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FALL 1999 EA-2 EXAM SOLUTIONS (Course P-365U)

These solutions use beginning of year amortization payments in setting up the Minimum Funding Standard Account. These solutions were prepared based on the law as in effect at June 30, 1999.

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!

For problems involving the deductible limit you should use the following sequence of steps:

1. Calculate the normal cost plus limit adjustments with interest to the earlier of the end of the plan year or the end of the tax year.

2. Calculate the Full Funding Limitation under Section 404 with interest to the end of the plan year. If this is less than the result of step one, then you can skip to step four.

3. Calculate the absolute minimum amount necessary to produce a non-negative credit balance in the Minimum Funding Standard Account. This amount should never be based on the Alternative MFSA. This amount may be increased by the amount of any "includible employer contribution."

4. The maximum deductible limit is the greater of (1) and (3), but not greater than (2).

5. If the Unfunded Current Liability exceeds the final deductible limit and the plan has more than 100 participants, then the final deductible limit will be the UCL. This UCL limit is only available to non-multiemployer plans.

Revision History:

January 24, 2019	Corrected note for problem 25
March 30, 2008	Clarified solution for problem 33
June 20, 2006	Clarified solution for problems 40, 44 and 46
September 5, 2005	Corrected solutions for problems 31 and 48
December 13, 2004	Clarified solution for problem 25
April 30, 2003	Corrected solution for problems 14 and 27
January 8, 2003	Clarified solution for problems 36 and 38
December 17, 2002	Corrected solutions for problems 40 and 46
June 21, 2002	Corrected solutions for problems 29, 37, 39, 44, 48, 49 and 50
May 6, 2002	Corrected solution for problem 36
January 10, 2002	Corrected solution for problem 36
July 9, 2001	Corrected solution for problems 33, 34, and 47
April 23, 2001	Corrected solutions for problems 25, 27, and 34
January 4, 2001	Corrected solutions for problems 18, 27 (page 2), 31, and 49
September 7, 2000	Original solutions

Problem 1

FALSE

The 1.414(l)-1(b)(9) regulation describes the assumptions to use for calculating the present value of the accrued benefit. It states that this "must be determined on the basis of reasonable actuarial assumptions." It then says that the PBGC assumptions are deemed reasonable. This does not mandate use of the PBGC assumptions, since other actuarial assumptions may also be "reasonable."

Answer is B

Problem 2

TRUE

The stability period is defined in the 1.417(e)-1(d)(4)(ii) as a month, or a plan/calendar quarter, or a plan/calendar year.

Answer is A

Problem 3

TRUE

This question tests your knowledge of the 1.411(d)-6 regulation. In A-9, the regulation states that the 204(h) notice does not need to be given to "any participant whose future rate of benefit accrual is reasonably not to be reduced by the amendment."

Answer is A

Problem 4

FALSE

This question tests your knowledge of QDROs with a small point. In IRC section 414(p)(3)(A) it states that a QDRO can not require a plan to provide a form of benefit not otherwise provided under the plan.

Answer is B

Problem 5

TRUE

This question tests your knowledge of the regulations governing enrolled actuaries. This is virtually a direct quote from the ERISA regulation at 901.20(d).

Answer is A

Problem 6

FALSE

This question tests knowledge of a small change made by the Taxpayer Relief Act of 1997. Prior to this law, the amended SPD had to be filed with the DOL. TRA 97 amended ERISA section 101(b) and other sections of ERISA to eliminate this requirement.

Answer is B

Problem 7

TRUE

This is true, due to a specific exception in the regulation at 1.411(d)-4 [A-2](b)(2)(ii). There is a specific example that is identical to the situation in this question, and it allows elimination of the 75% QJ&S.

Answer is A

Problem 8

TRUE

This question tests your general pension knowledge. ERISA section 3(14) has a defined list of parties in interest, which includes "a person providing services to such plan."

Answer is A

Problem 9

FALSE

This limit is defined in IRC section 411(a)(11), and it has never been indexed for inflation.

Answer is B

Problem 10

TRUE

In the 1.411(d)-4 regulation, it describes benefits which are protected:
1. Accrued benefits
2. Early retirement benefits
3. Retirement type subsidies
4. Optional forms of benefit payment

Ancillary death or disability benefits are not protected, and may be removed from the plan.

Answer is A

Problem 11

Similar to 1998 #28

FALSE

See §416(g)(2)(A)(i) and 1.416-1 question T-6
The code states that a required aggregation group consists of each plan in which a key employee is a participant. In addition, it includes each other plan which enables a plan (with a key employee participant) to satisfy the requirements of 401(a)(4) or 410. This is further clarified in question T-6 under the 1.416-1 regulation.

Since these plans satisfy the requirements of 401(a)(4) or 410 independently, and only one plan has key employees, they do not have to be aggregated.

Answer is B

Problem 12

TRUE

In general, once the funded current liability percentage is 90%, the plan is exempt from the 412(l) additional funding charge. The gateway percentage is calculated using specific assumptions that are designed to produce the largest value for the funded current liability percentage. Since we are not anything about which assumptions produce the value of 90%, we can assume that the gateway percentage must be at least 90%, so this plan is exempt from 412(l).

Answer is A

Problem 13

FALSE

Section 4050 of ERISA contains rules regarding missing participants. Section 4050.5(b) states that the present value must be determined using the most valuable benefit, with assumptions as of the deemed distribution date. The deemed distribution date is defined in Section 4050.2. In general, this is "the last day of the period in which distribution may be made under part 4041" which extends beyond the date of plan termination.

Answer is B

Problem 14 Similar to 1998 #7 **Revised 04/30/03**

FALSE

This question tests your knowledge of the definition of a 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 80,000, 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

Since the employee was not an owner, and was not hired in 1998, they do not satisfy the definition of an HCE.

Answer is B

Problem 15

TRUE

This question tests your knowledge of the rules in IRC section 318 regarding constructive ownership of stock. This code section was added to the syllabus for the 1999 exam.

Based on 318(a)(1)(A)(ii), the son is considered as owning the stock owned by his father. Based on the definition of key employee at IRC 416(i)(1)(A)(iii), the son is considered a key employee due to ownership of 5% or more stock.

Answer is A

Problem 16

TRUE

The definition of uniform normal retirement age at 1.401(a)(4)-12 allows for a maximum age of 65 (or SSRA, if all employees have the same SSRA.) It also allows for the normal retirement age to be defined as the later of a specified age and the fifth anniversary of the date of participation.

The fifth anniversary of the date of hire is earlier than the fifth anniversary of the date of participation. The normal retirement age in this problem satisfies the uniform normal retirement age definition in the regulation.

Answer is A

Problem 17

FALSE

The regulation at 1.410(b)-7 contains definitions and rules for mandatory disaggregation of plans, and permissive aggregation of plans. At 1.410(b)-7(d)(5), it states that 'Two or more plans may not be aggregated … unless they have the same plan year."

Answer is B

Problem 18 Similar to 1995 #24 **Revised 01/04/01**

TRUE

The regulation at 1.401(a)(4)-4 contains definitions and rules for nondiscriminatory availability of benefits rights and features. 1.401(a)(4)-4(b)(2)(i) states the general rule is that any determination is "based on the current facts and circumstances with respect to the employee." 1.401(a)(4)-4(b)(2)(ii)(A)(1) states that "any specified age and service condition with respect to an optional form of benefit or a social security supplement is disregarded in determining whether the optional form of benefit or social security supplement is currently available." 1.401(a)(4)-4(e)(1)(i) defines an optional form to include an early retirement benefit.

Apparently the age and service requirements for the early retirement benefit are ignored, and it is currently available to everyone. The ratio percentage would be calculated assuming everyone is benefiting from this plan provision:

Ratio % = [9 / 9] / [2 / 2] = 100%

Answer is A

Problem 19

TRUE

The regulation at 1.401(a)(4)-11(g) contains rules for corrective amendments. The rule regarding time for adoption of a corrective amendment at 1.401(a)(4)-11(g)(3)(iv) has the same wording as that proposed in the question.

Answer is A

Problem 20

FALSE

In general, average annual compensation is similar to a final average calculation, except that a period prior to the final "n" years may be used. The definition in the regulation at 1.401(a)(4)-3(e)(2)(i) states the averaging period must be at least three years, or the employee's period of employment, if less. This is the minimum number of years that may be used. The question is worded to imply that this is the maximum number of years that may be used.

Answer is B

Problem 21 - Page 1

Similar to 1998 #22

With an individual cost method, there are two things to be aware of. One is that you should check the Full Funding Limitation if you have the market value of assets. The other is that you should check for experience gains or losses each year.

Since this is a brand new plan, the FFL is so large that it will not apply. You have to calculate the experience G/L during 1998. You must determine the expected UAL at 01/01/99, as well as the actual UAL at 01/01/99 before the plan amendment. The difference between those two values is the experience gain or loss base.

$$\begin{aligned} 01/01/99\ {}_eUAL &= (1+i)*(NC_0 + UAL_0) - (\text{contrib} + i) \\ &= 1.07 * (60{,}000 + 335{,}000) - [\ 1 + (9/12)*.07\ ] *(100{,}000) \\ &= 422{,}650 - 105{,}250 \\ &= 317{,}400 \end{aligned}$$

$$\begin{aligned} 01/01/99\ UAL &= 490{,}000 - 110{,}000 = 380{,}000 \\ \text{Old plan AL} &= 490{,}000 * (24/30) = 392{,}000 \\ \text{Old plan UAL} &= 392{,}000 - 110{,}000 = 282{,}000 \end{aligned}$$

$$\begin{aligned} \text{Gain base} &= 317{,}400 - 282{,}000 = 35{,}400 \\ \text{Amortization} &= 8{,}069 = 35{,}400 \div \ddot{a}_{\overline{5}|.07} \end{aligned}$$

$$\begin{aligned} \text{Plan change} &= 380{,}000 - 282{,}000 = 98{,}000 \\ \text{Amortization} &= 7{,}381 = 98{,}000 \div \ddot{a}_{\overline{30}|.07} \end{aligned}$$

To determine the credit balance at 01/01/99, you have to determine the outstanding amount of the IAL amortization base at 7%:

$$01/01/99\ {}_eUAL = \text{O/S §412 bases - CB - ARA}$$

Amortization base	Original Base	Original Years	Amortization	Remaining years	Outstanding base
01/98 IAL base	335,000	30	25,230	29 = 30 - (99-98)	331,454

$$\begin{aligned} 01/01/99\ {}_eUAL &= 317{,}400 = 331{,}454 - CB - 0 \\ 01/01/99\ CB &= 14{,}054 \end{aligned}$$

Problem 21 - Page 2

1999 Minimum Funding Standard Account

Charges		Credits	
Normal Cost	100,000	Credit Balance	14,054
IAL Amort	25,230	1998 Gain	8,069
Plan change	7,381	12/31 contrib	x
7% interest	9,283	7% interest	1,549
Total charges	141,894	Total credits	x + 23,671

The minimum contribution is 141,894 – 23,671 = 118,223.

Answer is B

If you work the problem with compound interest, many items have different values. The minimum contribution is in the same range, as it must be!

