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2005 EA-2B EXAM SOLUTIONS

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2005 EA-2B Exam Solutions

These solutions were prepared based on the law as in effect at December 31, 2004.

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!

This exam was similar to 2004, with far fewer calculation type problems than prior years. There were more 2 and 3 point problems that tested general pension knowledge than in earlier years.

Revision History:

March 20, 2009	Corrected solution for problem 17
May 3, 2007	Corrected solution for problem 13
April 20, 2007	Corrected solution for problem 18
December 10, 2006	Corrected solutions for problems 6 and 29
April 26, 2006	Corrected solution for problems 1, 6 and 41
February 22, 2006	Corrected solution for problem 29
February 7, 2006	Original solutions

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Problem 1

Revised 04/26/06

FALSE

The Notice of intent to terminate has to be sent to all "affected parties". The PBGC is included only under a distress termination. This is mentioned on pages 30 and 57 of the PBGC study note.

Answer is B

It makes sense that the PBGC doesn't need to get the notice under a standard termination, since there is no liability for the PBGC. In an involuntary termination the PBGC takes over a plan, so it doesn't need to notify itself.

Problem 2

FALSE

If you must aggregate plans to pass either 410(b) testing (or 401(a)(4)), then you must aggregate the plans for 401(a)(4) testing (or 410(b)).

See 1.401(a)(4)-9(a) and 1.410(b)-7(d)(1).

Answer is B

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Problem 3

TRUE

The only thing that could prevent a participant from receiving the plan formula benefit is the 415 limit. But the 415 limit also has a 10,000 "floor".

The 10,000 floor is not adjusted for benefit commencement age, or form of payment. The 10,000 floor is reduced if the participant has less than 10 years of service.

See IRC 415(b)(4).

Answer is A

Problem 4

FALSE

The 415 dollar limit is adjusted for benefit commencement age, or form of payment (except for qualified J&S). The reduction prior to age 62 is based on the lesser of two factors.

One factor uses the plan basis for actuarial equivalence for early retirement. The other factor is on the mandated basis, which is at 5% interest and the "applicable mortality" under 417, which is the prevailing commissioners' standard mortality table.

See IRC 415(b)(2)(E).

Answer is B

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Problem 5

TRUE

One of three definitions must be satisfied for an employee to be a key employee for 2005:

- (i) Officer with 2004 compensation > 130,000 (2004 value)
- (ii) Someone with more than 5% of the stock ownership
- (iii) Someone with more than 1% of the stock ownership with pay > 150,000

This employee satisfies the third definition.

There is a limit on the number of officers counted as key employees. See IRC 416(i)(1)(A).

Answer is A

Problem 6

Revised 12/10/06

FALSE

If the plan becomes Top Heavy in 2005, then everyone becomes subject to the Top Heavy vesting schedule, regardless of how many hours they work during the year.

Answer is B

The question was trying to confuse you on the difference between earning a year of vesting service and being covered by Top Heavy vesting. You are subject to the T-H vesting schedule regardless of whether you have more or less than 1000 hours. People with less than 1000 hours won't earn a year of vesting under ANY vesting schedule.

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Problem 7

FALSE

It is not correct that you can opt to fully vest the employees in a spinoff. The 414(l) regulation requires that assets allocated to a spun off plan are greater than or equal to the present value of benefits on a termination basis for all the participants in the spun off plan.

A de minimis rule is available for the spinoff of a DB plan if the total amount of assets spun off from a plan in one plan year is less than 3% of the assets for one day in that plan year. If the de minimis rule is met, then the 414(l) regulation is satisfied by a spinoff of assets equal to the present value of the accrued benefits that are spun off.

See 1.414(l)-1(m).

Answer is B

Problem 8

TRUE

The point of this question is that Mr. Smith will receive 5,900 per month, which exceeds the guaranteed benefit limit. It makes sense that the PBGC would allow this. It should not matter whether the beneficiary is covered under the plan termination or not.

If the PBGC did not allow this, then there would be some caveats in the law or regulations regarding a joint and survivor payment form.

Answer is A

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Problem 9

FALSE

This type of benefit is excluded from the definition of "Benefit increase".

See PBGC regulation section 4022.2.

Answer is B

Problem 10

FALSE

By setting up a qualified replacement plan, and transferring 25% of the initial reversion, the excise tax is reduced from 50% to 20%. There is no way to eliminate the excise tax.

See IRC 4980(d).

Answer is B

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Problem 11

TRUE

IRC section 4975(c)(1) defines the term "Prohibited Transaction". 4975(c)(1)(A) includes the exchange of property with a "disqualified person".

All of the people listed match one the definitions in IRC 4975(e)(2) of "disqualified person".

Answer is A

Problem 12

TRUE

In the regulation at 901.31(c), it reads as follows:

"(c) *Disreputable conduct.*

The enrollment of an actuary may be suspended or terminated if it is found that the actuary has, at any time after he/she applied for enrollment, engaged in any conduct set forth in § 901.13(e)(1)(i)–(vi) or other conduct evidencing fraud, dishonesty, or breach of trust."

Answer is A

Problem 13

Revised 04/20/07

FALSE

Section 5 of the PBGC-1 Form instructions discusses prorating the premium. It allows you to pro-rate when the plan terminates, and a short plan year results from the distribution of plan assets.

There is a short plan year from January 1 to August 15, 2004 due to the annuity purchase. The premium should be pro-rated based on the August 15 date, not the plan termination date of January 15.

Answer is B

Problem 14

TRUE

Section 7 of the PBGC-1 Form instructions discusses underpayments and overpayments. Sub-section (v) discusses minimizing late payment charges associated with the first filing due date.

You won't have a late payment penalty charge if the premium payment with Form ES-1 is at least the lesser of:

- (a) 90% of the per-participant flat rate premium amount due at the final filing due date or
- (b) The per-participant flat rate premium amount based on the prior year's participant count

The final flat rate premium is $913(19) = 17,347$. The initial payment with the ES-1 did exceed $15,612 = 90\%(17,347)$, so there is no late payment penalty.

In sub-section (v) of the instructions, it states that there is no way to avoid the late payment interest charge.

Answer is A

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Problem 15

I. TRUE

See Q&A-1 of the 54.4980F regulation.

II. FALSE

See Q&A-13 of the 54.4980F regulation.

III. TRUE

See Q&A-10 of the 54.4980F regulation.

Only items I and III are True.

Answer is B

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Problem 16

This is the hardest question ever asked on the exam regarding the calculation of vesting service. Based on looking at the years with at least 1000 hours, Smith appears to have 4 years of service.

The key point of the problem is that you can ignore the hours earned in 1991, since Smith does not attain age 18 until 01/01/1992. See IRC 411(a)(4)(A). Smith has three years of vesting service: 1992, 1998 and 2005.

Another point is that Smith never has 5 consecutive 1-year breaks in service, so you can not ignore the years of service earned in 1992 and 1998. This is based on some tiny details in IRC Section 411.

IRC 411(a)(6)(D) allows exclusion of certain years from the calculation of vesting service, but only for non-vested participants. In order to do so, the number of consecutive 1-year breaks in service must equal or exceed the greater of 5, or the aggregate number of years of service before such period (of consecutive 1-year breaks in service).

In the years from 1993-1997, there are only three consecutive 1-year breaks in service. Since Smith worked more than 500 hours in 1996, there is no 1-year break in service that year.

The final trick to the question is that, in the years from 2000-2004, there are only four consecutive 1-year breaks in service. Since Smith was on maternity leave in 2000, there is no 1-year break in service that year. See IRC 411(a)(6)(E).

