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Guide for using EA-2F Outline

Some of the syllabus items for the EA-2F exam are rarely tested. This guide can be used to help you focus on what is typically the most important parts of the outline.

Pages 1 – 191: Single employer minimum funding is the most heavily tested topic on the exam, typically about 50% of the points. These would be the most important pages in the outline.

Pages 192 – 252: Funding based limits (IRC section 436) is typically tested in about 3 – 5 exam questions.

Pages 253 – 264: Multiemployer plan minimum funding is typically tested in about 4 – 6 exam questions (but quite a few more than normal on the 2015 exam).

Pages 265 – 324: Actuarial cost methods are typically tested in about 4 – 6 questions (but a few more than normal on the 2015 exam), and are also used in the multiemployer plan minimum funding questions. The cost methods most likely to be tested are Aggregate, Frozen initial liability, Unit credit, and Entry age normal. The other cost methods have not been tested since before the 2007 exam, with the exception of Attained age normal, which was tested once, in 2015. For more practice problems dealing with the cost methods, a copy of the text “Actuarial Cost Methods, A Review” can be downloaded from the ASPPA web site (https://www.asppa.org/Portals/2/PDFs/White%20Papers/Actuarial%20Cost%20Methods%20A%20Review.pdf).

Pages 325 – 349: The full funding limit is not tested on every exam, but is tested on many exams.

Pages 350 – 361: The funding rules for multiemployer plans in critical or endangered status are typically tested in 1 – 3 true/false exam questions.

Pages 362 – 370: The deduction rules for single employer plans are typically tested in about 1 – 3 exam questions.

Pages 371 – 379: The deduction rules for multiemployer plans are not tested on most exams, but are tested on some exams.

Pages 380 – 397: The special deduction rules, combined deduction rules, and sole proprietor rules have generally not been tested since before the 2007 exam.

Pages 398 – 405: The excise tax rules for nondeductible contributions have not been tested in much detail since before the 2007 exam.
Pages 406 – 429: The rules for maintaining amortization bases for multiemployer plans have not been tested since before the 2007 exam (other than the rules dealing with minimum funding at the top of page 406 and question 141).

Pages 430 – 453: The rules regarding changes in cost methods and the shortfall funding method, which apply to multiemployer plans, have not been tested since before the 2007 exam.

Pages 454 – 458: The compensation limits of IRC section 401(a)(17) are typically tested directly in 1 – 3 exam questions.

Pages 459 – 477: The IRC section 415 limits and 416 top heavy benefits are primarily tested on the EA-2L exam. However, they can be tested as part of a funding question, and might be expected to be tested in 1 or 2 exam questions.

Pages 478 – 481: The lump sum distribution rules are typically tested in 1 – 2 exam questions. Note, however, that while the IRC section is listed in the recommended reading list, the actual topic is not listed in the syllabus. That makes it unclear as to whether this topic is to be directly tested on this exam.

Pages 482 – 500: The merger and spinoff rules have generally not been tested since before the 2007 exam.

Pages 501 – 524: The funding rules with regard to gains and losses and retirement rate assumptions are typically tested in a few exam questions.

Pages 525 – 534: The rules regarding end of year valuations, life insurance, and employee contributions for multiemployer plans have generally not been tested since before the 2007 exam. There was one employee contribution question on the 2013 exam.
General Rules of Minimum Funding (IRC section 412)

- The minimum funding requirement for years beginning in 2008 and later is:
  - The minimum required contribution determined under IRC section 430 for single employer plans.
  - The IRC section 430 rules apply to multiple employer plans, applied to each employer separately if an election is made under IRC section 413(c)(4)(B) to do so – otherwise the rules of IRC section 430 are applied as if all participants were employed by a single employer (Treasury regulation 1.430(d)-1(a)(3)). For plans established after 1988, no election is necessary – the IRC section 430 rules apply to each employer separately for multiple employer plans established after 1988.
  - Note that a multiple employer plan is a plan that is sponsored by two or more unrelated employers. It is not a multiemployer plan, which is collectively bargained, and subject to IRC section 431.
  - The amount necessary to avoid a funding deficiency under IRC section 431 for multiemployer plans.