Compound interest results	
Expected UAL	317,445
Gain base	35,445
01/01/99 Credit balance	14,009
Gain amortization	8,079
12/31/99 minimum	118,260

Problem 22

You need to use the "equation of balance" to determine the amount of the new base due to the plan amendment at 01/01/99:
UAL = O/S 412 bases - credit balance - ARA

The main point of this problem is whether you know the amortization periods for multiemployer plans. These plans were not subject to the requirements of OBRA '87, so the amortization periods reflect the pre-OBRA '87 rules:

Amortization base	Amortization amount	Remaining years	Outstanding base
1-1-96 Initial AL	43,000	27 = 30-(99-96)	551,508 = 43,000 * $\ddot{a}_{\overline{27}\|.07}$
1-1-97 Loss base	4,000	13 = 15-(99-97)	35,771 = 4,000 * $\ddot{a}_{\overline{13}\|.07}$
1-1-97 Assump base	-3,500	28 = 30-(99-97)	-45,453 = -3,500 * $\ddot{a}_{\overline{28}\|.07}$
1-1-99 Gain base	-5,000	15 = 15-(99-99)	-48,727 = -5,000 * $\ddot{a}_{\overline{15}\|.07}$
All Total			493,099

PUC UAL = AL – AAV
= 925,000 – 250,000 = 675,000
675,000 = "old" O/S bases + PLAN – CB - ARA
= 493,099 + PLAN - 5,500 - 0
PLAN = 675,000 - 493,099 + 5,500
= 187,401

The amortization period for plan change amortization bases is 30 years for all plan types:

PLAN amortization = 187,401 / $\ddot{a}_{\overline{30}\|.07}$ = 14,114

Answer is C

Problem 23 - Page 1

Similar to 1997 #42

The accumulated reconciliation account (ARA) consists of the accumulation of the §412(l) additional funding charge (AFC), §412(m) late quarterly contribution penalties, and the additional amortization paid for waivers. This problem gives you the §412(m) late quarterly contribution penalty charge for 1999 as 600. You need to determine the §412(l) additional funding charge for 1999.

This problem gives you all the values needed to calculate the Deficit Reduction Contribution (DRC) and the §412(l) AFC. Based on the exam conditions, since you are told nothing about the Optional or Transition Rules, you can ignore both. If the plan had elected the Optional Rule, the amount of the §412(l) additional funding charge (AFC) should be the greater of the values calculated under the post-GATT and pre-GATT rules.

The first step is calculation of the Gateway test, to see if the plan is subject to §412(l). Since you are told the percentage is less than 80%, the plan is definitely subject to §412(l).

In this problem, you are told nothing about unpredictable contingent events. You must assume there are none.

Post-GATT AFC

The MFSA charges should be increased by the Unpredictable Contingent Event amount plus the excess, if any, of the DRC over the §412(b) normal cost plus all amortization charges and credits. The DRC is defined as the sum of the unfunded old liability amount (UOLA), the unfunded new liability amount (UNLA), and current liability normal cost.

The unfunded new liability (UNL) is the excess of the unfunded current liability (UCL) over the remaining portion of the unfunded old liability (UOL) plus any unpredictable contingent event liability. The unfunded current liability is defined as the excess of the current liability over the actuarial asset value, reduced by the credit balance. The definition also specifies that any debit balance should be treated as zero for this purpose.

You are given the 1-1-99 UOLA as 30,000. The UOLA equals the amortization of the remaining portion of the unfunded old liability (UOL) over a period that was 18 years at 1-1-89, at the 6.5% rate:

01/01/99 UOLA	Remaining years	01/01/99 UOL
30,000	8 = 18 - (99-89)	194,536

Problem 23 - Page 2

UCL = CL - (AAV - CB)
= 1,200,000 - (925,000 - 20,000)
= 295,000
UOL = 194,536
UNL = UCL - UOL - UCEL
= 295,000 - 194,536 - 0
= 100,464

The UNLA is defined as the unfunded new liability times the applicable percentage, which is 30% - 40% (FCL% - 60%) under RPA 94. In this problem, you must calculate this percentage. In calculating the FCL%, any debit balance is treated as a zero CB.

FCL% = (AAV - CB) / CL
= (925,000 - 20,000) / 1,200,000 = .7542

APP% = .30 - .40 [.7542 - .60] = 23.83%
If the FCL% is less than 60%, then the APP% would be limited to 30%.

UNLA = 100,464 * 23.83%
= 23,944
DRC = UOLA + UNLA + CLNC
DRC = 30,000 + 23,944 + 55,000
= 108,944

You must subtract the §412 normal cost plus all amortization charges from the DRC to calculate the additional §412(l) charge. Then you must bring the §412(l) charge forward to the end of the year with interest at the current liability rate.

01/01/99 §412(l) charge = 13,544 = 108,944 - (50,000 + 45,400)
12/31/99 §412(l) charge = 14,424 = 1.065 * 13,544

Based on Revenue Ruling 96-21, this end of year §412(l) charge should be limited to the end of year UCL. For the sake of speed in working problems, you can simply look at the UCL at the start of the year and see that it will not be anywhere near the magnitude of the §412(l) charge. In general, the end of year UCL should <u>never</u> be less than the AFC.

With more than 150 plan participants, you don't pro-rate the additional §412(l) charge. The final 01/01/2000 ARA equals the 01/01/99 value increased with interest at the valuation rate, plus the 12/31/99 §412(l) and §412(m) charges:

01/01/00 ARA = 63,174 = 1.07 * 45,000 + 14,424 + 600

Answer is E

Problem 24

Similar to 1997 #35

You are given the assumption change base at 01/01/99, but you must determine the remaining §412 bases for both the 01/01/91 Initial Accrued Liability and the 01/01/95 Plan Amendment. You have to determine the outstanding amount of the §412 bases at 8%, and re-determine the amortization of all three bases at the new 7% interest rate:

Amortization base	Remaining years	8% Outstanding base	New Amortization Amount at 7%
1-1-91 Initial AL	22 = 30-(99-91)	440,672 = 40,000 * $\ddot{a}_{\overline{22}\|.08}$	37,233
1-1-95 Plan base	26 = 30-(99-95)	116,748 = 10,000 * $\ddot{a}_{\overline{26}\|.08}$	9,226
1-1-99 Assump base	10 = 10-(99-99)	150,000	19,959

Now you can solve for the minimum contribution at 12/31/99:

1999 Minimum Funding Standard Account

Charges		Credits	
Normal Cost	100,000	Credit Balance	0
IAL amortization	37,233		
Plan chg amortization	9,226	12/31 contrib	x
Assump amortization	19,959		
7% interest	11,649	7% interest	0
Total charges	178,067	Total credits	x

The minimum contribution payable 12/31/99 is 178,067.

Answer is C

This problem seems to be relatively short compared to other, similar problems on this exam!

Problem 25 Similar to 1998 #32 **Revised 01/24/19**

Under the Rolling Five Method, the calculation of withdrawal liability is relatively simple. Employer B's share of the 12/31/97 UVB is based on the ratio of employer B's contributions in the prior five years to the total contributions in the prior five years. The complicating factor in this problem is that Employer A apparently withdrew in 1996. As a result, the total contributions in the denominator must be reduced by the amount of contributions for Employer A.

This problem also gives you the amount of the collectible (not uncollectible!) withdrawal liability for withdrawals in prior years (presumably for Employer A). Logically, this amount should be deducted from the unfunded vested benefit liabilities. The adjusted 12/31/97 value is 1,300,000 - 75,000 = 1,225,000.

YEAR:	1997	1996	1995	1994	1993
ER share=1,225,000* (	80,000 +	72,500 +	67,500 +	65,000 +	60,000)
(	607,000 +	605,000 +	605,000 +	590,000 +	580,000
-	0 -	40,000 -	67,000 -	65,000 -	65,000)

$$= 153{,}682 = 1{,}225{,}000 * \frac{345{,}000}{(2{,}987{,}000 - 237{,}000)}$$

After determining Employer B's share of the UVB, the de minimis amount must be calculated. 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.

You are told that the plan originally used the mandatory de minimis, but that the amount was increased to 100,000, which is the alternative de minimis rule. The alternative de minimis amount is the lesser of 100,000 or 3/4% of the plan's total UVB (.0075 * 1,300,000), which is 9,750. The deductible is the alternative de minimis amount reduced by the excess of the allocated UVB over 150,000. Since the employer's share exceeds 150,000, the deductible equals 9,750 - 3,682 = 6,068. The final employer withdrawal liability is 153,682 - 6,068 = 147,614.

Answer is C

NOTES:

1. ERISA 4211(c)(3)(A) describes the Rolling Five method, and it states that you subtract the UVB for employers whose liabilities are collectible. There is no specific adjustment to the UVB for employers whose liabilities are not collectible. In ERISA 4209, there is NO similar adjustment to the UVB for calculating the de minimis amount.

2. ERISA 4211(c)(3)(B) implies that you subtract the contributions from the denominator of the fraction for any employers who had previously withdrawn within the five year period. That includes both employers whose liabilities are collectible, and those whose liabilities are not collectible.

Problem 26 - Page 1

Similar to 1998 #17

§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.

You are given no information on the old PBGC graded interest rates under §417(e)(3). This plan apparently has been amended to reflect the new GATT rules for lump sum calculations under §417(e)(3).

You need to determine the age, service, vesting percentage and total accrued benefit at 01/01/98 and 01/01/99:

	01/01/98	**01/01/99**
Age	26	27
Service	3	4
Vesting %	20%	40%
FAE – 3 years	40,000	40,000
	3 *2.5% * 40,000	4 *2.5% * 40,000
Accrued benefit	= 3,000	= 4,000

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

Year	**01/01 EECWI**	**12/31 contribution**	**120% A.F.R.**	**12/31 EECWI calculation**
1995	-0-	1,300	N/A	1,300
1996	1,300	1,300	6.89%	2,690 = 1.0689 * 1300 + 1300
1997	2,690	1,300	7.34%	4,187 = 1.0734 * 2690 + 1300
1998	4,187	1,300	7.13%	5,786 = 1.0713 * 4187 + 1300

01/01/98 Vested accrued benefit

Smith is age 26 at 01/01/98, and you have to convert the contribution balance to a benefit at normal retirement age, which is 39 years later. The 01/01/98 EECWI is accumulated with interest at the §417(e) rate until normal retirement age 65. You should use the December 1997 30 year Treasury rate:

EECWI at 65 = $4,187 * (1.0599)^{39}$
= 40,479

Problem 26 - Page 2

The employee provided annual accrued benefit at age 65 is calculated by dividing by the annuity value at the §417(e) interest rate of 5.99%:

40,479 ÷ 10.65 = 3,801

The final accrued benefit at 01/01/98 is 3,801. The accrued benefit is the greater of the employee provided benefit and the plan formula accrued benefit.

The question asks for the increase in the vested annual accrued benefit during 1998. The employee provided portion is always 100% vested, and the remaining accrued benefit is subject to the plan's vesting schedule:

100% (3,801) + 20% (3,801 – 3,801) = 3,801

01/01/99 Vested accrued benefit

Smith is age 27 at 01/01/99, and you have to convert the contribution balance to a benefit at normal retirement age, which is 38 years later. The 01/01/99 EECWI is accumulated with interest at the §417(e) rate until normal retirement age 65. You should use the December 1998 30 year Treasury rate:

EECWI at 65 = $5,786 * (1.0506)^{38}$
= 37,757

The employee provided annual accrued benefit at age 65 is calculated by dividing by the annuity value at the §417(e) interest rate of 5.06%:

37,757 ÷ 11.48 = 3,289

The employee provided portion is always 100% vested, and the remaining accrued benefit is subject to the plan's vesting schedule. With four years of service, Smith is 40% vested.