Smith has three years of vesting service: 1992, 1998 and 2005.

Answer is C

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Problem 17 – Page 1

Similar to 2002 #34

Revised 03/20/09

This is the second benefit accrual rule question on the exam that required some serious thought. The challenge in this problem is to identify the maximum value of X in the fewest possible calculations.

The benefit formula given fails the 133 ⅓% rule, since $300/200 = 150\%$. 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.

Under the 3% rule of 411(b)(11)(A), each year's accrued benefit must be at least equal to 3% times years of service times the projected benefit. The first step is calculation of the projected benefit:

$$\text{Projected benefit} = 5,000 + 10X = 200*10 + 300*10 + X*10$$

Let t represent years of service. Under the 3% rule, you must satisfy this relationship for every value of t from 1 to 33 ⅓ years:

$$\text{Accrued benefit at time } t \geq 3\%(t)(5,000+10X)$$

The point of the 3% rule is to prevent back-loaded benefit accruals. In general, you can be sure that X must be less than \$300 under the 3% rule. This is based on averaging the rate of benefit accrual over 33 1/3 years.

It is also possible that X could be less than \$200. If you think about testing years 2 through 10, it does not matter which you test. The reason is clear when you look at the 3% rule:

$$\begin{aligned} 200(t) &\geq 3\%(t)(5,000+10X) && \text{for } t \leq 10 \\ 200 &\geq .03*(5,000+10X) \\ 200 &\geq 150 + .3X \\ 166.67 &\geq X \end{aligned}$$

Continuing in the same manner, think about testing years 11 through 20. Since X must be less than 300, the worst case would be the 11th year. This will produce the lowest value of X.

You can solve for the required value of X by looking at the accrued benefit after 11 years of service:

$$\begin{aligned} \text{Accrued benefit at time 11} &\geq 3\%(11)(5,000+10X) \\ 200*10 + 300*1 &= 2,300 && \geq 33\%(5,000+10X) \\ 2,300 &\geq 1,650 + 3.3X \\ 650 &\geq 3.3X \\ 196.97 &\geq X \end{aligned}$$

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Problem 17 – Page 2

Beyond 20 years, the allowable values of X should increase. Take a look at the 3% rule after 30 years of benefit accrual:

$$\begin{array}{ll} \text{Accrued benefit at time 30} & \geq 3\%(30)(5,000+10X) \\ 10*(200 + 300 + X) & \geq 90\%(5,000+10X) \\ 100%*(5,000+10X) & \geq 90\%(5,000+10X) \end{array}$$

This formula is satisfied for all positive values of X. It should be clear that you don't need to worry about X becoming less than 166.67 for the benefit accrual years from 20 to 30.

In order to satisfy both formulas on the prior page, X must be no more than 166.67.

Answer is C

If you REALLY want to, you can analyze what happens between 20 and 30 years:

$$\begin{array}{ll} \text{Accrued benefit at time } 20+t & \geq 3\%(20+t)(5,000+10X) \quad \text{for } t \leq 10 \\ 5,000 + t*X & \geq (.6+.03t)(5,000+10X) \\ 5,000[1-(.6+.03t)] & \geq (6+.3t)X - t*X \\ 5,000[.4-.03t] & \geq (6-.7t)X \\ 5,000[.4-.03t] / (6-.7t) & \geq X \end{array}$$

As the value of t goes from 1 to 10, the denominator of the fraction decreases much faster than the numerator. The resulting maximum values for X increase until the denominator becomes negative.

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Problem 18 – Page 1

Similar to 2002 #15

Revised 04/20/07

This is a typical §415 problem. The key point of the problem is the calculation of the actuarial reduction to the §415 dollar limit prior to age 62.

Starting in 1997, earnings under §415 is defined as total compensation (not taxable). Earnings under §415 is not subject to the §401(a)(17) limit.

At 01/01/05

Age	58
Service	9 years
Participation	8 years

PLAN BENEFIT

Accrued benefit at age 65 (given) = 190,000

Early retirement benefit at age 58 = 110,200 = 190,000 * [1-7(.06)]

415 COMP LIMIT

The §415(b)(1)(B) compensation limit is reduced when service is less than ten years. In this problem, you have to ignore it, since you have no compensation data.

415 DOLLAR LIMIT

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

§415 dollar limit during 2005 = 170,000 at age 62 * (8/10)
= 136,000

§415(b)(2)(E)(i) says to use the greater of 5% and the interest rate specified in the plan to reduce the §415 dollar limit prior to age 62. The examples in Revenue Ruling 98-1 clarify that the §415 dollar limit is reduced using the lower of the factors calculated based on the mandated mortality and interest rate, and plan basis for optional forms.

You should use the “N/N” factors both on the plan basis and on the mandated basis. This is consistent with the definition of the death benefit (which is never specified). With a death benefit that is not equal to 100% of the present value of the accrued benefit, there is a risk of forfeiting the benefit, and there is some mortality risk involved.

The actuarial reduction prior to age 62 is calculated using the ratio of the N_x values, which includes the probability of death:

Actuarial reduction from 62 to 58 = $v^4 {}_4p_{58} (\ddot{a}_{62}^{(12)} / \ddot{a}_{58}^{(12)})$
(Mandated basis 5% app. mortality)

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Problem 18 - Page 2

You are given actuarial reduction factors from age 65 on the mandated basis. You can use the ratio of these factors to calculate the actuarial reduction from 62 to 58:

$$\begin{aligned}\text{Actuarial reduction from 65 to 62} &= .7821 = v^3 {}_3p_{62} (\ddot{a}_{65}^{(12)} / \ddot{a}_{62}^{(12)}) \\ \text{Actuarial reduction from 65 to 58} &= .5776 = v^7 {}_7p_{58} (\ddot{a}_{65}^{(12)} / \ddot{a}_{58}^{(12)}) \\ \text{Actuarial reduction from 62 to 58} &= [v^7 {}_7p_{58} (\ddot{a}_{65}^{(12)} / \ddot{a}_{58}^{(12)})] / [v^3 {}_3p_{62} (\ddot{a}_{65}^{(12)} / \ddot{a}_{62}^{(12)})] \\ \text{(Mandated basis 5\% app. mortality)} &= v^4 {}_4p_{58} (\ddot{a}_{62}^{(12)} / \ddot{a}_{58}^{(12)}) \\ &= .5776 / .7821 \\ &= .7385\end{aligned}$$

One detail in this problem is the definition of the reduction from age 62 to age 58 on the plan's optional form basis. In this problem, no basis is specified for the factors. You are told that the reduction is 5% per year before age 65. The example in Q-7 of Revenue Ruling 98-1 calculates the actuarial reduction on the plan basis as the ratio of the plan's "tabular" reduction factor at the early retirement age to the factor at age 62.

$$\begin{aligned}\text{Actuarial reduction from 62 to 58} &= \text{ERF}_{58} / \text{ERF}_{62} \\ \text{(plan "tabular" basis)} &= [1-.06(7)] / [1-.06(3)] \\ &= .58 / .82 \\ &= .7073\end{aligned}$$

$$\begin{aligned}\$415 \text{ dollar limit at age 58} &= 136,000 * \text{lesser of } [.7385 \text{ or } .7073] \\ &= 96,195\end{aligned}$$

Smith's plan benefit of 110,200 is limited to the lesser of the compensation limit (unknown) and the dollar limit of 96,195.

