue Code states that the excise tax upon reversion is 20%. §4980(d) states that the excise tax increases to 50% unless either

- The employer establishes a “qualified replacement plan”, or
- The employer grants certain benefit increases prior to plan termination.

The general definition of a qualified replacement plan includes 95% participation by continuing employees from the terminating plan, plus an asset transfer of at least 25% of the excess assets. You can reduce the 25% asset transfer by the value of benefit improvements made within the 60 days ending on the date of plan termination.

The problem states that the plan sponsor makes an asset transfer of 103,000 to a qualified replacement plan. In addition, the plan sponsor increased benefits by 67,000 at plan termination. You are given assets and liabilities prior to the benefit increase (and asset transfer).

$$\begin{aligned}\text{Initial reversion} &= 3,985,000 - 3,330,000 \\ &= 655,000\end{aligned}$$

$$\begin{aligned}\text{Required transfer} &= 25\%(655,000) \\ &= 163,750\end{aligned}$$

You can reduce this by the amount of the benefit increases granted. The net required transfer to reduce the excise tax to 20% is  $96,750 = 163,750 - 67,000$ .

Since the asset transfer is larger, the excise tax is based on the 20% rate. Now you can calculate the final reversion, as well as the excise tax:

$$\begin{aligned}\text{Final reversion} &= (3,985,000 - 103,000) - (3,330,000 + 67,000) \\ &= 485,000\end{aligned}$$

$$\begin{aligned}\text{Excise tax} &= 20\%(485,000) \\ &= 97,000\end{aligned}$$

**Answer is A**

### NOTE

Instead of establishing a “qualified replacement plan”, the plan can grant benefit increases at plan termination. The benefit improvements must meet three criteria:

- Present value  $\geq$  20% of the reversion (prior to the benefit changes)
- Uniform for all participants
- Benefit increases for non-active participants can not exceed 40% times [20% of the reversion (prior to the benefit changes)]

## 2013 EA-2L Exam Solutions

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### Problem 38

Similar to 2012 #08
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FALSE

In general, amendments can not take effect if the Adjusted Funding Target Attainment Percentage (AFTAP) is less than 80%. IRC 436(c)(2) allows the amendment to take effect if the plan sponsor makes an additional IRC 436 contribution.

**Answer is B**

#### NOTE

The amount of the 436 contribution varies depending on the value of the AFTAP prior to reflecting the amendment. If the AFTAP is less than 80%, the contribution must be equal to the increase in the Funding target due to the plan amendment. If the AFTAP is 80% or more, the contribution must be sufficient to produce an AFTAP equal to 80% after the plan amendment.

## 2013 EA-2L Exam Solutions

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### Problem 39

FALSE

This is very simple §415 problem. The key point of the problem is that the §415 limits are reduced for service (and participation) less than 10 years.

At 01/01/13

Age	65
Service	8 years
Participation	8 years

One simplifying factor in this problem is that you do not calculate the plan benefit. You are told “Smith accrues the maximum benefit allowable under the law”.

### 415 COMP LIMIT

No pay history is given, so you must skip the 415(b)(1)(B) compensation limit.

### 415 DOLLAR LIMIT

Under §415(b)(1)(A), the dollar limit is reduced when participation is less than ten years. In §415(b)(5)(C), it states that the pro-rata reduction would never be less than 1/10:

$$\begin{aligned}\text{\$415 dollar limit during 2013} &= 205,000 * (8/10) && \text{for ages 62-65} \\ &= 164,000\end{aligned}$$

Regardless of Smith’s actual compensation history, the benefit at age 65 could not exceed 164,000.

**Answer is B**

## 2013 EA-2L Exam Solutions

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### Problem 40

Similar to 2005 #35
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This is the third question asked on the EA-2L exam on the actual calculation of the excise tax for failure to provide a 204(h) notice. In IRC 4980F(e)(1)(iii), there is a 204(h) notice required for “applicable employees”. These are participants who are adversely affected by the plan amendment. In this problem, only the active employees are subject to a decrease in future benefit accruals.