100% (3,289) + 40% (4,000 - 3,289) = 3,289 + 284 = 3,573

Change in vested accrued benefit

The total accrued benefit increased slightly from 01/01/98 to 01/01/99. The problem asks for the absolute value of the change in the vested accrued benefit:

(228) = 3,573 - 3801

Answer is B

Problem 27 – Page 1 Similar to 1998 #30 **Revised 04/30/03**

Earnings under §415 are defined as total compensation. Earnings under §415 is not subject to the §401(a)(17) limit of 150,000.

At 01/01/99

Age	58	Birth date	1/1/41
Service	15 years	Hire date	1/1/84
Participation	12 years	Effective date	1/1/87
		Normal retirement age	65
		Early retirement age	58
		Social Security Retirement age	66

Final average earnings at age 58	=	(100,000 + 105,000 + 112,250) / 3
	=	105,750
Accrued benefit at age 58	=	105,750 * 100%
Early retirement benefit at age 58	=	105,750 * (1 - .08 * (62-58))
	=	71,910

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

Age 58 100% 3 year comp. §415 limit = 105,750 = 105,750 * (10/10)

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

Social Security Retirement Age	=	66 since born in 1940
§415 dollar limit during 1997	=	130,000 at age 66 * (10/10)
§415 dollar limit at age 65	=	130,000 * .9333
§415 dollar limit at age 64	=	130,000 * .8667
§415 dollar limit at age 63	=	130,000 * .8000
§415 dollar limit at age 62	=	130,000 * .7500
	=	97,500

§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 95-29 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. Based on the general conditions for this exam, in the absence of other information, you should assume that the basis for optional form conversions is the same as the funding assumptions.

Problem 27 – Page 2 **Revised 04/23/01**

In this problem, you are given the "N/N" factors on the mandated basis. This is consistent with the definition of the death benefit under the plan. Only if your death benefit was 100% of the present value of the accrued benefit would you use $(1+i)^n$ times the ratio of the annuity values.

In most problems you are given the N_x factors adjusted for monthly payment of annuities, which is the default based on the general conditions for the exam. Here you are asked to calculate the annual benefit amount, so you should use the annual factors you are given.

Actuarial reduction from 62 to 58	= N_{62} / N_{58}
(mandated 5% GAM83 basis)	= 11,558 / 15,726
	= .7350

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 plan, no basis is specified for the factors. You are told that the reduction is 8% per year before age 62. The example in Q-10 of Revenue Ruling 95-29 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.

Actuarial reduction from 62 to 58	= ERF_{58} / ERF_{62}
(plan "tabular" basis)	= (1-.08(4)) / 1.0
	= .6800

§415 dollar limit at age 58	= 97,500 * lesser of [.7350 or .6800]
	= 66,300

Smith's benefit of 71,910 is limited to the lesser of the compensation limit of 105,750 and the dollar limit of 66,300, which equals 66,300.

Answer is C

Problem 28

Similar to 1998 #18

With an aggregate type cost method, you need both the market value of assets and the Entry age normal valuation results to check the Full Funding Limitation. Since you have these values, you should calculate the FFL values.

The problem asks for the deductible limit for 1999, which you calculate as normal cost plus limit adjustments. Under the Aggregate method, there are no 404 bases. The deductible limit is equal to the normal cost increased with interest:

Deductible limit = 53,500 = 1.07 * 50,000

The next step is to check the Full Funding Limitation under §404. A key point is that, in 1999 and 2000, the OBRA 87 FFL current liability is multiplied by 155%.

§404 "ERISA" FFL = (1+i)*(NC + AL - (lesser MVA,AAV))
= 1.07 * (45,000 + 240,000 – 250,000)
= 37,450

§404 "OBRA 87" FFL = 1.55 (12/31 CL) - (1+i)*(lesser MVA,AAV)) (if no benefit payments)
= 1.55 * 200,000 - 1.07 * 250,000
= 42,500

§404 "RPA 94" FFL = .90 (12/31 RPA CL) - (1+i)*(AAV) (if no benefit payments)
= .90 * 225,000 - 1.07 * 250,000
= -0-

Note that the end of year asset value (if any) should be used in calculating the OBRA 87 and RPA ’94 FFL. The reason is that any benefit payments during the year should be reflected at the valuation rate in the assets, and presumably are included in the end of year value. They would be accumulated at the current liability interest rate in the end of year current liability value.

The final §404 FFL value is the greater of the RPA ’94 floor, and the lesser of the ERISA and OBRA FFL values, or 37,450. Since the §404 FFL applies, you don’t need to calculate the §412 minimum contribution.

You are given the participant count of 80 for 1999. The plan sponsor is not eligible for the deductible limit based on the Unfunded Current Liability. The final deductible limit is the FFL of 37,450.

Answer is C

Problem 29 Similar to 1998 #40 **Revised 06/21/02**

In some §404 problems, the hardest thing to get straight is which valuation corresponds to which tax year. Usually you are only given one set of valuation results, which is based on the correct valuation date.

The deductible limit for the taxable year ending 06/30/98 is based on the valuation for the plan year beginning in that tax year. The 04/01/98 valuation should be used to determine the deductible limit needed for the answer to this problem.

The first step should be to calculate the normal cost plus limit adjustments. The ten year amortization bases include the initial accrued liability, and the loss. The deductible limit is the normal cost plus limit adjustments brought forward with interest to the earlier of the end of the plan year, or the end of the tax year, which is 06/30/98:

Limit adjustment = (500,000 + 35,000) / $\ddot{a}_{\overline{10}|.07}$ = 71,189

Deductible limit = (40,000 + 71,189) * [1 + (3/12) * .07] = 113,135

The second step is usually to check the Full Funding Limitation under §404. Since you have no market value of assets, you can't check the Full Funding Limitation.

With an experience loss, and a debit balance of 3,500, it is unlikely that the minimum contribution would exceed 113,135. You must determine the §412 amortizations to complete the Minimum Funding Standard Account. If you show a debit balance at the end of the year, then the maximum really should be equal to the minimum!

IAL amortization = 500,000 / $\ddot{a}_{\overline{30}|.07}$ = 37,657

Loss amortization = 35,000 / $\ddot{a}_{\overline{5}|.07}$ = 7,978

1998 Minimum Funding Standard Account

Charges		**Credits**	
Debit Balance	3,500	Credit Balance	0
Normal Cost	40,000		
IAL amortization	37,657		
Assump. amortization	7,978	03/15 contribution	113,135
7% interest	6,239	7% interest	330
Total charges	95,374	Total credits	113,465

The credit balance is 113,465 - 95,374 = 18,090.

Answer is A

You can not calculate the deductible limit based on unfunded current liability. On a compound interest basis, the deductible limit is 113,086 and the credit balance is 18,031.

Problem 30 – Page 1

Similar to 1997 #32

The key point to this problem is that the §404 UAL and the §412 UAL are equal, and that you include the waiver base and the ARA in the amount of the §404 UAL.

In some §404 problems, the hardest thing to get straight is which valuation corresponds to which tax year. Usually you are only given one set of valuation results, which is based on the correct valuation date. The deductible limit for the taxable year ending 06/30/99 is based on the valuation for the plan year beginning in that tax year. The 01/01/99 valuation should be used to determine the deductible limit needed for the answer to this problem.

The first step should be to calculate the normal cost plus limit adjustments. You are told to do this calculation under the fresh start alternative, which requires you to calculate a single ten year amortization for the entire Unfunded Actuarial Liability.

The §404 UAL will equal the §412 UAL, since there are no non-deductible contributions. The §412 UAL can be calculated based on the equation of balance:

UAL = O/S §412 bases - credit balance - ARA
= (400,000 + 25,000 + 60,000) - 0 – 17,000
= 468,000

The deductible limit is the normal cost plus limit adjustments brought forward with interest to the earlier of the end of the plan year, or the end of the tax year, which is 06/30/99:

Limit adjustment = (468,000) / $\ddot{a}_{\overline{10}|.07}$ = 62,274

Deductible limit = (70,000 + 62,274) * (1.035) = 136,903

The second step is usually to check the Full Funding Limitation under §404. Since you have no market value of assets, you can't check the Full Funding Limitation.

The next step is to calculate the minimum contribution. Since you have a waiver base, it is possible for the minimum to exceed the previously calculated deductible limit.

IAL amortization = 400,000 / $\ddot{a}_{\overline{22}|.07}$ = 33,797

Plan amortization = 25,000 / $\ddot{a}_{\overline{30}|.07}$ = 1,883

Waiver amortization = 60,000 / $\ddot{a}_{\overline{5}|.07}$ = 13,676 (see note below re: 7.01%)

Problem 30 – Page 2

One trick to save a little time is to use the 7.0% valuation rate instead of the 7.01% rate for calculating the waiver amortization. This makes a difference of $4 in the final minimum contribution. If you compare the end of year value of the §412 amortizations to the end of year value of the limit adjustments, the §412 minimum does not exceed the previously calculated deductible limit:

1.07 * (33,797 + 1,883 + 13,676) = 52,811 which is less than 1.035 * 62,274

You have no information to either calculate the unfunded current liability, or to determine if you are eligible to use it.

Answer is D

On a compound interest basis, the deductible limit is 136,825.

If you really want to see the MFSA details, it will take a little more work, which translates into wasted time on the exam.

In general, waiver problems have a different interest rate to amortize the waiver. To avoid "interest confusion" in the MFSA, it is a good idea to use an end of year amortization for the waiver. Then you should credit 7% interest on all the other MFSA charges.

Waiver amortization = $60{,}000 / \ddot{a}_{\overline{5}|.0701} * 1.0701 = 14{,}637$

1999 Minimum Funding Standard Account

Charges			Credits	
	Normal Cost	70,000	Credit Balance	0
	IAL amortization	33,797		
	PLAN amortization	1,883	12/31 contribution	x
	7% interest	7,398		0
12/31	Waiver amortization	14,637	7% interest	0
	Total charges	127,715	Total credits	x

The minimum contribution at 12/31/99 is 127,715.

Problem 31 – Page 1 Similar to 1997 #28 **Revised 09/05/05**

With an individual type cost method, you would need the market value of assets to check the Full Funding Limitation. Since you have it, you should calculate the FFL values.

The first step should be to calculate the normal cost plus limit adjustments. The deductible limit is the normal cost plus limit adjustments brought forward with interest to the earlier of the end of the plan year, or the end of the tax year, which is 12/31/99.

You are NOT told to use the fresh start alternative, which produces an unusual problem. All of the prior §412 amortization bases have been eliminated due to the ERISA Full Funding Credit in 1998. You really don't know whether the prior §404 bases were eliminated. The reason is that, in 1.404(a)-14(k), the §404 bases are eliminated when the actual deduction is greater than or equal to the §404 Full Funding Limitation.

I will assume that the prior §404 bases have been eliminated at 12/31/03. You must set the §404 loss base for 2003 equal to the §404 UAL at 01/01/04. This is required in order to satisfy the "§404 balance equation":

§404 Loss base = §404 UAL
= §404 AL - 404 AAV
= 275,000 - 250,000
= 25,000

The end result is that it looks like we used the Fresh Start alternative to calculate the deductible limit. We really did not do that. After satisfying the "§404 balance equation", we have the same results as the Fresh Start alternative.