Answer is C

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Problem 19

Similar to 2001 #15

Section 4050 of ERISA contains rules regarding missing participants. In the regulation at 4050.5(a), it describes the amount of the “designated benefit” for four different cases:

- 4050.5(a)(1) Mandatory lump sum - Present value under plan assumptions
- 4050.5(a)(2) De minimis lump sum - Present value < 5,000 under missing participant lump sum assumptions
- 4050.5(a)(3) No elective lump sum - Present value at deemed distribution date under missing participant annuity assumptions
- 4050.5(a)(4) Elective lump sum - greater of values under (a)(1) and (a)(3)

In 4050.2, the missing participant annuity assumptions are defined as the assumptions and methods under section 4044.52, applied as if the deemed distribution date were the termination date. You do not use the expected retirement age assumptions under 4044. In lieu of the expense adjustment under 4044.52(e), add \$300 as an expense load for each missing participant whose benefit liability would exceed 5,000 without the expense loading applied.

Under 4050.5(b), the present value must be determined as the most valuable benefit. In this problem, you are simply given the present values. Since all plan lump sums exceed the 5,000 threshold under 411(a)(11)(A), case 4050.5(a)(1) does not apply. Since the PBGC lump sums exceed 5,000, case 4050.5 (a)(2) does not apply.

The plan’s elective lump sum distribution limit is 25,000. Jones is the only participant whose plan lump sum exceeds this value. Jones falls under 4050.5(a)(3), so the designated benefit is the 26,000 using the missing participant annuity assumptions. After the 300 expense load, the final value is 26,300.

The other two participants are eligible for the plan elective lump sum, so they fall under 4050.5(a)(4). The value of the designated benefit is the greater of the (a)(1) and (a)(3) values. For Smith, the result is the plan lump sum of 11,000. For Brown, the result is the 24,000 using the missing participant annuity assumptions. After the 300 expense load, the final value is 24,300.

The total for all three is 61,600.

Answer is D

NOTES:

For benefits not in pay status, the most valuable benefit is the benefit at the benefit commencement age that produces the highest present value as of the deemed distribution date (using the missing participant annuity assumptions.)

Any missing participant not in pay status at the deemed distribution date is assumed to be married to a spouse the same age, and their benefit must be valued under the QJ&SA form payable under the plan. If they were already in pay status, you would use the form of benefit and beneficiary of the pay status benefit.

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Problem 20

Similar to 2002 #25

The PBGC-1 form has an exemption from the Variable Rate Premium for plans whose contributions in the prior year are greater than or equal to the Full Funding Limitation.

In PBGC Technical Update 00-4, it states:

“ ... Accordingly, a plan qualifies for the PBGC FFL Exemption for a plan year if the sum of contributions to the plan for the prior year (including any interest credited under the funding standard account) and any credit balance in the funding standard account (including interest to the end of the plan year) is not less than the full funding limitation under Code section 412(c)(7). “

Based on this guidance, the calculation of the Full Funding Limitation should be the same as that used for minimum funding under IRC 412. The amount of the contribution is NOT compared directly to the amount of the Full Funding Limitation, since allowance is made for the amount of the credit balance.

$$\begin{aligned} 412 \text{ "ERISA" FFL} &= (1+i)*[AL + NC - (\text{Lesser}(MV, AAV) - CB)] \\ &= 1.08[(5,000,000+200,000) - (4,400,000-100,000)] \\ &= 972,000 \end{aligned}$$

$$\begin{aligned} 412 \text{ "RPA" FFL} &= 90\%(12/31 \text{ RPA CL} + NC) - (1+i)*AAV \\ &= 1.0655*90\%*(7,000,000+300,000) - 1.08*4,500,000 \\ &= 2,140,335 \end{aligned}$$

$$\begin{aligned} 412 \text{ final FFL} &= \text{Greater of RPA FFL and ERISA FFL} \\ &= 2,140,335 \end{aligned}$$

The amount of the 12/31 contribution that would need to be made is the difference between the 412 Full Funding Limitation (always at EOY) and the credit balance at 12/31.

The result is 2,032,335 which equals 2,140,335 FFL – 1.08*(100,000) CB at 12/31. The plan would then be exempt from the Variable Rate Premium for 2005.

Answer is B

NOTE

If you forgot the interest adjustment on the credit balance, you got lucky. The result of 2,040,335 is also in answer range B.

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Problem 21

You are doing the 410(b) average benefit percentage test (ABPT) for 2005. You need to aggregate all the benefit percentages of the employer's plans to do the ABPT calculations.

For the ABPT, employee benefit percentages should be determined based on plan years ending in the same calendar year. See the regulation at 1.410(b)-5(d)(3). Plan A's plan year ending in 2005 is 12/31/2005. Plan B's plan year ending in 2005 is 06/30/2005.

The average benefit percentage test is defined under the regulations at §1.410(b)-5 as the ratio of the actual benefit percentage (ABP) for non-highly compensated employees (NHCEs) who benefit under the plan divided by the ABP for highly compensated employees (HCEs) who benefit under the plan.

The ABP for NHCEs equals the sum of benefit accrual rates for NHCEs in the plan divided by the total number of non-excludable NHCEs. The ABP for HCEs equals the sum of benefit accrual rates for HCEs in the plan divided by the total number of non-excludable HCEs.

	HCEs	NHCEs
Total employees	30 = 10 + 20	200 = 100 + 100
Total Excludable employees	0	0
Employees not benefiting	5	50
Total Non-Excludable ees	35	250
Employees benefiting under Plan A	10	100
Sum of benefit accrual rates - Plan A	10 * 1.50%	100 * 1.25%
Employees benefiting under Plan B	20	100
Sum of benefit accrual rates - Plan B	20 * 2.00%	100 * 1.50%
Sum of benefit accrual rates - total	55%	275%
Average benefit percentage	1.57% = 55%/35	1.10% = 275%/250

The average benefit percentage test result is the ratio of the NHCE result divided by the HCE result:

$$70.00\% = 1.10\% / 1.57\%$$

Answer is B

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Problem 22

This is a straightforward question on the definition of highly compensated employee (HCE). IRC section 414(q)(1) defines an HCE as any employee who

- A. Was a 5% owner at any time during the current year or the prior year, or
- B. For the preceding year
 - i. Had compensation from the employer in excess of "90,000", and
 - ii. If the employer elects application of this clause for the prior year, was in the top paid 20% of employees for the prior year

In this problem you are told that the employer did not make the 20% top paid group election. The value of 90,000 shown above is from the table furnished with the exam. Even though the HCE determination is made for 2005, the 90,000 from the table (for 2004) is compared against the 2004 pay.

Based on pay alone, Brown is an HCE. No one else earned more than 90,000 for 2004.

The definition of a 5% owner comes from the 1.416 regulation. It is defined as someone who owns more than 5% of the stock.

Jones is the only HCE due to stock ownership. Brown and Jones are the only two HCEs.

Answer is A

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Problem 23 - Page 1

Similar to 2001 #23

§411(c)(2) of the IRC defines the calculation of the employee provided accrued benefit. After the passage of OBRA '89, the §417(e) interest rate is used to accumulate the employee contributions plus interest (EECWI) from the determination date to normal retirement age. The resulting EECWI is converted to an annual annuity by dividing by an annuity at the §417(e) interest rate. For a normal form other than a life annuity, factors in Revenue Ruling 76-47 were used to adjust the resulting benefit.

There is some unusual wording in this problem. In prior problems, they asked for the change in the vested accrued benefit from one valuation date to the next. In this problem, they ask for the change from one day to the next.

The key point of the problem is figuring out what does change between 12/31/04 and 01/01/05. The plan formula benefit does not change, since they accrued a full year of service for 2004. What does change is the 417(e) interest rate, which is used to convert the employee contributions into an employee provided benefit.