IRC Section 4980F(b)(1) defines the excise tax for failure to file a 204(h) notice. It is equal to \$100 per participant per day in the noncompliance period. The details of the excise tax calculation are contained in the 54.4980F regulation.

In this problem, only 50 active participants are affected by the amendment. The excise tax for failure to provide the notice is calculated as follows:

$$275,000 = \$100(50 \text{ active ees})(55 \text{ days})$$

**Answer is B**

## 2013 EA-2L Exam Solutions

### Problem 41 – Page 1

Similar to 2009 #41

Revised 02/26/15

This is a typical PBGC guaranteed benefits question. It tests your knowledge of the 5 year phase-in of guaranteed benefits. Guaranteed benefits are based on the vested accrued benefits of the plan participants. In calculating the guaranteed benefit, remember that changes in vesting schedule, normal retirement age, and normal form of annuity payment are all considered as changes in benefit amount that are subject to the phase in rules.

When there is a change in normal form of benefits, you would have to normalize the benefits. Normalization is the process of converting benefits available under earlier sets of plan provisions to equivalent benefit amounts based on the plan provisions in effect at date of plan termination (DOPT). This is a necessary step; otherwise you would be comparing apples and oranges.

The PBGC maximum monthly guaranteed benefit (MGB) is defined as the lesser of the adjusted ERISA §4022(b) value, or the highest five year consecutive compensation. The MGB is defined assuming payment on a life annuity basis at age 65.

Another key point of the problem is that the maximum guaranteed benefit limit (MGB) must be reduced for benefit commencement ages before 65. The 2013 MGB at 65 is 4,789.77 (from the tables given with the exam).

A key point to this problem is that you should use the later of age at DOPT and age at benefit commencement for purposes of adjusting the MGB. The MGB should be adjusted based on the retirement age of 55 (also at DOPT). Based on page 72 of the PBGC study note, it is correct to age adjust the MGB, even when it is based on the highest five year compensation.

In addition, the MGB must be adjusted to allow for the payment form. Smith retired at 05/01/2013 under a 10 year certain and life payment form. It is not 100% clear, but it appears the normal form of benefit is 10-year certain and life, since no optional form reduction factors are given. It is incorrect to use a PBGC adjustment factor to calculate the plan benefit.

You need to adjust the guaranteed benefit limit to the same form of payment:

05/01/13 Age	55
Average monthly compensation	$3,333.33 = 40,000/12$
2013 MGB at 65 on life annuity	Lesser of 4,789.77 or 3,333.33
Age 55 MGB factor	.45
2013 MGB at 55 on life annuity	$1,500.00 = .45(3,333)$
10 year C&L MGB factor	.925
2013 MGB at 55 on 10 year C&L	$1,387.50 = .925(1,500)$

The change in plan benefits at 07/01/2009 is subject to the 5 year phase-in rules at the DOPT of 05/01/2013. Based on item nine on page 84 of the PBGC study note, use the later of the adoption date and the effective date of the increase for phase-in purposes.

## 2013 EA-2L Exam Solutions

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### Problem 41 – Page 2

07/01/2006 Base plan benefit	$1,125.00 = 45(25)$
Early retirement factor at 55	$.79 = 1 - 3\%(62-55)$
Early retirement benefit	$888.75 = .79(1,125.00)$
Guaranteeable benefit increase	888.75
Years plan has been in effect	5
Phase-in	888.75
07/01/2009 Base plan benefit	$1,625.00 = 65(25)$
Early retirement factor at 55	$.79 = 1 - 3\%(62-55)$
Early retirement benefit	$1,283.75 = .79(1,625.00)$
Guaranteeable benefit increase	$395.00 = 1,283.75 - 888.75$
Years plan has been in effect	3
Phase-in: Greater of \$60 or 60%(GBI)	$\$60 \text{ or } 395.00(60\%)$ $= 237.00$
07/01/2011 Base plan benefit	$2,000.00 = 80(25)$
Early retirement factor at 55	$.79 = 1 - 3\%(62-55)$
Early retirement benefit	$\cancel{1,580.00} = .79(2,000.00)$ $= 1,387.50 \quad (\text{hit MGB})$
Guaranteeable benefit increase	$103.75 = 1,387.50 - 1,283.75$
Years plan has been in effect	1
Phase-in: Greater of \$20 or 20%(GBI)	$\$20 \text{ or } 103.75(20\%)$ $= 20.75$
Total guaranteed benefit	$1,146.50 = 888.75 + 237.00 + 20.75$