Limit adjustment = $25{,}000 / \ddot{a}_{\overline{10}|.07}$ = 3,327

Deductible limit = (45,000 + 3,327) * 1.07 = 51,709

The next step is to check the Full Funding Limitation under §404. A key point is that, in 1999 and 2000, the OBRA 87 FFL current liability is multiplied by 155%.

§404 "ERISA" FFL = (1+i)*(NC + AL - (lesser MVA,AAV))
= 1.07 * (45,000 + 275,000 – 250,000)
= 74,900

§404 "OBRA 87" FFL = 1.55 (12/31 CL) - (1+i)*(lesser MVA,AAV)) (if no benefit payments)
= 1.55 * 250,000 - 1.07 * 250,000
= 120,000

§404 "RPA 94" FFL = .90 (12/31 RPA CL) - (1+i)*(AAV) (if no benefit payments)
No need to calculate the FFL floor, since the §404 FFL does NOT apply

Problem 31 – Page 2 **Revised 01/04/01**

Note that the end of year asset value (if any) should be used in calculating the OBRA 87 and RPA '94 FFL. The final §404 FFL value is the greater of the RPA '94 floor, and the lesser of the ERISA and OBRA FFL values, or 51,994. Since the §404 FFL does not apply, you need to at least think about calculating the §412 minimum contribution.

Section 7 of RR 81-213 defines a "Special G/L" calculation that establishes an amortization base that FORCES the theoretical equation of balance to hold. Section 7 of RR 81-213 states that you can do a special determination of the G/L only when an experience loss has occurred, and when there are no other amortization bases. The proposed regulation at §1.412(b)-1(f)(2)(ii) contains basically the same rule, except that it does not require a loss to have occurred.

Unit Credit is an individual cost method, and you normally would calculate the experience G/L each year. This year, you simply "back into" the amount of the base needed, and call that an experience loss base:

Loss base = UAL + credit balance + ARA
= 27,000 = 25,000 + 2,000 + 0

With a loss base, it is likely that the minimum could exceed the normal cost plus limit adjustments. The reason is that the loss is amortized over five years versus ten years for the deductible limit. In this problem, there are no limit adjustments, so it is more likely!

Loss amortization = $27{,}000 / \ddot{a}_{\overline{5}|.07}$ = 6,154

1999 Minimum Funding Standard Account

Charges		**Credits**	
Normal Cost	45,000	Credit Balance	2,000
Loss amortization	6,154	12/31 contrib	x
7% interest	3,581	7% interest	140
Total charges	54,735	Total credits	x + 2,140

The §412 minimum of 52,595 (54,735 – 2,140) does exceed the previously calculated deductible limit of 51,994. Based on the values calculated for the §404 FFL, the FFL will not apply under §412 either.

Since you have more than 100 participants, then the final test for the deductible limit is be the Unfunded Current Liability. This is calculated on an end of year basis similar to the RPA '94 FFL. The result is zero: 1.0 * 240,000 - 1.07 * 250,000.

Since the unfunded current liability does not apply, the final deductible limit is the minimum contribution of 52,595.

Answer is D

Problem 32 - Page 1

Similar to 1998 #19

Revenue Procedure 95-51 (as modified by RP 98-10) contains the rules for setting up a new amortization base when there is a change in cost method. Section 5.01(1) of Revenue Procedure 95-51 specifies that certain bases must be maintained regardless of the funding method that is used. These bases include waivers, shortfall gains and losses, switchback from AMFSA, and the OBRA Full Funding credit base.

In general, the calculation of the normal cost must satisfy the formulas that are applicable to all reasonable funding methods (see the regulations at §1.412(c)(3)-1):

Except under the Aggregate method

PV Future Normal costs = PV Future Benefits - Actuarial Assets
- (O/S §412 amortization bases - credit balance - ARA)

Section 5.01(2) requires that you set up a new method change base such that the UAL = O/S 412 bases - credit balance - ARA. If you change to a method other than Aggregate, then you must determine the method change base so that the equation of balance is satisfied.

IAL amortization = 800,000 / $\ddot{a}_{\overline{30}|.07}$ = 60,252

EAN UAL = O/S bases + Method - CB - ARA
700,000 = ($\ddot{a}_{\overline{19}|.07}$ * 60,252) + Method - 0 - 0
Method = 700,000 - 666,327 = 33,673

The amortization period for all cost method change amortization bases specified in Revenue Procedure 95-51 is 10 years.

Method amortization = 33,673 / $\ddot{a}_{\overline{10}|.07}$ = 4,481

1999 Minimum Funding Standard Account

Charges		**Credits**	
Normal Cost	X	Credit Balance	0
IAL amortization	60,252	04/01 contribution	75,000
Method amortization	4,481	12/31 contribution	40,000
7% interest	.07X + 4,532	7% interest	3,938
Total charges	1.07X + 69,265	Total credits	118,938

The interest credit of 3,938 is calculated based on simple interest: (9/12)(.07)(75,000).

Problem 32 - Page 2

You are given the 12/31/99 credit balance as 8,000. Now solve for the normal cost that produces that result:

$$
\begin{aligned}
8{,}000 &= 118{,}938 - (1.07X + 69{,}265) \\
X &= (118{,}938 - 69{,}265 - 8{,}000) / 1.07 \\
&= 38{,}947
\end{aligned}
$$

Answer is B

Compound interest results	
MFSA interest credit	3,904
MFSA credits	118,904
Normal cost	38,915

Problem 33 – Page 1 Similar to 1997 #29 **Revised 03/30/08**

I. TRUE

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.

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.

Depending on whether the employer elects to aggregate plans (they did NOT do so here), you may use only the employees benefiting under a single plan for the numerator in the ratio percentage test. There are some complicated rules in the 1.410(b)-7 regulation that govern when you can voluntarily aggregate plans, as well as when you must mandatorily disaggregate plans.

The ratio denominators should be based on counts for the entire controlled group, not just for the single plan being tested. The excludable employees include those who do not meet the minimum participation requirements, collectively bargained employees who are not benefiting, and nonresident aliens. The rules in 1.410(b)-6(f)(1) specify that a terminating employee may be excludable if they satisfy six criteria:

1. Employee does not benefit under the plan for the year
2. Employee is eligible to participate
3. The plan has a minimum period of service, or a requirement of being employed on the last day to receive an allocation
4. Employee fails to receive an allocation due to failure to satisfy item 3
5. Employee terminates with no more than 500 hours, and is not an employee on the last day of the plan year
6. If this paragraph is applied to any employee, it is applied to all employees for the year

	NHCEs	**HCEs**	**Ratio**
Total employees	11,000	300	
Total Excludable employees	1,400	25	
Collectively bargained employees*	5,000		
Total Non-Excludable ees	4,600	275	
Employees benefiting under Plan B	1,750	200	
Ratio percentage test	1,750 / 4,600	200 / 275	
	= 38.04%	= 72.73%	52.31%

* The rules in 1.410(b)-6(d) specify that collectively bargained employees who are benefiting should be disaggregated, and tested as a separate plan.

Problem 33 – Page 2 **Revised 03/30/08**

II. FALSE

The non-highly compensated concentration percentage is defined under the regulations at §1.410(b)-4(c)(4)(iii) as the ratio of total non-excludable NHCEs to total non-excludable employees. The calculation is based on counts for the entire controlled group, not just for the single plan being tested:

4,600 / (4,600 + 275) = 94.36%

III. TRUE

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.

1.410(b)-7(e) states that "all plans in the testing group" must be taken into account for the average benefit percentage test. It goes on to define "all plans in the testing group" as the plan being tested, plus all plans that could be permissively aggregated under 1.410(b)-7(d). This permissive aggregation for ABPT ignores

- 1.410(b)-7(d)(4) QSLOB rule
- 1.410(b)-7(d)(5) reqt re: same plan years
- Mandatory disaggregation rules for 401(k) / 401(m) , and ESOP / non ESOP

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.

	NHCEs	**HCEs**	**Ratio**
Total employees	11,000	300	
Total Excludable employees	1,400	25	
Collectively bargained employees*	5,000		
Total Non-Excludable ees	4,600	275	
Employees benefiting under Plan B	1,750	200	
Sum of benefit accrual rates – Plan B	1,750 * 1.8%	200 * 1.5%	
Employees benefiting under Plan A	500	40	
Sum of benefit accrual rates – Plan A	500 * 2.0%	40 * 1.6%	
Sum of benefit accrual rates	4,150%	364%	
Average benefit percentage test	4,150% / 4,600	364% / 275	
	= 90.22%	= 132.36%	68.16%

Both item I and item III are true.

Answer is C

* See note on prior page.

Problem 34 – Page 1 Similar to 1998 #44 **Revised 07/09/01**

This is a typical PBGC guaranteed benefits question. It tests your knowledge of the five year phase-in for non-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, early retirement reductions, and normal form of annuity payment are all considered as changes in benefit amount subject to the phase in rules.

If there was 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 changes in plan benefits at 01/01/95 and 01/01/98 are subject to phase-ins at the DOPT of 12/31/99. 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. As a result, the final benefit change is ignored, since it was adopted less than one year before DOPT.

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. You are given the MGB for 1999, since that corresponds to Smith's retirement date.

Smith's highest five year compensation of 35,000 is lower than the MGB. The resulting MGB of 2,916.67 is defined assuming payment on a life annuity basis at age 65.

The MGB should be adjusted based on the benefit commencement age (beyond DOPT) of 63. The age 63 adjusted MGB is 2,508.33 = .86 * 2,916.67. 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.

Problem 34 – Page 2 **Revised 04/23/01**

	Smith: 5 year phase-ins
Date of birth	01/01/37
01/01/2000 age	63
Date of hire	01/01/65
Date of retirement	12/31/99
Years of service	35
Substantial owner?	NO
Vesting percentage	100% based on §411 minimum vesting
02/01/93 Base plan benefit	2,100.00 = 60 * 35
Early retirement factor	1.00 (no reductions until age 62)
02/01/93 early retirement benefit	2,100.00
Full years plan has been in effect	6
Phase-in	2,100.00
02/01/96 Base plan benefit	2,800.00 = 80 * 35
Early retirement factor	1.00
02/01/96 early retirement benefit	2,800.00
Maximum Guaranteeable benefit	2,508.33
Guaranteeable benefit increase	408.33 = 2,508.33 – 2,100.00
Full years plan has been in effect	3
3 year phase-in	245.00 = Greater of 60%(408.33) or $60/mo
Total guaranteed monthly benefit	2,345.00 = 2,100.00 + 245.00

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.

Answer is A

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. See Example 16 in Appendix A of the PBGC study note.
3. For retirements after DOPT, all benefit service accruals ceased at DOPT.

Problem 35

Similar to 1998 #33

The first step should be to calculate the normal cost plus limit adjustments. The only potential trick to the problem is that you should not amortize the OBRA Full Funding credit base when calculating the deductible limit. This base was set up to restore the equation of balance under §412, and has no meaning under §404.

The deductible limit is the normal cost plus limit adjustments brought forward with interest to the earlier of the end of the plan year, or the end of the tax year:

Limit adjustment = $(540{,}000 + 32{,}000) / \ddot{a}_{\overline{10}|.07}$

= 76,112

Deductible limit = 124,240 = (40,000 + 76,112) * (1.07)

The second step is usually to check the Full Funding Limitation under §404. In this problem, you have no asset values, so you can not check the Full Funding Limitation. You have no information regarding the deductible limit based on Unfunded current liability.