You need to determine the age, service, vesting percentage and total accrued benefit at 01/01/2005:

As of 01/01/2005

Age	44
Service	4
Vesting %	40%
FAE – 3 years	$60,000 = (55,000 + 60,000 + 65,000) / 3$
Accrued benefit	$3,600 = 60,000 * 4 * 1.5\%$

The next step is to calculate each year's employee contributions with interest, and then the amount of the employee provided accrued benefit:

Year	Pay	12/31 Contrib.	120% AFR	12/31 EECWI	EECWI Calculation
2001	50,000	2,500	0	2,500.00	
2002	55,000	2,750	5.40%	5,385.00	$= 1.0540 * 2,500.00 + 2,750$
2003	60,000	3,000	4.12%	8,606.86	$= 1.0412 * 5,385.00 + 3,000$
2004	65,000	3,250	4.23%	12,220.93	$= 1.0423 * 8,606.86 + 3,250$

Smith is age 44 at 01/01/05, and you have to convert the contribution balance to a benefit at normal retirement age, which is 21 years later. The 01/01/05 EECWI is accumulated with interest at the §417(e) rate until normal retirement age 65.

The employee provided annual accrued benefit at age 65 is calculated by dividing the age 65 EECWI by the annuity value at the §417(e) interest rate. The employee provided benefit equals the accrued benefit less the employee provided benefit.

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Problem 23 - Page 2

The question asks for the change in the vested annual accrued benefit between 12/31/04 and 01/01/05. The employee provided portion is always 100% vested, and the remaining accrued benefit is subject to the plan's vesting schedule. Here are the details of the calculations, using the two different interest rates:

	12/31/2004	01/01/2005
417(e)(3) rate	5.07%	6.25%
EECWI at 65	34,527	43,653
Annuity at NRA	11.72	10.65
EE provided benefit	2,946	4,099
Plan accrued benefit	3,600	3,600
Final accrued benefit	3,600	4,099
ER provided benefit	654	-
Vesting percentage	40%	40%
Vested ER provided benefit	262	-
Total vested benefit	3,208	4,099

One point of the problem is that the final accrued benefit is defined as the greater of the employee provided benefit and the plan formula accrued benefit. This results in an employer provided benefit of zero at 01/01/05.

The change in the vested annual accrued benefit between 12/31/04 and 01/01/05 is $891 = 4,099$ minus $3,208$.

Answer is C

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Problem 24 – Page 1

Similar to 2002 #15

This is a typical §415 problem. The key point of the problem is the calculation of the actuarial reduction to the §415 dollar limit prior to age 62.

Starting in 1997, earnings under §415 is defined as total compensation (not taxable). Earnings under §415 is not subject to the §401(a)(17) limit.

At 01/01/05

Age	55
Service	25 years
Participation	15 years

You can't calculate the plan formula benefit in this problem. The reason is that the problem only asks for the 415 limit.

415 COMP LIMIT

The §415(b)(1)(B) compensation limit is reduced when service is less than ten years.

$$\begin{aligned}\text{\$415 compensation limit} &= 107,000 * (10/10) \\ &= 107,000\end{aligned}$$

415 DOLLAR LIMIT

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

$$\begin{aligned}\text{\$415 dollar limit during 2005} &= 170,000 \text{ at age 62} * (10/10) \\ &= 170,000\end{aligned}$$

§415(b)(2)(E)(i) says to use the greater of 5% and the interest rate specified in the plan to reduce the §415 dollar limit prior to age 62. The examples in Revenue Ruling 98-1 clarify that the §415 dollar limit is reduced using the lower of the factors calculated based on the mandated mortality and interest rate, and plan basis for optional forms.

In this problem, you are given the factors for $\ddot{a}_{55}^{(12)}$ and $\ddot{a}_{62}^{(12)}$ on several bases. You are also given factors for ${}_7p_{55}$ and ${}_{10}p_{55}$. This is consistent with the definition of the death benefit under the plan.

With a death benefit that is not equal to 100% of the present value of the accrued benefit, there is a risk of forfeiting the benefit, and there is some mortality risk involved. The actuarial reduction prior to age 62 is calculated using the ratio of the N_x values, which includes the probability of death.

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Problem 24 - Page 2

$$\begin{aligned}\text{Actuarial reduction from 62 to 55} &= N_{62}^{(12)} / N_{55}^{(12)} \\ &= [v^{10}_{10} p_{55} \ddot{a}_{62}^{(12)}] / [v^3_3 p_{62} \ddot{a}_{55}^{(12)}] \\ &= v^7_7 p_{55} (\ddot{a}_{62}^{(12)} / \ddot{a}_{55}^{(12)})\end{aligned}$$

$$\begin{aligned}\text{Actuarial reduction from 62 to 55} \\ \text{(Mandated basis 5\% app. mortality)} &= (1.05)^{-7}(.9665)(12.67/14.57) \\ &= .5973\end{aligned}$$

One detail in this problem is the definition of the reduction from age 62 to age 55 on the plan's optional form basis. In this problem, no basis is specified for the factors. You are told that the reduction is 5% per year before age 65. The example in Q-7 of Revenue Ruling 98-1 calculates the actuarial reduction on the plan basis as the ratio of the plan's "tabular" reduction factor at the early retirement age to the factor at age 62.

$$\begin{aligned}\text{Actuarial reduction from 62 to 55} &= \text{ERF}_{55} / \text{ERF}_{62} \\ \text{(plan "tabular" basis)} &= [1-.06(5)-.035(5)] / [1-.06(3)] \\ &= .5250 / .8200 \\ &= .6402\end{aligned}$$

$$\begin{aligned}\$415 \text{ dollar limit at age 58} &= 170,000 * \text{lesser of } [.5973 \text{ or } .6402] \\ &= 101,541\end{aligned}$$

The 415 limit is the lesser of the compensation limit of 107,000 and the dollar limit of 101,541. One point of the problem is that there is no adjustment made to the 415 limit for a qualified joint and survivor annuity.

Answer is D

2005 EA-2B Exam Solutions

Problem 25

Similar to 2001 #36

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 plans were Top Heavy in four years: 1998, 1999, 2000 and 2004.

Now you should calculate the plan benefits for both employees:

	Smith	Brown
Location	1	2
Effective date	01/01/1998	01/01/1997
Hire date	01/01/1997	01/01/2002
01/01/05 participation service	7	3
Annual pay	30,000	25,000
Plan accrued benefit	$[1.25\%(5) + .75\%(2)] * 30,000$ = 2,325	$3(400)$ = 1,200

Neither Smith nor Brown 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. One key point of the problem is that Brown only has one year of T-H service:

	Smith	Brown
Top Heavy service	4	1
T-H minimum	$2\% * (4) * 30,000$ = 2,400	$2\% * (1) * 25,000$ = 500
Final accrued benefit	2,400	1,200

The sum of the annual accrued benefits is 3,600.

Answer is B

2005 EA-2B Exam Solutions

Problem 26 - Page 1

Similar to 2004 #27

This problem tests your knowledge of the method for adjusting assets and discounting contributions under the Alternative calculation method (ACM) for calculating the Variable Rate Premium (VRP) on the PBGC-1 Form, Schedule A.

Since this is the 2005 PBGC premium calculation under the ACM, the determination date is 01/01/2004. You must calculate the adjusted liability values. Here is the formula (from the tables given with the exam):

$$VB_{adj} = VB_{pay} * 0.94^{(RIR-BIR)} + [VB_{Nonpay} * 0.94^{(RIR-BIR)} * ((100+BIR)/(100+RIR))^{(ARA-50)}]$$

In the formula, RIR equals 5.00 and BIR equals 6.55 (100 times the required interest rate and the current liability interest rate, respectively). One key point of the problem is that, for participants who are not in pay status, the formula given does not include the 1.07 adjustment in the PBGC-1 instructions.