**Answer is B**

Notes re: Guaranteed benefit calculations

1. The MGB does not increase beyond the year of plan termination. See Example 13 in Appendix A of the PBGC study note.
2. You should use the later of age at DOPT and age at benefit commencement for purposes of adjusting the MGB for age. See Example 16 in Appendix A of the PBGC study note.
3. You should use the form of payment in effect at the later of age at DOPT and age at benefit commencement for purposes of adjusting the MGB for form of payment. See Example 18 in Appendix A of the PBGC study note.
4. For retirements after DOPT, all benefit service accruals ceased at DOPT.

### Problem 41 – Page 3

Notes re: Guaranteed benefit calculations (continued)

5. When calculating the phase-ins, the percent is more valuable when the amount of the Guaranteeable benefit increase exceeds 100. If it is less than 100, then the fixed dollar amount is more valuable. At 100, they both produce the same result.
6. If there is a change in normal form of benefits, you should normalize the benefits. Normalization is the process of converting benefits available under earlier sets of plan provisions to equivalent benefit amounts based on the plan provisions in effect at date of plan termination (DOPT). This is a necessary step; otherwise you would be comparing apples and oranges.



## 2013 EA-2L Exam Solutions

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### Problem 42

Similar to 2010 #19

TRUE

There is a reportable event when the active participant count is less than 80% of the active count at the beginning of the plan year, or less than 75% of the active count at the beginning of the prior plan year.

You can check the first of these items to see if a reportable event occurred for 2012:

$80\%(1,000) = 800 \quad \rightarrow$  reportable event at 12/31/2012, due to participant count of 740

You can check the second of these items to see if a reportable event occurred for 2013:

$75\%(1,000) = 750 \quad \rightarrow$  reportable event at 01/01/2013, due to participant count of 740

A reportable event occurred for both plan years.

**Answer is A**

## 2013 EA-2L Exam Solutions

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### Problem 43

Similar to 2009 #28
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FALSE

In the PBGC Comprehensive premium payment instructions, there is a definition of "participant" for premium purposes:

"For premium purposes, "participant" means an individual (whether active, inactive, retired, or deceased) with respect to whom the plan has Benefit Liabilities. Beneficiaries and alternate payees are not counted as participants. However, a deceased participant will continue to be counted as a participant if there are one or more beneficiaries or alternate payees who are receiving or have a right to receive benefits earned by the participant."

The participant in this problem matches the description in the last sentence of that definition. The plan sponsor is required to count the deceased participant for premium payment purposes.

**Answer is B**

## 2013 EA-2L Exam Solutions

### Problem 44

Similar to 2010 #42

Revised 03/18/15

This problem asks for the qualified pre-retirement spouse annuity (QPSA), payable at the earliest date. This is an annuity type similar to a qualified joint and survivor annuity (QJSA), which is defined in 417(b)(1) as a joint and survivor annuity of at least 50%.

The problem defines the QJSA with a 100% benefit to the spouse. Under IRC 417(g), the qualified optional survivor annuity (QOSA) must have a continuation percentage of 50%. Under IRC 417(c), the QPSA must have a continuation percentage at least as large as the QJSA. The result is that the QPSA must equal 100%, and the QOSA is equal to 50%.

In 417(c)(1)(A)(ii), if the participant dies after their earliest retirement age, the annuity should commence at current age. Based on the plan provisions, Smith's earliest retirement age is age 55. The calculations below are based on benefit commencement at 55 (two years after 01/01/2013).

You are told the participant has been married for more than one year, so it is necessary to provide the QPSA (see 417(d)). The majority of the problem solution is a benefit calculation.