The last step is to complete the 1999 Minimum Funding Standard Account, assuming payment at 01/01/99 of the deductible limit:

IAL amortization = $540{,}000 / \ddot{a}_{\overline{30}|.07}$ = 40,670

Loss amortization = $32{,}000 / \ddot{a}_{\overline{5}|.07}$ = 7,294

OBRA FFC amortization = $28{,}000 / \ddot{a}_{\overline{20}|.07}$ = 2,470

One of the points of this problem is that the original amortization period for all OBRA bases was changed to 20 years, effective 01/01/99.

1999 Minimum Funding Standard Account

Charges		Credits	
Normal Cost	40,000	Credit Balance	0
IAL amortization	40,670		
Loss amortization	7,294	01/01 contrib	124,240
FFC amortization	2,470		
7% interest	6,330	7% interest	8,697
Total charges	96,764	Total credits	132,937

The credit balance is 132,937 – 96,764 = 36,173.

Answer is C

Problem 36 – Page 1 Similar to 1995 #37 **Revised 04/21/03**

It is unfortunate that the problem refers to its employee data as rate groups, since they are simply groups of employees. The definition of a rate group is that it consists of all employees with both a normal accrual rate (NAR) and a most valuable accrual rate (MVAR) that are equal to or exceed those rates for a given HCE. I'll refer to the groups of employees as Group A, Group B, Group C, and Group D.

Under the 401(a)(4) test, if a rate group's ratio percentage is less than 70%, the rate group must pass the average benefits percentage test of 1.410(b)-2(b)(3). This test has two parts, just like the ABP test in 410(b)(2)(A). The first part of the test is the non-discriminatory classification test, and the second part is the average benefits percentage test. All rate groups are deemed to satisfy the reasonable classification requirement. In lieu of the facts-and-circumstances requirement, each rate group's ratio percentage must equal or exceed the lesser of

- The ratio percentage for the plan, or
- The midpoint between the safe and unsafe harbor percentages for the testing group

Here are the steps required to work this problem:
1. Calculate the non-highly compensated concentration percentage
2. Calculate the ratio percentage test for the plan
3. Identify the safe harbor and unsafe harbor percentages from the table
4. Calculate the lesser of step 2, and the midpoint between the safe and unsafe harbors
5. Construct the rate groups which correspond to each of the four groups of HCEs
6. Calculate the ratio percentage test for each rate group which will contain NHCEs from Group B
7. Solve for the minimum number of NHCEs in Group B which will produce a ratio test that equals or exceeds the value from step 4
8. Verify that the entire testing group passes the average benefits percentage test

Step 1

The non-highly compensated concentration percentage (NHCCP) is defined under the regulations at §1.410(b)-4(c)(4)(iii) as the ratio of NHCEs to total non-excludable employees. The number of non-participants should be included in the total non-excludable. The total number of HCEs in all four groups, plus the non-participants is 375, and the total number of NHCEs is 1125. The NHCCP is 1125 / (1125 + 375) = 75.0%

Step 2

The ratio percentage for the plan is calculated as the ratio of a NHCE value divided by the HCE value. Each of the values is itself the ratio of the number of employees benefiting under the plan divided by the total number of non-excludable:

[(1125 – 345) / 1125] / [(375 – 40) / 375] = 69.3% / 89.3% = 77.6%

Since the ratio percentage is at least 70%, the plan passes the 410(b) coverage test.

Problem 36 – Page 2 **Revised 04/21/03**

Step 3
Based on the NHCCP of 75.0%, the safe harbor percentage is 38.75%, and the unsafe harbor percentage is 28.75%.

Step 4
The lesser of 77.6% and the midpoint between the safe and unsafe harbors is 33.75%

Step 5
The data given has four groups of HCEs. Since the HCEs have different values for the MVAR and NAR, there are four rate groups:

	HCEs	NHCEs	NAR	MVAR	Constructed from which Groups?
Rate Group A	285	280	0.80%	1.60%	A, B, and D
Rate Group B	260	230	1.00%	1.60%	B and D
Rate Group C	250	730	1.20%	1.30%	C and D
Rate Group D	200	230	1.40%	1.60%	D only

Step 6
The rate groups which will contain the NHCEs from Group B are Rate Group A and Rate Group B. The ratio percentage for the Rate Group A is 32.75%, and the ratio percentage for the Rate Group B is 29.49%. These values are calculated as follows:

Rate Group A: [280 / 1125] / [285 / 375] = .249 / .760 = 32.75%
Rate Group B: [230 / 1125] / [260 / 375] = .204 / .693 = 29.49%

Step 7
Assume that X is the number of NHCEs moved from the non-participants to Group B. The total number of NHCEs remains at 1,125. Now we can solve for the minimum value of X that will produce the desired ratio percentage result of 33.75%:

Rate Group A: [(280+X) / 1125] / .760 ≥ 33.75%
Rate Group B: [(230+X) / 1125] / .693 ≥ 33.75%

As will be shown below, if you use the formula for the ratio percentage for Rate Group B, it will also produce the desired result for Rate Group A.

Rate Group A: (280+X) ≥ .3375 * .760 * 1125
Rate Group B: (230+X) ≥ .3375 * .693 * 1125

Rate Group A: X ≥ 8.56 = 288.56 - 280
Rate Group B: X ≥ 33.25 = 263.25 - 230

The value of X must be at least 34 to satisfy both conditions for rate groups A and B.

Problem 36 – Page 3 **Revised 04/21/03**

Step 8
The final step is to verify that the entire testing group passes the average benefits percentage test. This is necessary, otherwise each rate group's ratio percentage would have to be at least 70% in order to pass the general test under IRC Section 401(a)(4).

	NHCEs	NAR	Benefit%
Non-participants	311	0.00%	0.0%
Group A	50	0.80%	40.0%
Group B	34	1.00%	34.0%
Group C	500	1.20%	600.0%
Group D	230	1.40%	322.0%
Totals	1,125		996.0%

	HCEs	NAR	Benefit%
Non-participants	40	0.00%	0.0%
Group A	25	0.80%	20.0%
Group B	60	1.00%	60.0%
Group C	50	1.20%	60.0%
Group D	200	1.40%	280.0%
Totals	375		420.0%

The average benefit percentage test result is (996.0% / 1,125) divided by (420% / 375), which is .89% / 1.12% = 79.0%. Since the entire testing group passes the average benefits percentage test, then each rate group can also pass with a ratio percentage test result below 70%.

After shifting 34 NHCEs from the non-participants to Group B, the plan's ratio percentage will increase:
[(1125 – 311) / 1125] / [(375 – 40) / 375] = 72.4% / 89.3% = 81.0%

The plan still passes the IRC Section 410(b) coverage test.

Answer is D

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Problem 37 - Page 1 Similar to 1997 #42 **Revised 06/21/02**

This problem gives you all the values needed to calculate the Deficit Reduction Contribution (DRC) and the §412(l) AFC. You are told that the plan did not elect the Optional Rule or the Transition Rule. If the plan had elected the Optional Rule, the amount of the §412(l) additional funding charge (AFC) should be the greater of the values calculated under the post-GATT and pre-GATT rules.

The first step is calculation of the Gateway test, to see if the plan is subject to §412(l). Since you are told the percentage is less than 80%, the plan is definitely subject to §412(l). In this problem, you are told there are no unpredictable contingent events.

Post-GATT rules

The MFSA charges should be increased by the Unpredictable Contingent Event amount plus the excess, if any, of the DRC over the §412(b) normal cost plus all amortization charges and credits. The DRC is defined as the sum of the unfunded old liability amount (UOLA), the unfunded new liability amount (UNLA), and current liability normal cost.

The unfunded new liability (UNL) is the excess of the unfunded current liability (UCL) over the remaining portion of the unfunded old liability (UOL) plus any unpredictable contingent event liability.

The unfunded current liability is defined as the excess of the current liability over the actuarial asset value, reduced by the credit balance. The definition also specifies that any debit balance should be treated as zero for this purpose.

UCL = CL - (AAV - CB)
= 3,000,000 - (2,300,000 - 0)
= 700,000
UOL = 375,000 (given)
UNL = UCL - UOL - UCEL
= 700,000 - 375,000 - 0 = 325,000

The UOLA equals the amortization of the remaining portion of the unfunded old liability (UOL) over a period that was 18 years at 1-1-89, at the 6.5% rate:

01/01/97 UOL	Remaining years	UOLA
375,000	8 = 18 - (99-89)	57,830

The UNLA is defined as the unfunded new liability times the applicable percentage, which is 30% - 40% (FCL% - 60%) under RPA 94. In this problem, you must calculate this percentage. In calculating the FCL%, any debit balance is treated as a zero CB.

Problem 37 - Page 2

FCL% = (AAV - CB) / CL
= (2,300,000 -0) / 3,000,000 = .7667

APP% = .30 - .40 [.7667 - .60] = 23.33%
If the FCL% is less than 60%, then the APP% would be limited to 30%.

UNLA = 325,000 * 23.33% = 75,829
DRC = UOLA + UNLA + CLNC
DRC = 57,830 + 75,829 + 159,900 = 293,559

You must subtract the §412 normal cost plus all amortization charges from the DRC to calculate the additional §412(l) charge. Then you must bring the §412(l) charge forward to the end of the year with interest at the current liability rate.

01/01/99 §412(l) charge = 293,559 - (200,000 + 79,000 - 5,000) = 19,559
12/31/99 §412(l) charge = 1.065 * 19,559 = 20,830

Based on Revenue Ruling 96-21, this end of year §412(l) charge should be limited to the end of year UCL. For the sake of speed in working problems, you can simply look at the UCL at the start of the year and see that it will not be anywhere near the magnitude of the §412(l) charge. In general, the end of year UCL should never be less than the AFC.

With less than 150 plan participants, you must pro-rate the §412(l) AFC. The pro-rata is based on the highest number of plan participants on any day in the prior plan year. The highest number during 1998 is 130.

12/31/99 §412(l) AFC= 20,830*[2% * (130-100)]
= 20,830 * .60 = 12,498

Answer is B

The problem gave you the participant counts for both 1998 and 1999 in an attempt to confuse you. For the §404 deductible limit based on Unfunded Current Liability, the participant count is defined as “for the year”. In general, you would use the highest count for the current plan year to determine if you had more than 100 participants, and were eligible for the UCL deductible limit. See problem 31 from the 1999 exam.

Problem 38 **Revised 01/08/03**

This problem has never been asked on the EA-2 exam before. 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.

Since this plan has no elective lump sum, 4050.5(a)(3) applies. The designated benefit is calculated as the present value at the deemed distribution date under the missing participant annuity assumptions.

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. 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.

The calculations used for this problem are similar to those in example 2 of Appendix A of the regulation. The benefit must be reduced by 6% per year prior to age 65. There is also a 20% reduction for the QJ&S benefit:

Age	Early Ret Age Reduction	J & S Reduction	Reduced Benefit	PV Factor	Present Value
	(1)	(2)	(3) = 1200*(1)*(2)	(4)	(3)*(4)
65	1.00	0.8	960.00	64.7	62,112
64	0.94	0.8	902.40	70.2	63,348
63	0.88	0.8	844.80	76.0	64,205
62	0.82	0.8	787.20	82.1	64,629
61	0.76	0.8	729.60	88.6	64,643
60	0.70	0.8	672.00	95.4	64,109

The greatest present value is based on payment at age 61. The final value is 64,943, which equals the 64,643 plus the 300 expense load under 4050.2.