	In pay status	Not in pay status
Group	Retired	Active and terminated vested
Unadjusted vested liability	400,000	2,600,000
Adjustment factor	$.94^{(5.00-6.55)}$ = 1.1007	$1.07 * (.94^{(5.00-6.55)}) * [(106.55/105.00)^{(63-50)}]$ = 1.4249
Adjusted vested liability	440,263	3,704,614

The total adjusted vested current liability at 01/01/04 is 4,144,877.

Use the actuarial asset value at 01/01/04, and reduce it by any included receivable contributions. Then you must add the discounted value of “contributions paid for plan years prior to the premium payment year ...” The interest rate used for discounting assets is always the Required Interest Rate:

$$\begin{aligned} 01/04 \text{ Adjusted assets} &= (1,900,000 - 200,000) + 200,000 * (1.0500)^{(-3.5/12)} \\ &= 1,897,174 \end{aligned}$$

$$\begin{aligned} 01/04 \text{ Unfunded vested liability} &= 4,144,877 - 1,897,174 \\ &= 2,247,702 \end{aligned}$$

The adjusted value of the unfunded benefits liability is the excess of the liabilities over the adjusted assets, “adjusted for the passage of time from the first day of the plan year preceding the premium payment year to the premium snapshot date.” The interest rate used for the adjustment is the Required Interest Rate:

$$\begin{aligned} 01/05 \text{ Unfunded vested liability} &= 2,247,702 * 1.0500 \\ &= 2,360,088 \end{aligned}$$

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Problem 26 - Page 2

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

$$\begin{aligned} \text{2005 Variable rate premium} &= 2,361,000 * .009 \\ &= 21,249 \end{aligned}$$

Answer is B

NOTES:

1. The Alternative Calculation Method (ACM) normally uses current liability values from the prior year's Schedule B. The adjusted liability values allow for the difference between the current liability interest rate and the required interest rate.
2. You may value current liabilities at the required interest rate under the ACM, but only if the required interest rate exceeds the current liability interest rate. Then the only adjustment made to the current liabilities is the 1.07 factor for those not yet in pay status.

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Problem 27

I. FALSE

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).

II. TRUE

This is almost a direct quote from ERISA Section 402(c)(1).

III.FALSE

This is almost a direct quote from ERISA Section 402(a)(1).

Only item II is True.

Answer is E

2005 EA-2B Exam Solutions

Problem 28

The definition of a rate group is that it consists of all employees with both a normal accrual rate and a most valuable accrual rate that are equal to or exceed those rates for a given HCE.

For the normal accrual rates, you can group all rates within 105% of the midpoint. For most valuable accrual rates, you can group all rates within 115% of the midpoint.

You are not given any HCE rates in this problem. The best approach is to set the midpoint of a rate group equal to the average of two employees' accrual rates. If the rates are close enough together, then the rate group will include both employees.

If you look at the rates given, the most valuable accrual rates are farther apart. There may be fewer pairs of employees where the rates are close enough to be in the same rate group.

I'll test each pair of most valuable accrual rates, going in order from lowest to highest:

	Average of MVAR	Bottom rate	Top rate
E3 and E1	$3.425\% = .5(2.90\% + 3.95\%)$	$2.911\% = .85 * 3.425\%$	$3.939\% = 1.15 * 3.425\%$
E1 and E2	$4.400\% = .5(3.95\% + 4.85\%)$	$3.740\% = .85 * 4.400\%$	$5.060\% = 1.15 * 4.400\%$
E2 and E4	$5.605\% = .5(4.85\% + 6.36\%)$	$4.764\% = .85 * 5.605\%$	$6.446\% = 1.15 * 5.605\%$

There are two pairs that may fall in a rate group: E1 and E2, and E2 and E4. Now you need to do similar calculations for the normal accrual rates.

	Average of NAR	Bottom rate	Top rate
E1 and E2	$2.395\% = .5(2.54\% + 2.25\%)$	$2.275\% = .95 * 2.395\%$	$2.515\% = 1.05 * 2.395\%$
E2 and E4	$2.165\% = .5(2.25\% + 2.08\%)$	$2.057\% = .95 * 2.165\%$	$2.273\% = 1.05 * 2.165\%$

E1 and E2 can not be in the same rate group, since their normal accrual rates are too far apart. Only E2 and E4 can be in a rate group.

Answer is D

2005 EA-2B Exam Solutions

Problem 29

Similar to 2004 #32

Revised 12/10/06

In event of termination, a defined benefit plan must limit benefits of HCEs (or former HCEs) to an amount that is not discriminatory under 401(a)(4). The regulation at 1.401(a)(4)-5(b)(3) contains the rules regarding restricted distributions.

In general, it says the employee can't receive more than one year's life annuity payments in a year. There are several exceptions to this distribution restriction at 1.401(a)(4)-5(b)(3)(iv)(A):

- After payment, plan assets $\geq 110\%$ of current liability under 412(l)(7)
- Value of benefits payable $< 1\%$ of current liability
- Value of benefits payable $< 411(a)(11)(A)$ mandatory L.S. amount (5,000)

First you need to calculate Smith's total lump sum at 01/01/05:

Age	65
Service	10
Accrued benefit	$2.5\%(10)(150,000)$ $= 37,500$
Plan lump sum	$11.87(37,500)$ $= 445,125$

To satisfy the requirements of the regulation, the assets after Smith's distribution need to be at least 110% of the remaining current liability. Based on the answer ranges, it is clear that you can't pay Smith the full lump sum amount. The key to the problem is that, if a partial lump sum is paid, then Smith still has part of their current liability remaining.

Let LS be the partial lump sum paid to Smith. The reduction in the current liability due to the payment is $LS * (500,000 / 445,125)$. Now you can solve for the value of LS:

$$\frac{625,000 - LS}{1,000,000 - LS * \frac{(500,000)}{(445,125)}} \geq 110\%$$

$$\begin{aligned} 625,000 - LS &\geq 1,100,000 - LS * 1.2356 \\ LS &\geq 2,016,061 \end{aligned}$$

What this result means is that it is impossible to pay any amount to Smith, and still have the assets be at least 110% of the current liability. The only amount that can be paid is Smith's annual benefit of 37,500.

Answer is A

2005 EA-2B Exam Solutions

Problem 30 – Page 1

Similar to 2001 #22

This is a very messy PBGC guaranteed benefits question. This is one of the more complicated questions asked in recent years, because there are SO many tiny details.

This question tests your knowledge of both the five year phase-in and the 30 year phase-in of guaranteed benefits for substantial owners. 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.

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.

One key point of the problem is that you use the 2004 MGB value, since the termination date is 12/31/04. The 2004 MGB at 65 is 3,698.86 (from the tables given with the exam).

Another key point of the problem is that 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 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. The MGB also must be reduced for the 100% Joint and Survivor normal form.

The 01/01/85 plan benefit and the 01/01/90 plan benefit were adopted at later dates. For purposes of measuring the years that each plan was effective, you use the later of the effective date and the adoption date (02/01/85 and 07/01/00 respectively).

In this problem, Jones is a substantial owner, with more than 10% ownership. The 01/01/85 plan benefit and the 01/01/90 plan benefit are both subject to the 30 year phase-ins. The phase-ins are measured from the later of the effective date (or the adoption date), or Jones' date of participation. The 01/01/85 plan has been in effect for 19 full years, from 02/01/85 to 02/01/04. The 01/01/90 plan has been in effect for 4 full years, from 07/01/00 to 07/01/04.