#### As of 01/01/2013

Age	53
Service	11
Earliest Retirement Age	55

Annual accrued benefit	44,000
	$= 11 * 4.0\% * 100,000$
Vesting percentage	100%
Vested benefit	44,000

Early Retirement reduction	.70
	$= 1 - 3.0\% * (65 - 55)$
Early Retirement benefit payable at age 55	30,800
	$= .70 * 44,000$

100% J&S Reduction	89%
100% J&S Death benefit	27,412

**Answer is E**

#### NOTE

One potential area for confusion is that you should consider both the vesting percentage and the early retirement reduction. Based on IRC 411, the participant becomes 100% vested when they reach normal retirement age. Depending on the plan design, they may not become 100% vested at early retirement age.

## 2013 EA-2L Exam Solutions

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### Problem 45

This is a simplified problem on calculating the Ratio Percentage test and the safe harbor percentage. The ratio percentage is defined under the regulations at §1.410(b)-9 as the percentage of non-highly compensated employees (NHCEs) who benefit under the plan divided by the percentage of highly compensated employees (HCEs) who benefit under the plan:

$$\text{Ratio \% test: } \frac{\left( \frac{\text{Non-HCEs who benefit}}{\text{Total Non-excludable non-HCEs}} \right)}{\left( \frac{\text{HCEs who benefit}}{\text{Total Non-excludable HCEs}} \right)}$$

The percentage of NHCEs who benefit under the plan equals the number of NHCEs in the plan divided by the total number of non-excludable NHCEs. The percentage of HCEs who benefit under the plan equals the number of HCEs in the plan divided by the total number of non-excludable HCEs.

$$\begin{aligned}\text{Ratio \%} &= (400/9,500) / (100/500) \\ &= 21.05\%\end{aligned}$$

1.410(b)-4(c)(4) defines the Safe and Unsafe harbor percentages based on the non-highly compensated concentration percentage (NHCCP). The NHCCP is defined under the regulations at §1.410(b)-4(c)(4)(iii) as the ratio of non-excludable NHCEs to total non-excludable employees.

The regulation defines the NHCCP as "for all employees of the employer." For the NHCCP, the regulation states that the excludable employees are the same as under the ABPT, which uses "all plans in the testing group."

The safe and the unsafe harbor percentages are defined in tables that are given with the exam. The NHCCP can be calculated using the denominator values for the 410(b) ratio percentage test:

$$\begin{aligned}\text{NHCCP} &= 9,500 / (9,500+500) \\ &= 95\%\end{aligned}$$

You should truncate this to lookup the safe and unsafe harbor values. The Safe harbor percentage is 23.75% and the Unsafe harbor percentage is 20%. The difference between the ratio percentage and the safe harbor percentage is 2.70% = 23.75% - 21.05%.

**Answer is E**

## 2013 EA-2L Exam Solutions

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### Problem 46

FALSE

The PBGC 4050 regulation defines how to calculate benefits for missing participants. For benefits not in pay status, the most valuable benefit is based on the benefit commencement age that produces the highest present value as of the deemed distribution date (using the missing participant annuity assumptions.)

This includes all possible future retirement ages - it is not limited to only the normal retirement age.

**Answer is B**

## 2013 EA-2L Exam Solutions

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### Problem 47

TRUE

At 1.410(b)-2(b), the regulation includes several exceptions that allow plans to get a “free pass” of the non-discrimination requirements:

- 2(b)(4) Tax credit ESOP
- 2(b)(5) Employer with no NHCEs
- 2(b)(6) Plan with no HCES benefiting
- 2(b)(7) Plan benefits only ees under CBA

**Answer is A**

NOTE

The exception under 2(b)(5) is a bit tricky. It is not for a plan which only covers HCEs. It is for an employer whose employees are all HCEs.

### Problem 48

Revised 05/14/19

FALSE

In the regulation at 901.20(h), it requires the actuary to report any non-filing of actuarial documents they have signed. But that is not what is described in this question.

The actuary provided an AFTAP certification for the plan. That actuary was terminated as the enrolled actuary. Another enrolled actuary provided an AFTAP certification for the plan, with a different value.

Based on the information given in the question, there is no requirement for the first actuary to notify the IRS.

**Answer is B**

### NOTE

The 901 regulation was revised in 2013. Under the new regulation, the correct reference is to 901.20(k).

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