Answer is D

Problem 39 - Page 1 Similar to 1998 #37 **Revised 06/21/02**

§404(a)(7)(A) of the IRC defines the overall deduction limitation for combinations of DB and DC plans. The limit is the greater of 25% of compensation, or the amount paid to the DB plans, not to exceed the minimum contribution requirement for the DB plan under §412. If the actual deduction for a year was equal to the unfunded current liability, the deduction limitation would be no less than that amount.

DB PLAN

First you should calculate the deductible limit for the DB plan.

Limit adjustment = (300,000 + 50,000 + 35,000 + 50,000) / $\ddot{a}_{\overline{10}|.07}$

= 57,882

Deductible limit = 158,234 = (90,000 + 57,882) * (1.07)

You have no information to calculate the Full Funding Limitation. The deductible limit will be the greater of the normal cost plus limit adjustments, or the minimum under §412. With several loss bases, the §412 minimum could be greater than the §404 maximum:

§412 Amort = 300,000 / $\ddot{a}_{\overline{30}|.07}$ + (50,000 + 35,000 + 50,000) / $\ddot{a}_{\overline{5}|.07}$

= 53,365

The final deductible limit is 158,234, since the §412 Amortizations are less than the §404 Limit adjustments. Since the plan has 50 participants, you are not eligible for the deductible limit based on Unfunded Current Liability.

DC PLAN

The money purchase plan has a deduction limitation based on the contribution percentage specified in the document. Since the forfeitures are used to reduce plan costs, the employer contribution will be reduced, which also reduces the deduction:

10%(1,000,000) – 10,000 = 90,000.

This is the first time a problem covered the situation where forfeitures were used to reduce the amount of the employer contributions.

Problem 39 - Page 2

OVERALL DB/DC

The overall deduction limitation is defined as the greater of 25% of taxable compensation, or the minimum contribution requirement for the DB plan. However, if the actual deduction for the DB plan is based on the unfunded current liability, then the overall deduction limitation is defined as the greater of 25% of taxable compensation, and the DB plan unfunded current liability.

Based on the previous calculations, the DB plan minimum is less than the DB plan deductible limit of 158,234.

25% taxable compensation = .25(1,000,000) = 250,000

The overall DB/DC plan deduction limit is 250,000. The sum of the actual contributions for the two plans is 158,234 + 90,000 = 248,234. Since this is less than the overall combined limitation, the total contribution of 248,234 can be deducted for 1999.

Answer is B

This problem did not ask for the non-deductible contribution or the excise tax, since all contributions were deductible. If this problem had asked for the excise tax, it is NOT based solely on the non-deductible contribution. Under RPA ’94, there is an exemption from the excise tax for the lesser of the DC plan contribution, or the first 6% of taxable compensation. This excise tax exemption is only available if there are more than 100 employees covered by the DB plans whose contributions are limited.

Problem 40 – Page 1 **Revised 06/20/06**

With an individual cost method, there are two things to be aware of. One is that you should check the Full Funding Limitation if you have the market value of assets. The other is that you should check for experience gains or losses each year.

Since this is a relatively new plan, the accrued liability is much larger than the assets. It should be clear that the neither the 404 Full Funding Limitation, nor the 412 Full Funding Limitation will apply for either 1998 or 1999.

1998 Deductible limit

You are told that the 1998 contribution was equal to the deductible limit. You need to calculate that contribution, and develop the credit balance at 12/31/98.

Limit adjustment = $297{,}000 / \ddot{a}_{\overline{10}|.07}$

= 39,520

Deductible limit = 74,386 = (30,000 + 39,520) * (1.07)

1998 Minimum contribution

IAL amortization = $297{,}000 / \ddot{a}_{\overline{30}|.07} = 22{,}368$

1998 Minimum Funding Standard Account

Charges		Credits	
Normal Cost	30,000	Credit Balance	0
IAL Amort	22,368	06/30 contrib	74,386
7% interest	3,666	7% interest	2,604
Total charges	56,034	Total credits	76,990

The 12/31/98 credit balance is 76,990 – 56,034 = 20,956.

1999 Minimum contribution

You have to calculate the experience G/L during 1998. You must determine the expected UAL at 01/01/99, as well as the actual UAL at 01/01/99 before the interest rate change. The difference between those two values is the experience gain or loss base.

With the change in the interest rate, you have to determine the outstanding amount of the IAL amortization base at 7%, and calculate the amortization at 8%. Since the base was established at 01/01/98, the remaining amortization period is 30 - (99 - 98) = 29.

Problem 40 - Page 2

Amortization base	Original Base	Original Years	Amortization	Remaining years	Outstanding base
01/98 IAL base	297,000	30	22,368	29 = 30 - (99-98)	293,856

01/01/99 $_e$UAL = O/S §412 bases - CB - ARA
01/01/99 $_e$UAL = 272,900 = 293,856 - 20,956 - 0

01/01/99 7% UAL = 320,000 - 77,500 = 242,500
Gain base = 242,500 - 272,900 = -30,400

Assump chg base = 295,000 - 320,000 = -25,000
Assump Amort = -3,450 = -25,000 ÷ $\ddot{a}_{\overline{10}|.08}$

Gain Amort = -7,050 = -30,400 ÷ $\ddot{a}_{\overline{5}|.08}$

IAL Amort = 24,384 = 293,856 ÷ $\ddot{a}_{\overline{29}|.08}$

1999 Minimum Funding Standard Account

Charges		Credits	
Normal Cost	31,500	Credit Balance	20,956
IAL Amort	24,384	1998 Gain	7,050
		Assump chg	3,450
		12/31 contrib	x
8% interest	4,471	8% interest	2,516
Total charges	60,355	Total credits	x + 33,972

The minimum contribution is 60,355 – 33,972 = 26,383.

Answer is C

Problem 41 - Page 1

Similar to 1997 #42

This problem gives you all the values needed to calculate the Deficit Reduction Contribution (DRC) and the §412(l) AFC. Based on the exam conditions, since you are told nothing about the Optional or Transition Rules, you can ignore both. If the plan had elected the Optional Rule, the amount of the §412(l) additional funding charge (AFC) should be the greater of the values calculated under the post-GATT and pre-GATT rules.

The first step is calculation of the Gateway test, to see if the plan is subject to §412(l). Since you are told the percentage is less than 80%, the plan is definitely subject to §412(l).

In this problem, you are told nothing about unpredictable contingent events. You must assume there are none.

Post-GATT rules

The MFSA charges should be increased by the Unpredictable Contingent Event amount plus the excess, if any, of the DRC over the §412(b) normal cost plus all amortization charges and credits. The DRC is defined as the sum of the unfunded old liability amount (UOLA), the unfunded new liability amount (UNLA), and current liability normal cost.

The unfunded new liability (UNL) is the excess of the unfunded current liability (UCL) over the remaining portion of the unfunded old liability (UOL) plus any unpredictable contingent event liability.

The unfunded current liability is defined as the excess of the current liability over the actuarial asset value, reduced by the credit balance. The definition also specifies that any debit balance should be treated as zero for this purpose.

UCL = CL - (AAV - CB)
= 1,300,000 - (750,000 - 0)
= 550,000
UOL = 0 (given)
UNL = UCL - UOL - UCEL
= 550,000 - 0 - 0 = 550,000

The UOLA equals the amortization of the remaining portion of the unfunded old liability (UOL) over a period that was 18 years at 1-1-89, at the 6.0% rate. This value is zero.

The UNLA is defined as the unfunded new liability times the applicable percentage, which is 30% - 40% (FCL% - 60%) under RPA 94. In this problem, you must calculate this percentage. In calculating the FCL%, any debit balance is treated as a zero CB.

Problem 41 - Page 2

FCL% = (AAV - CB) / CL
= (750,000 -0) / 1,300,000 = .5769

APP% = .30 - .40 [.5769 - .60] = 30.0%
Since the FCL% is less than 60%, then the APP% is limited to 30%.

UNLA = 550,000 * 30.0% = 165,000
DRC = UOLA + UNLA + CLNC
DRC = 0 + 165,000 + 40,000 = 205,000

You must subtract the §412 normal cost plus all amortization charges from the DRC to calculate the additional §412(l) charge. Then you must bring the §412(l) charge forward to the end of the year with interest at the current liability rate.

01/01/99 §412(l) charge = 205,000 - (45,000 + 1,000,000 / $\ddot{a}_{\overline{30}|.08}$)
= 205,000 - (45,000 + 82,248) = 77,752
12/31/99 §412(l) charge = 1.060 * 77,752 = 82,418

Based on Revenue Ruling 96-21, this end of year §412(l) charge should be limited to the end of year UCL. For the sake of speed in working problems, you can simply look at the UCL at the start of the year and see that it will not be anywhere near the magnitude of the §412(l) charge. In general, the end of year UCL should never be less than the AFC.

With less than 150 plan participants, you must pro-rate the §412(l) AFC. The pro-rata is based on the highest number of plan participants on any day in the prior plan year. The highest number during 1998 is 145 on 08/01/98.

12/31/99 §412(l) AFC= 82,418*[2% * (145-100)]
= 82,418 * .90 = 74,176

Answer is C

Problem 42

Similar to 1997 #48

In general, the Top Heavy 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. For this problem the determination date is 06/30/98.

However, based on questions T-24 and T-25 of the 1.416 regulation, the present value of accrued benefits for the DB plan (or accrued benefit for the DC plan) is calculated as of the valuation date in the 12 month period ending on the determination date. This problem is the second time this detail has been tested on the exam, although the 06/30/98 date is unchanged.

You should add together the present value of vested and non-vested accrued benefits and the account balances as of that date for all participants and the key employees. These amounts should include distributions within the five years preceding the determination date. The amounts should exclude values for terminated employees who have not been employed in the last 5 years, or values for former key employees.

If the ratio of key employee values to total values exceeds 60%, the plan is Top Heavy. If the ratio exceeds 90%, the plan is super Top Heavy. A key employee includes anyone who satisfied the definition in the five years preceding the determination date. The definition of a key employee includes various employees as defined under 416(i)(1)(A). In this problem, the two employees Smith and Green are identified as key employees.

The trick to this question is the handling of Jones, who retired at 7/1/96, and who should be included in the calculation. You must treat each year's benefit payments of 12,000 as distributions, and add the value back when calculating the Top Heavy ratio. There are exactly 24 payments from 7/1/96 through 6/30/98, for a total of 24,000.

The account balances for the key employees at 06/30/98 are

	Smith		Green	
785,000 =	310,000 +	375,000 +	80,000 +	20,000

The account balances for the non-key employees at 06/30/98 are

	Brown		Jones	
444,000 =	200,000 +	100,000 +	24,000 +	120,000

The Top heavy ratio is

63.87% = 785 / (785 + 444)

Answer is B

Problem 43 - Page 1

Similar to 1997 #21

Revenue Procedure 95-51 (as modified by RP 98-10) contains the rules for setting up a new amortization base when there is a change in cost method. Section 5.01 of Revenue Procedure 95-51 specifies that certain bases must be maintained regardless of the funding method that is used. These bases include waivers, shortfall gains and losses, switchback from AMFSA, and the OBRA Full Funding credit base.

With an aggregate type cost method, you would need both the market value of assets, and EAN valuation results to check the Full Funding Limitation. Since you have no EAN valuation results, you can't calculate the Full Funding Limitation.