Smith is subject to the five year phase-in rules. For Smith, the 01/01/85 plan has been in effect for five full years at DOPT. Due to the later adoption date, the 01/01/90 plan has been in effect for four full years at DOPT, from 07/01/00 to 07/01/04.

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Problem 30 – Page 2

	Smith: 5 year phase-ins	Jones: 30 year phase-ins
Date of birth	01/01/45	01/01/42
Date of retirement	12/31/04	12/31/04
12/31/04 age	60	63
Date of hire	01/01/80	01/01/75
Past service	25	30
Substantial owner?	NO	YES
Vesting percentage	100%	100%
5 year average compensation	$3333.33 = 40,000/12$	$6666.67 = 80,000/12$
MGB at 65 (life annuity)	3333.33	3,698.86
MGB at 65 (100% J&S)	$2,666.67 = .80 * 3333.33$	$2,959.09 = .80 * 3,698.86$
MGB reduced for age at DOPT	$1,733.33 = .65 * 2,666.67$	$2,544.82 = .86 * 2,959.09$
“02/01/85” Base plan benefit	$3,333.33(2.5\%)(25)$ $= 2,083.33$	$6,666.67(2.5\%)(30)$ $= 5,000.00$
Early retirement reduction	$75\% = 1-5(5\%)$	$90\% = 1-2(5\%)$
Early retirement benefit	$2,083.33 * (75\%)$ $= 1,562.50$	$5,000.00(90\%)$ $= 4,500.00$ $= 2,544.82$ (hit MGB)
Guaranteeable benefit increase	1,562.50	2,544.82
Years plan has been in effect	5	19
Phase-in	1,562.50	$2,544.82 * (19/30)$ $= 1,611.72$
“07/01/00” Base plan benefit	$3,333.33(3.0\%)(25)$ $= 2,500.00$	2,544.82 (hit MGB)
Early retirement benefit	$2,500.00 * (75\%)$ $= 1,875.00$ $= 1,733.33$ (hit MGB)	2,544.82 (hit MGB)
Guaranteeable benefit increase	$1,733.33 - 1,562.50$ $= 170.83$	0
Years plan has been in effect	4	
Phase-in	$170.83(80\%)$ or \$80 $= 136.67$	
Total guaranteed benefit	$1,562.50 + 136.67$ $= 1,699.17$	1,611.72

The sum of the guaranteed benefits is 3,310.89.

Answer is B

(See next page for notes)

Problem 30 – Page 3

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.
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 were 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.

2005 EA-2B Exam Solutions

Problem 31

Similar to 2004 #20

The key to this problem is knowing the definition of the annual withdrawal liability payment. The annual payment amount is 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

In this problem, the withdrawal year is 2004. The highest contribution rate in the 10 years from 1995 through 2004 is 3.75.

The highest consecutive 3 year average of hours in the 10 years from 1994 through 2003 is calculated using the years 2001 through 2003:

$$805,333 = (1/3)[786,000 + 810,000 + 820,000]$$

The annual payment amount is $3,020,000 = 3.75 \times 805,333$.

Answer is B

NOTE:

There are other definitions that may be tested in future years. There is a 20 year payment cap. The payments stop after 20 years, even if the withdrawal liability exceeds the present value of 20 years of annual payments.

The actual payments are made quarterly. The quarterly payment amount is $\frac{1}{4}$ of the annual payment amount. The first quarterly payment is made at the start of the plan year following the year of withdrawal.

2005 EA-2B Exam Solutions

Problem 32

Similar to 2003 #32

The key to this problem is knowing what "the minimum required pre-retirement survivor annuity" means. This refers to the qualified pre-retirement spouse annuity (QPSA). This is an annuity type similar to a qualified joint and survivor annuity, which is defined in 417(b)(1) as a joint and survivor annuity of at least 50%.

In 417(c)(1)(A)(ii), if the participant dies prior to their earliest retirement age, the annuity should commence at that earliest retirement age. Based on the plan provisions, Smith's earliest retirement age is 60, since they had only completed 5 years of service at death.

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

As of 01/01/2005

Age	55
Service	5
Earliest Retirement Age	60

Accrued Benefit	10,000
Vesting percentage	60%
Vested benefit	6,000
Early Retirement reduction	0.70
	$= 1 - .06*(65-60)$
Benefit payable at age 60	4,200

50% J&S Reduction	93%
50% J&S Benefit	3,906
50% Death benefit	1,953

Answer is B

2005 EA-2B Exam Solutions

Problem 33

The key to this problem is knowing that pay used in calculating the 415 compensation limit is not subject to the 401(a)(17) limit. Smith's compensation limit is the average of the three years of total compensation given:

$$205,000 = \frac{1}{3}(215,000 + 205,000 + 195,000)$$

Answer is E

One way to get the problem wrong is to subtract the 401(k) deferrals from the total compensation given. That is incorrect, since EGTRRA changed most of the compensation definitions to use total compensation (not taxable compensation).

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Problem 34 - Page 1

Similar to 2003 #14

This is a lengthy problem on plan design using the annual disparity fraction and the cumulative disparity fraction. The annual disparity fraction (ADF) is designed to prevent multiple 401(l) plans from exceeding the .75% permitted disparity limit. The cumulative disparity fraction (CDF) is designed to keep a single defined benefit plan from exceeding 35 years of accruals at the .75% permitted disparity limit.

The total annual disparity fraction (at 1.401(l)-5(b)(2)) is defined as the sum of the ADF for all plans whose plan year ends in the current plan year of the plan being tested. The ADF is defined as follows:

$$\text{DC plan} \quad - \quad \frac{\text{Disparity for the year}}{\text{Maximum excess allowance}}$$

$$\text{DB excess} \quad - \quad \frac{\text{Disparity for the year}}{\text{Maximum excess allowance}}$$

$$\text{DB offset} \quad - \quad \frac{\text{Disparity for the year}}{\text{Maximum offset allowance}}$$

$$\text{ADF} \quad - \quad 1.0 \text{ for imputed permitted disparity plans}$$

The cumulative disparity fraction (CDF) at 1.401(l)-5(c)(2) is the sum of the ADF for all plans for all years of service. The CDF must not exceed 35. This is essentially a limit that applies to defined benefit (DB) plans. The reason is that the CDF limit is deemed automatically satisfied for an employee who does not benefit under any DB plans (see 1.401(l)-5(c)(1)(ii)).

You should determine the ADF for the profit sharing plan. To satisfy the total annual disparity fraction limit, the ADF for the DB plan must be less than 1.0 less the DC ADF. Since the DB plan accrues benefits for more than 35 years, the DB plan ADF must be further reduced to satisfy the CDF.

DC PLAN

In the given plan, the disparity is 3%, which equals the excess contribution percentage (8%) minus the base contribution percentage (5%).

The annual disparity fraction for DC plans depends on the percentage of the Taxable Wage Base (TWB) used as the integration level. The maximum excess allowance is defined at 1.401(l)-2(b)(2) as the lesser of

- The base contribution percentage, or
- The greater of 5.7% (as reduced under 1.401(l)-2(d)(4)), or the old age FICA rate

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Problem 34 - Page 2

The resulting maximum excess allowance is the base percentage of 5%. The ADF for the DC plan equals $3.0\% / 5.0\% = .60$.

DB PLAN

Based on the prior calculations, the ADF for the DB plan can't exceed .40, which equals $1.0 - .60$.

In the given plan, the disparity is X%, which equals the excess contribution percentage $(1\% + X\%)$ minus the base contribution percentage (1%).