The calculation of the normal cost under the FIL method must satisfy the formulas that are applicable to all reasonable funding methods (see the regulations at §1.412(c)(3)-1):

Except under the Aggregate method

PV Future Normal costs = PV Future Benefits - Actuarial Assets
- (O/S §412 amortization bases - credit balance - ARA)

The effect of the change in the asset valuation method creates a new amortization base at 01/01/99. The actuarial value of assets increased from the smoothed value of 755,000 to the MVA of 800,000. This increase of 45,000 in the AAV means that the UAL decreased by 45,000.

Now calculate the normal cost under the Frozen Initial Liability method:

PVNC = PVFB - AAV - O/S bases + CB + ARA

Amortization base	Original Base	Original Years	Amortization	Remaining years	Outstanding base
01/89 IAL base	600,000	30	45,189	20 = 30 - (99-89)	512,240

PVNC = 1,750,000 - 800,000 – (512,240 – 45,000)
= 482,760

PVE/E = 2,000,000 / 200,000 = 10.0000
NC = 482,760 / 10.00
= 48,276

Problem 43 - Page 2

Amortization base	Original Base	Amortization
1-1-99 Method base	-45,000	-5,988 = -45,000 / $\ddot{a}_{\overline{10}\rceil .07}$

1999 Minimum Funding Standard Account

Charges		Credits	
Normal Cost	48,276	Credit Balance	-0-
IAL amortization	45,189	Method amortization	5,988
		12/31 contribution	x
7% interest	6,543	7% interest	419
Total charges	100,007	Total credits	x + 6,407

The minimum contribution at 12/31/99 is 100,007 – 6,407 = 93,600.

Answer is C

Problem 44 - Page 1 Similar to 1997 #22 **Revised 06/20/06**

Since the 1/1/97 funded current liability percentage is 100%, there were no required quarterly contributions for 1998. To calculate the required quarterly contribution for 1999, you must first calculate the required annual payment (RAP). This is the lesser of last year's minimum required contribution or 90% of this year's. These numbers are both interest adjusted to the first day of this plan year, and they both would not reflect any credit balance.

You are given the minimum contribution for both 1998 and 1999. At 01/01/99, this figure represents §412 NC + §412 amortizations - credit balance. Based on the 1998 minimum contribution of 400,000 and the actual contribution of 435,000, the 01/01/99 credit balance is 5,000.

12/31/98 "MFSA excluding CB"	=	(§412 NC + §412 amort - 0) * 1.07	=	430,000
12/31/99 "MFSA excluding CB"	=	(§412 NC + §412 amort - 0) * 1.07	=	510,000
01/01/99 "MFSA excluding CB"	=	(§412 NC + §412 amort)	=	476,636
Lesser of 1998 or 90% of 1999	=	Lesser of (430,000 or .90 * 476,636)	=	428,972

The required quarterly installment is based on the applicable percentage multiplied by the RAP, which is 25%(428,972) = 107,243.

You may use the 01/01/99 credit balance like an employer contribution for a required quarterly installment, but only if the contribution that creates the credit balance is actually in the trust fund at the installment date. The problem states that the 1998 contribution was paid at 07/14/99, so you can apply the credit balance towards the 07/15/99 installment.

The new twist in this problem is the information on the quarterly liquidity shortfall. You should assume the liquidity shortfall is paid off at 04/15/99.

This is based on Q&A 8 and 9 of Revenue Ruling 95-31. If the employer does not pay off the shortfall liquidity requirement, there will be an additional interest charge under 412(m)(1). The problem tells you that the employer pays contributions "in the smallest amounts required to avoid an additional interest charge with respect to each such contribution." This means that you must assume the liquidity shortfall is paid off at 04/15/99.

Problem 44 - Page 2 **Revised 06/21/02**

At 07/15/99, you can use the credit balance to meet the quarterly requirement.

Date	Required	Simple Interest Amount Available	Overpayment (Underpayment)
04/15/99	107,243	109,400	109,400 – 107,243 = 2,157
07/15/99	107,243	2,157 * [1+ (.07)*(3/12)] + 5,000 * [1+ (.07)*(6.5/12)] = 7,385	7,385 - 107,243 = (99,858)

The required payment at 07/15/99 to avoid an interest penalty is 99,858. Note that the credit balance accumulates with interest at the valuation rate from 01/01/99 to 07/15/99.

Answer is C

Compound interest is "harder". Since the time period is less than one year, it produces a larger required payment:

Date	Required	Compound Interest Amount Available	Overpayment (Underpayment)
04/15/99	107,243	109,400	109,400 – 107,243 = 2,157
07/15/99	107,243	2,157 * $[1+ (.07)^{(3/12)}]$ + 5,000 * $[1+ (.07)^{(6.5/12)}]$ = 7,380	7,380 - 107,243 = (99,863)

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Problem 45

Similar to 1997 #23

With an individual type cost method, you would need the market value of assets to check the Full Funding Limitation. Since you have it, you should calculate the FFL values.

The problem asks for the deductible limit for 1999, which you calculate as normal cost plus limit adjustments. You are given the Loss base that was set up at 01/01/99, plus the net limit adjustment for all the other 404 bases.

Limit adjustment = $40{,}000 + 20{,}000 \; / \; \ddot{a}_{\overline{10}|.07} = 42{,}661$

Deductible limit = $(\; 25{,}000 + 42{,}661 \;) * (\; 1.07 \;) = 72{,}398$

The next step is to check the Full Funding Limitation under §404. A key point is that, in 1999 and 2000, the OBRA 87 FFL current liability is multiplied by 155%. The main trick to working this problem correctly is that you are given the OBRA/RPA current liability at the beginning of the year, and you must adjust it to an end of year value:

§404 "ERISA" FFL = (1+i)*(NC + AL - (lesser MVA,AAV))
= 1.07 * (25,000 + 500,000 – 450,000)
= 80,250

§404 "OBRA 87" FFL = 1.55 (12/31 CL) - (1+i)*(lesser MVA,AAV)) (if no benefit payments)
= 1.55 * 1.065 * 325,000 – [1.07 * 450,000 – 0]
= 54,994

§404 "RPA 94" FFL = .90 (12/31 RPA CL) - (1+i)*(AAV) (if no benefit payments)
= .90 * 1.065 * 325,000 – [1.07 * 475,000 – 0]
= -0-

Note that the end of year asset value (if any) should be used in calculating the OBRA 87 and RPA ’94 FFL. The reason is that any benefit payments during the year should be reflected at the valuation rate in the assets, and presumably are included in the end of year value. They would be accumulated at the current liability interest rate in the end of year current liability value.

The final §404 FFL value is the greater of the RPA ’94 floor, and the lesser of the ERISA and OBRA FFL values, or 54,994. Since the §404 FFL applies, you don’t need to calculate the §412 minimum contribution. The deductible limit is the FFL of 54,994.

Answer is D

You have no information on the participant count. You don’t know if the plan sponsor is eligible for the deductible limit based on the Unfunded Current Liability, so you should ignore it (it would not apply, based on the EOY value of zero).

Problem 46 – Page 1 Similar to 1998 #21 **Revised 06/20/06**

Based on the Funded Current Liability percentage at 01/01/98, the plan is subject to quarterly contributions for 1999. To calculate the required quarterly contribution for 1999, you must first calculate the required annual payment (RAP). This is the lesser of last year's minimum required contribution or 90% of this year's.

These numbers are both interest adjusted to the first day of this plan year, and they both would not reflect any credit balance. In this problem, the 12/31 valuation date does not alter the calculation date, which remains the first day of the plan year.

You are given the components of the minimum contribution for both 1999 and 1998:

12/31/98 "MFSA excluding CB" = (100,000 NC / 1.07) * 1.07 = 100,000
01/01/99 "MFSA excluding CB" = (120,000 NC / 1.07) = 112,150

Lesser of 1998 or 90% of 1999 = Lesser of (100,000 or .90 * 112,150) = 100,000

The required quarterly installment is based on the applicable percentage multiplied by the RAP, which is 25%(100,000) = 25,000.

Based on the 160,000 contribution for 1998, the credit balance at 12/31/98 is 60,000. You may use the 01/01/99 credit balance like an employer contribution for a required quarterly installment, but only if the contribution that creates the credit balance is actually in the trust fund at the installment date. The problem states that the 1998 contribution was paid at 03/15/99, so you can apply the credit balance towards the 04/15/99 installment.

Date	Required	Amount Available	Overpayment (Underpayment)
01/01/99		60,000	60,000
04/15/99	25,000	60,000 * [1+ (.07)*(3.5/12)] = 61,225	61,225 - 25,000 = 36,225
07/15/99	25,000	36,225 * [1+ (.07)*(3/12)] = 36,859	36,859 - 25,000 = 11,859
10/15/99	25,000	11,859 * [1+ (.07)*(3/12)] = 12,066	12,066 - 25,000 = (12,934)
01/15/00	25,000	0	(25,000)

Problem 46 – Page 2 **Revised 12/17/02**

The interest penalty is calculated based on the period of the underpayment, and is applied to the amount of the underpayment. The final 1999 contribution will not be paid until 09/15/00, so the periods are 11 months for the first underpayment, and 8 months for the second underpayment. Using simple interest, the interest penalty is calculated as follows:

Pmt date	Period	Amount	Penalty interest	Valuation interest	Penalty
10/15/99	11 months	12,934 *	[(1+(.0819)(11/12))	- (1+(.07)(2.5/12))	] = 782
01/15/00	8 months	25,000 *	[(1+(.0819)(8/12))	- (1+(.07)(0/12))	] = 1,365
					2,147

When the underpayment period extends beyond the end of the plan year, interest at the valuation rate is only credited to the end of the plan year. The 175% of the F.M.R. continues to accrue to the date of payment.

Answer is D

Compound interest is "harder". Since the time period is less than one year, it produces a smaller payment, and a larger underpayment:

Date	Required	Amount Available	Overpayment (Underpayment)
01/01/99		60,000	60,000
04/15/99	25,000	60,000 * $(1.07)^{3.5/12}$ = 61,196	61,196 - 25,000 = 36,196
07/15/99	25,000	36,196 * $(1.07)^{3/12}$ = 36,813	36,813 - 25,000 = 11,813
10/15/99	25,000	11,813 * $(1.07)^{3/12}$ = 12,015	12,015 - 25,000 = (12,985)
01/15/00	25,000	0	(25,000)

The interest penalty is calculated based on the period of the underpayment, and is applied to the amount of the underpayment. Using compound interest, the interest penalty is calculated as follows:

Pmt date	Period	Amount	Penalty interest	Valuation interest	Penalty
10/15/99	11 months	12,985 *	[$(1.0819)^{11/12}$	- $(1.07)^{2.5/12}$	] = 787
01/15/00	8 months	25,000 *	[$(1.0819)^{8/12}$	- $(1.07)^{0/12}$	] = 1,347
					2,134

The resulting penalty is in the same range, as it must be!

Problem 47 - Page 1

This problem tests details of the average benefits percentage test (ABPT) that have never been asked on the EA-2 exam before. One main aspect of the problem is testing a defined contribution plan on a benefits basis. This requires you to determine the allocations under the plan, accumulate them to age 65, and determine the equivalent annual benefit. When divided by compensation, this produces the benefit percentage that is used in the ABPT.

There are several details that are tested in this problem. The first detail is application of the §401(a)(17) compensation limit. Logically it makes sense that all compensation values should be limited in doing nondiscrimination testing under §401(a)(4) and §410(b). If not limited, a participant with a million dollars in compensation would have a ridiculously small benefit percentage, which would make it much easier to pass the tests. There is a specific reference to application of the §401(a)(17) limits at 1.401(a)(5)-1(e)(2), which covers defined benefit plans that are integrated with Social Security.

The next small detail is handling of NHCE 4, who is in Division B, and is not covered under any plan. This employee should be counted in the denominator as a non-excludable employee when determining the average benefit percentage for all the NHCEs. This is specified in the last sentence of 1.410(b)-5(c).

The last small detail is handling of NHCE 3, who terminated during 1999. The rules in 1.410(b)-6(f)(1) specify that a terminating employee may be excludable if they satisfy six criteria:

1. Employee does not benefit under the plan for the year
2. Employee is eligible to participate
3. The plan has a minimum period of service, or a requirement of being employed on the last day to receive an allocation
4. Employee fails to receive an allocation due to failure to satisfy item 3
5. Employee terminates with no more than 500 hours, and is not an employee on the last day of the plan year
6. If this paragraph is applied to any employee, it is applied to all employees for the year

Due to the §401(k) deferral, the terminating employee does not satisfy the first criteria, and therefore can not be treated as excludable. They will not receive an allocation for the year, and their §401(k) deferral will be used to determine their benefit percentage.

Problem 47 – Page 2 **Revised 07/09/01**

Now you can calculate the allocation each participant will receive. The rates are 15% for the HCE, and 4% for the NHCEs in Plan A. NHCE 3 receives no allocation due to termination prior to 12/31/99. NHCE 4 receive no allocation because they are not covered under any plan. The allocation under the plan is calculated using the compensation as limited by §401(a)(17).

Division	ID	Limited Comp	Hours worked	Allocation Rate	Allocation
A	HCE 1	160,000	2,080	15%	24,000
A	NHCE 1	15,000	2,080	4%	600
A	NHCE 2	50,000	2,080	4%	2,000
A	NHCE 3	17,000	475	4%	-
B	NHCE 4	30,000	2,080	0%	-

Division	ID	Age	401(k) Deferral	Total Contribution	PV at 65	Benefit at age 65	Equivalent percent
A	HCE 1	46	6,000	30,000	141,347	17,783	11.11%
A	NHCE 1	41	-	600	4,251	535	3.57%
A	NHCE 2	36	3,000	5,000	53,264	6,701	13.40%
A	NHCE 3	30	200	200	3,476	437	2.57%
B	NHCE 4	32	-	-	-	-	0.00%

The calculation of the PV at age 65 uses the 8.5% rate to accumulate the total contribution up to age 65. The benefit at age 65 is that result divided by the 7.9486 annuity value. The equivalent percent equals the benefit divided by the limited compensation.

The ABPT equals the ratio of the average benefit percentage for the NHCEs divided by the average for the HCEs. The average for the NHCEs is

(3.57% + 13.40% + 2.57% + 0.0%) / 4 = 4.89%

The ABPT result is 4.89% / 11.11% = 43.97%.

Answer is C

Problem 48 - Page 1

Similar to 1998 #38

Credit balance allocation

Revenue Ruling 81-212 contains acceptable methods used to allocate Minimum Funding Standard Account items when a plan is spun off into two or more plans. Revenue Ruling 86-47 contains different rules which must be used when the market value of assets exceeds the present value of benefits on a termination basis (before the plan is spun off), and when one of the spun off plans has a zero UAL.

RR 86-47 requires the allocation of the credit balance in a specific manner:

1. Determine the lesser of (MVA - CB) or PV of accrued benefits for the single plan.
2. Allocate the lesser amount between the spun-off plans on a termination basis.
3. Calculate the excess of the market value of assets allocated to each plan over the amount allocated in step 2
4. The credit balance is allocated based on the excess calculated in step 3

For Plan A, the MVA less CB is 485,000 - 100,000, or 385,000. The PV of accrued benefits is 450,000, which is greater. You are not given the PV of accrued benefits on a PBGC priority category basis. Instead, the problem gives you the allocated values of (MVA – CB), presumably on the appropriate basis. You need to determine the total allocated market value of assets to complete the allocation of the credit balance.

Market value allocation

IRC §414(l)(2) contains provisions for allocating assets to spun off plans when the assets exceed the present value of accrued benefits on a termination basis, and when the spun off plans are members of the same controlled group. Since the plan sponsor continues to maintain both plans B and C, they remain members of the same controlled group.

You must allocate the "applicable percentage" of the "excess assets" to each spun off plan. The "excess assets" equal the excess of the market value of assets over the present value of accrued benefits on a termination basis. In this problem, the excess assets equal 485,000 - (150,000 + 300,000) = 35,000.

The "applicable percentage" is the ratio for a spun off plan to the total (for the original plan) of the excess, if any, of (I) the lesser of 150% of Current Liability or (normal cost plus accrued liability), over (II) the present value of accrued benefits on a termination basis. This problem gives you values of the liability component of the Full Funding Limitation.

Problem 48 - Page 2 **Revised 09/05/05**

	Market value Allocation: Description of item	Total Plan A	Plan B	Plan C
(1)	Liability component of FFL, lesser of 155% CL or EAN AL	600,000	250,000	350,000
(2)	PV of AB on termination basis	450,000	150,000	300,000
(3)	Excess of (1) over (2)	150,000	100,000	50,000
(4)	Applicable percentage	100%	66.67%	33.33%
(5)	Allocated excess assets	35,000	23,333	11,667
(6)	Total allocated assets (2)+(5)	485,000	173,333	311,667

Once you have the total market value of assets, you can finish the allocation of the credit balance:

	Credit balance Allocation: Description of item	Total Plan A	Plan B	Plan C
(1)	Allocated market value	485,000	173,333	311,667
(2)	Allocated MVA – CB, Given	385,000	128,333	256,667
(3)	Excess of (1) over (2), equals 100% of credit balance	100,000	45,000	55,000

The credit balance for plan B is 45,000.

Answer is C

Problem 49 - Page 1 **Revised 06/21/02**

With an aggregate type cost method, you need both the market value of assets and Entry Age Normal valuation results to check the Full Funding Limitation. Since you have both, you should calculate the FFL values.

One of the points of this problem is that the original amortization period for all OBRA bases was changed to 20 years, effective 01/01/99. You need to increase the remaining amortization period for any prior OBRA bases by 10 years and redetermine the amortization amount.

Amortization base	Original Base	Original Years	Amortization	Remaining years	Outstanding base
01/95 OBRA base	45,000	10	5,988	6 = 10 - (99-95)	30,539

IAL amortization = $500{,}000 / \ddot{a}_{\overline{30}|.07} = 37{,}657$

1/95 OBRA FFC amort = $30{,}539 / \ddot{a}_{\overline{16}|.07} = 3{,}021$

1/99 OBRA FFC amort = $32{,}000 / \ddot{a}_{\overline{20}|.07} = 2{,}823$

1999 Minimum Funding Standard Account

Charges		Credits	
Normal Cost	37,000	Credit Balance	0
IAL amortization	37,657		
'95 FFC amortization	3,021	12/31 contribution	x
'99 FFC amortization	2,823		
7% interest	5,635	7% interest	0
Total charges	86,136	Total credits	x

The next step is to check the Full Funding Limitation under §412. Based on the 12/82 proposed regulation, the Accumulated Funding Deficiency (AFD) based on no contribution and no credit balance must be calculated. This equals the MFSA charges of 86,136. If the §412 FFL is less than the AFD, then there will be a Full Funding Credit in the MFSA equal to the excess of the AFD over the FFL.

Problem 49 – Page 2 **Revised 01/04/01**

A key point is that, in 1999 and 2000, the OBRA 87 FFL current liability is multiplied by 155%. You are given the OBRA/RPA current liability at the beginning of the year, and you must adjust it to an end of year value:

§412 "ERISA" FFL = (1+i)*(NC + AL) - (1+i)*[(lesser MVA,AAV) - CB]
= 1.07 * (30,000 + 750,000 – 590,000)
= 203,300

§412 "OBRA" FFL = 1.55 (12/31 CL) - (1+i)*[(lesser MVA,AAV) - CB](no benefit payments)
= 1.55 * 1.065 * (35,000 + 410,000) – [1.07 * 590,000 – 0]
= 103,284

§412 "RPA 94" FFL = .90 (12/31 CL) - (1+i)*(AAV) (if no benefit payments)
= No need to calculate FFL floor, since the §412 FFL does not apply

Note that the end of year asset value (if any) should be used in calculating the OBRA 87 and RPA ’94 FFL. The reason is that any benefit payments during the year should be reflected at the valuation rate in the assets, and presumably are included in the end of year value. They would be accumulated at the current liability interest rate in the end of year current liability value.

The final §412 FFL value is the greater of the RPA ’94 floor, and the lesser of the ERISA and OBRA FFL values, or 103,284. Since this is greater than the AFD, the FFL does not apply.

The minimum contribution is the previously calculated MFSA charges of 86,136.

Answer is C

Problem 50 - Page 1 Similar to 1996 #37 **Revised 06/21/02**

The whole point of the problem is the definition of earnings. Earned income is defined in §401(c)(2)(A)(v) as net earnings after allowing for the deduction under §404 for plan contributions.

The problem gives you the earned income before allowing for the deduction for plan contributions. 1998 was the first year of the plan. The net pensionable earnings for 1999 are actually 100,000 - X, where X is the 12/31/99 minimum required contribution that is the answer to the problem. You can assume that the minimum contribution will be paid on 12/31/99, and that the deduction will equal the same amount.

Since the benefit is defined based on the high five year average, it could use years 1998-2002, 1999-2003, or 2000-2004 (or later):

Starting year	Five year average			
1998	97,000 – .8X =	[	85,000 +	(100,000 - X)*4] / 5
1999	100,000 – X =	[		(100,000 - X)*5] / 5
2000	100,000 – X =	[		(100,000 - X)*5] / 5

Based on the answer ranges, you can assume that X should be in the neighborhood of 36,000 (bottom of the "A" answer range) to 46,000 (top of the "E" answer range). The highest value for the five year average earned income is 97,000 - .8X, since the 85,000 earned income for 1998 is greater than 100,000 – X in later years.

Under the Individual Aggregate cost method, each participant's normal cost is calculated using the formulas for the Aggregate method, except the AAV is allocated to each participant based an unspecified formula:

PVNC = PVB - AAV - (O/S §412 bases - CB)
NC = PVNC / [PVE / Earnings]

One thing to be careful of is the fact that this problem has an end of year valuation date. The participant is age 57 at 01/01/99, so the temporary annuity for the normal cost will assume 8 normal cost payments. The present value of benefits will only be discounted back for 7 years, based on the 12/31/99 age of 58. This is a minor detail that can easily be overlooked while dealing with the earned income complications!

Problem 50 – Page 2

Projected benefit = 85% * (97,000 - .8X)
= 82,450 - .68X

PV future benefits
discount factor = $(D_{65} / D_{58}) \ddot{a}^{(12)}_{65}$
= $(1.07)^{-7} * (9.87) = 6.1465$

PVNC = (82,450 – .68X) * 6.1465 – 65,000
= 441,782 – 4.1796X

12/31 NC = PVNC / $\ddot{a}_{\overline{57:8}|}$ = PVNC / $\ddot{a}_{\overline{8}|.07}$

12/31 NC = X = (441,782 – 4.1796X) / 6.3893
6.3893X = 441,782 – 4.1796X
X = 41,800

Answer is C