The annual disparity fraction for DB excess plans depends on several factors. The maximum excess allowance is defined at 1.401(l)-3(b)(2) as the lesser of

- .75% reduced as required under 1.401(l)-3(d), or 1.401(l)-3(e), or
- The base benefit percentage

1.401(l)-3(d) contains adjustments based on the integration level. In this problem (as in all prior problems), the integration level equals 100% of covered compensation. If the integration level were greater, then the .75% would be reduced based on the table at 1.401(l)-3(d)(9).

1.401(l)-3(e) contains adjustments based on benefit commencement ages other than Social Security Retirement Age (SSRA). These adjustment tables are given with the EA-2B exam each year. Since the plan allows early retirement at age 62, the .75% must be reduced to reflect that benefit commencement age.

In this problem, you must be careful to check the simplified table. The reason is that the adjusted percentage is .50% at age 62 using the table for SSRA 67, but it is .52% at age 62 under the simplified table.

Some prior problems have told you to ignore the simplified table. This is the second problem where use of the simplified table is required to produce the correct answer range.

The ADF for the DB plan equals $X\% / .52\%$. If you now solve for X%, you will get the wrong answer:

$$\begin{aligned} [X\% / .52\%] &= .40 = 1 - .60 \\ X\% &= .208\% \end{aligned}$$

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Problem 34 - Page 3

The prior calculation guarantees that the DB and the DC plan meet the ADF limit. But this incorrectly ignores the cumulative disparity fraction (CDF). Since the DB plan allows benefits to accrue for 40 years, you should add the disparity fractions for each year of benefit accrual, and compare them to the CDF:

$$\begin{aligned} 40 * [X\% / .52\%] &\leq 35 * (.40) \\ [X\% / .52\%] &\leq (35/40) * (.40) \\ X\% &\leq .182\% \end{aligned}$$

Answer is C

NOTES:

There are several ways to get the problem wrong. As mentioned earlier, if you ignore the simplified table, you will get $X \leq .175\%$, which is Answer B.

2005 EA-2B Exam Solutions

Problem 35

Similar to 2004 #21

This is the second question asked on the EA-2B 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.

The excise tax for failure to provide the notice is calculated as follows:

$$204,000 = \$100(40 \text{ active ees})(51 \text{ days})$$

Answer is C

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Problem 36 – Page 1

Similar to 2002 #16

This is not a typical §415 problem. It is unusual to have late retirement problems with §415 limits. The key point of the problem is the calculation of the actuarial increase in the §415 dollar limit after age 65. Another point is the adjustment of the §415 dollar limit for the normal form of benefit payment.

At 01/01/05

Age	66	Birth date	01/01/39
Service	10 years	Hire date	01/01/95
Participation	10 years	Effective date	01/01/70
		Late retirement age	66
		Normal retirement age	65

Similar to problem 24, you can't calculate the plan formula benefit in this problem. The reason is that the problem only asks for the 415 limit.

415 COMP LIMIT

The §415(b)(1)(B) compensation limit is reduced when service is less than ten years:

$$\text{Age 66 100\% 3 year comp. §415 limit} = 183,300 * (10/10)$$

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:

$$\text{§415 dollar limit during 2005} = 170,000 \text{ at age 65} = 170,000 * (1/10)$$

§415(b)(2)(E)(iii) says to use the lesser of 5% and the interest rate specified in the plan to increase the §415 dollar limit after age 65. The examples in Revenue Ruling 98-1 clarify that the §415 dollar limit is increased using the lower of the factors calculated based on the mandated mortality and interest rate, and plan basis for optional forms.

If there were no death benefit at all, then there would be a risk of forfeiting the benefit. In that case, the late retirement actuarial increase should be calculated using the “N/N” factors.

In this problem, the actuarial increase factor is lower than it would be using the “N/N” factors. This is due to the fact the participant is covered by a death benefit during the period after normal retirement age. You should use the $(1+i)^{y-65}(\ddot{a}_{65} / \ddot{a}_y)$ factors both on the plan basis and on the mandated basis.

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Problem 36 – Page 2

$$\begin{aligned}\text{Actuarial increase from 65 to 66} &= (1.050)^1 * (\ddot{a}_{65}^{(12)} / \ddot{a}_{66}^{(12)}) && \text{(at 5.0\%)} \\ \text{(Mandated basis 5\% app. mortality)} &= (1.050)(12.25 / 11.95) \\ &= 1.0764\end{aligned}$$

$$\begin{aligned}\text{Actuarial increase from 65 to 66} &= (1.055)^1 * (\ddot{a}_{65}^{(12)} / \ddot{a}_{66}^{(12)}) && \text{(at 5.5\%)} \\ \text{(Plan basis 5.5\% app. mortality)} &= (1.055)(11.77 / 11.50) \\ &= 1.0798\end{aligned}$$

$$\begin{aligned}\$415 \text{ dollar limit at age 66} &= 170,000 * \text{lesser of } [1.0764 \text{ or } 1.0798] \\ \text{Annual life annuity} &= 182,981\end{aligned}$$

Smith's 415 limit at age 66 is the lesser of the compensation limit of 183,300 and the dollar limit of 182,981. This is based on a life annuity payment form.

FORM OF PAYMENT

You need to calculate the adjustment factors to allow for payment on the normal form of 10 year certain and life. IRC §415(b)(2)(E)(i) says to use the lesser of 5% and the interest rate specified in the plan to adjust the \$415 dollar limit for form of payment. But you actually calculate two separate factors, and use the lesser of the two results.

This benefit must be adjusted to the 10 year certain and life normal form using this factor:

$$\ddot{a}_{66}^{(12)} / \ddot{a}_{66:\overline{10}|}^{(12)}$$

$$\begin{aligned}\text{10 year certain and life adjustment} &= 11.95 / 12.48 && \text{(at 5.0\%)} \\ \text{(Mandated basis 5\% app. mortality)} &= .9575\end{aligned}$$

$$\begin{aligned}\text{10 year certain and life adjustment} &= 11.50 / 12.02 && \text{(at 5.5\%)} \\ \text{(Plan basis 5.5\% app. mortality)} &= .9567\end{aligned}$$

$$\begin{aligned}\$415 \text{ dollar limit at age 66} &= 182,981 * \text{lesser of } [.9575 \text{ or } .9567] \\ \text{10 year certain and life} &= 175,065\end{aligned}$$

Answer is B

NOTE

You really did not have to calculate both factors each time, since the mandated assumptions and the plan assumptions use the same mortality table. Any actuarial increase factor will be smaller for lower interest rates. Any actuarial reduction factor will be smaller for higher interest rates.

2005 EA-2B Exam Solutions

Problem 37

Similar to 2004 #24

I. TRUE

In the regulation at 901.20(b), it reads as follows:

"(b) Professional duty.

An enrolled actuary shall not perform actuarial services for any person or organization which he/she believes or has reasonable grounds for believing may utilize his/ her services in a fraudulent manner or in a manner inconsistent with law."

II. TRUE

In the regulation at 901.20(c), it reads as follows:

"(c) Advice or explanations.

An enrolled actuary shall provide to the plan administrator upon appropriate request, supplemental advice or explanation relative to any report signed or certified by such enrolled actuary."

III. TRUE

In the regulation at 901.20(f), it reads as follows:

"(f) Report or certificate.

An enrolled actuary shall include in any report or certificate stating actuarial costs or liabilities, a statement or reference describing or clearly identifying the data, any material inadequacies therein and the implications thereof, and the actuarial methods and assumptions employed."

All three items are True.

Answer is D

2005 EA-2B Exam Solutions

Problem 38

Similar to 2004 #4

This item has been tested numerous times on past exams. In 901.20(d), it states that a conflict of interest does not prevent an actuary from performing services. Once they have made full disclosure of the conflict of interest, they can continue to provide actuarial services. The disclosure should be made to the plan trustees, any named fiduciary of the plan, and the plan administrator (and the collective bargaining representative, if applicable).

I. FALSE

II. TRUE

III. FALSE

Only item II is True.

Answer is C

2005 EA-2B Exam Solutions

Problem 39

The key to working this problem is knowing some small details in the regulations. These are in 1.401(a)(4)-8(d), which mostly covers cross-testing of DB or DC plans. When you cross-test a DB plan on a contribution basis, you need to convert the life annuity payments to a lump sum at the current age.

At 12/31/2004, Smith is age 25. The problem states that the annual accrued benefit (payable at normal retirement age 65), increased by 4,000. You need to calculate the present value at testing age 65, and discount it back to today at the 8.5% standard interest rate.

One minor point of the problem is that you should use a monthly life annuity. This is based on exam condition 7, which states that the plan benefit is payable monthly. It is surprising that you can get the correct answer range, even if you don't adjust to a monthly annuity.

$$\ddot{a}_{65}^{(12)} = 7.4917 = \ddot{a}_{65} - \frac{11}{24}$$

$$\begin{aligned} \text{PV at age 65} &= 4,000 * 7.4917 \\ &= 29,967 \end{aligned}$$

$$\begin{aligned} \text{DC amount at 25} &= 29,967 * (1.085)^{-(65-25)} \\ &= 1,147 \end{aligned}$$

At this point, you have converted the 4,000 increase in the accrued benefit into an equivalent allocation of 1,147. Now you have to know what to do with the rollover amount, as well as the investment gains or losses. It makes sense to exclude the rollover amount, since that is not an employer contribution. This is specified in the regulation at 1.401(a)(4)-11(b)(1).

You are given the 2004 allocations and investment gains and losses for the profit sharing and 401(k) plan. In general, the 2004 investment gains and losses would be based on the account balance at 01/01/2004, not solely on the 2004 allocations.

Based on the regulation (at 1.401(a)(4)-8(b)(2)(ii)(A)), you must exclude the investment gains and losses attributed to the beginning account balance. The regulation allows you to exclude the investment gains and losses attributed to the current year allocation, as an option.

Now you can add up all the allocations, and determine the allocation rate:

DB plan	1,147
Profit sharing plan	2,500
401(k) deferral	<u>7,500</u>
Total	11,147

The total allocation rate is $7.43\% = 11,147 / 150,000$.

Answer is C

2005 EA-2B Exam Solutions

Problem 40

Similar to 2004 #26

This problem is a simple one on Top Heavy (T-H) minimums. The only tricky case is Brown, who is covered under both a DB and a DC plan.

If employees participate in both a top-heavy DB plan and a top-heavy DC plan, minimum benefits do not have to be provided in both. There are four safe harbor alternatives discussed in Q&A M-12 of the 1.416 regulation.

- Provide T-H minimum only in DB plan
- Provide T-H minimum in DB plan, but offset the DB minimum by equivalent level benefit under the DC plan (cheaper than 1)
- Prove through analysis of comparability of benefits (see RR 81-202) that the plans provide benefits > DB minimums
- Provide contributions + forfeitures \geq 5% of compensation under DC plan

I. FALSE

Smith is only covered under the DC plan. For a DC plan the T-H minimum is an allocation of 3% (or the lowest allocation percent for any key employee). Smith's T-H minimum is an allocation of 900 = 3%(30,000).

II. TRUE

Jones is only covered under the DB plan. For a DB plan the T-H minimum is an allocation of 2% times T-H pay times T-H service. Jones only has one year of T-H service, so their T-H minimum benefit is 1,500 = 2%(1)(75,000).

III. TRUE

Brown is covered under both plans. Based on the first of the four options, the T-H minimum could be provided only in the DB plan. Brown's DB plan T-H minimum benefit is 1,200 = 2%(1)(60,000).

Based on the last of the four options, a minimum allocation of 5% could be provided only in the DC plan. Brown's DC plan allocation would be 3,000 = 5%(60,000).

Answer is C

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Problem 41 – Page 1

Similar to 2001 #28

Revised 04/26/06

This is the second question asked on the exam regarding Internal Revenue Code section 420, which was added to the syllabus in 2000. Section 420 defines what constitutes a qualified excess asset transfer from a pension plan to a 401(h) account.

IRC 420(b)(1) defines a “qualified transfer” as a transfer of excess pension assets to a health benefits account which is part of such plan. IRC 420(b)(5) states that there will be no qualified transfers in any taxable year beginning after 12/31/2013.

IRC 420(e)(2) defines "excess pension assets" as the excess of an asset amount over a liability amount, determined as of the most recent valuation date before the transfer. The asset is the amount under §412(c)(7)(A)(ii), which is the lesser of market and actuarial value of assets. The liability is the greater of (i) the liability component of the Full Funding Limitation (FFL) under §412(c)(7)(A)(i), or (ii) 125% of the OBRA '87 current liability plus normal cost.

Based on the general conditions for the exam, the OBRA and RPA current liabilities have the same value, which is given as 35,500,000. The liability component of the FFL is the Accrued liability plus normal cost:

Asset piece

45,200,000 = lesser of 46,200,000 or 45,200,000

Liability piece

44,375,000 = greater of 40,000,000 or 125%(35,500,000)

Excess assets = 45,200,000 – 44,375,000
= 825,000

IRC 420(b)(3) defines the limitation on the amount transferred. The amount of excess pension assets that may be transferred can not exceed the reasonably estimated amount the employer would pay (directly or through reimbursement) out of the account for "qualified current retiree health liabilities". This equals the expected health benefits paid in 2005, which is 1,000,000.

The key point of this problem is that there are additional adjustments that must be applied to the limitation on the amount transferred. These details have never been tested on the exam.

IRC 420(e)(1)(A) defines "qualified current retiree health liabilities" as the amount which could have been deducted by the employer, assuming they were paid directly by the employer.

IRC 420(e)(1)(B) describes a reduction that must be made in the 1,000,000 value:

"(B) Reductions for amounts previously set aside

The amount determined under subparagraph (A) shall be reduced by the amount which bears the same ratio to such amount as--

(i) the value (as of the close of the plan year preceding the year of the qualified transfer) of the assets in all health benefits accounts or welfare benefit funds (as defined in section 419(e)(1)) set aside to pay for the qualified current retiree health liability, bears to

(ii) the present value of the qualified current retiree health liabilities for all plan years (determined without regard to this subparagraph)."

This sounds like it might be the 1,000,000 times the ratio of the retiree health plan assets to liabilities given:

$$666,667 = 1,000,000 - 1,000,000 (5,000,000/15,000,000)$$

There is one last trick to the problem. IRC 420(e)(1)(D) describes the treatment of key employees:

"(D) Key employees excluded

If an employee is a key employee (within the meaning of section 416(i)(1)) with respect to any plan year ending in a taxable year, such employee shall not be taken into account in computing qualified current retiree health liabilities for such taxable year or in calculating applicable employer cost under subsection (c)(3)(B)."

This means that the 1,000,000 expected claims and the 15,000,000 liability value both should be multiplied by 90%

$$566,667 = 1,000,000(90\%) - 1,000,000(90\%)*(5,000,000)/[90\%(15,000,000)]$$

Answer is A

In my opinion, this is a truly ridiculous question. I wonder if ANY student got the correct answer.

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