- The contributions must generally be made by the sponsoring employer.
  - For employers that are part of a controlled group, each employer in the controlled group may be held liable for contributions not made by other members of the group.
  - Multiemployer plans in critical status under IRC section 432 may not be held liable for required contributions if the plan adopts and complies with rehabilitation requirements under IRC section 432(e).
• Funding deficiencies
  o For a single employer plan, under IRC section 430, a funding deficiency (or the portion of the funding deficiency to be waived) is determined as of the valuation date.
  o For a multiemployer plan, under IRC section 431, or for single employer plans prior to 2008, a funding deficiency (or the portion of the funding deficiency to be waived) is determined as of the last day of the plan year.

• Waiver of minimum funding
  o All or part of the minimum funding standards may be waived by the IRS upon application by the employer.
    - The IRS cannot waive the minimum funding standard for more than 3 out of any 15 consecutive years for single employer plans (or multiple employer plans).
    - The IRS cannot waive the minimum funding standard for more than 5 out of any 15 consecutive years for multiemployer plans.
  o The waiver is amortized under the rules of IRC section 430 for single employer plans and IRC section 431 for multiemployer plans.
    - The amortization of the waived deficiency cannot be waived in a subsequent year.
The waiver can only be granted in the case of business hardship.
- In the case of a single employer plan, this must be a temporary substantial business hardship. This applies to each member of the controlled group.
- In the case of a multiemployer plan, 10% or more of the employers contributing to the plan must have a substantial business hardship based on the following factors:
  - The employer is operating at an economic loss.
  - There is substantial unemployment in the industry.
  - The sales and profits within the industry are depressed or declining.
  - It is reasonable to expect that the plan will continue only if the waiver is granted.

Special rules for single employer plans
- The application for the waiver must be submitted no later than 2½ months after the end of the plan year.
- Security against the waiver may be required by the IRS.
  - The security is not required if the unpaid minimum required contribution plus the outstanding balance of prior waivers is less than $1,000,000.

The plan cannot be amended to increase benefit liabilities while a waiver is in effect, unless the amendment only provides for a de minimis increase in the liabilities.
- Changes in the plan year or funding method must be approved by the IRS.
• Plan amendments
  o Plan amendments adopted on or before the valuation date and effective at any time during the plan year must be used to determine valuation results.
  o Plan amendments adopted after the valuation date (and no later than 2½ months after the end of the plan year for single employer plans – 2 years for multiemployer plans) can be used to determine valuation results at the election of the plan sponsor.
  o Note that prior to 2008, Revenue Ruling 77-2 allowed for other options when the effective date of the amendment was after the first day of the plan year. These options no longer apply beginning in 2008.

• Short plan years
  o The minimum funding requirement is generally pro-rated for a short year.
    - Note that the target normal cost for a single employer plan is not pro-rated for a short plan year. The target normal cost is based upon the increase in the accrued benefit for the short year.
  o For plans terminating before the end of the plan year, the minimum funding requirement is pro-rated as if the plan year is a short year. However, the plan year remains the same, and the minimum funding and Schedule B filing deadlines remain as they would be for a full plan year. See Revenue Ruling 79-237.

• Minimum funding rules do not apply to:
  o Government plans.
  o Church plans.
  o Insurance contract plans, funded exclusively through insurance contracts that provide for level annual premium payments.
**Question 1**

Consider the following statements concerning waiver of the minimum funding standard.

I. All plans must submit an application for a waiver of the minimum funding standard to the Internal Revenue Service no later than 2½ months after the plan year end.

II. The entire minimum funding standard can potentially be waived in any year if business hardship exists.

III. No security is required for a waiver of $500,000.

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

**Solution to question 1**

I. Only single employer plans are required to submit an application for a waiver of the minimum funding standard to the Internal Revenue Service no later than 2½ months after the plan year end. This statement is false.

II. The amortization of previously waived deficiencies cannot be waived in a subsequent year, regardless of whether business hardship exists. This statement is false.

III. No security is required for a waiver of under $1,000,000. This statement is true.
Question 2

Plan effective date: 1/1/2000

Plan termination date: 9/30/2008

Minimum required contribution as of 1/1/2008
   without regard to the plan termination: $300,000

The plan was amended to cease benefit accruals on 1/1/2008.

What is the minimum required contribution for 2008 as of 1/1/2008?

Solution to question 2

The minimum required contribution is pro-rated in a year in which the plan terminates. Since the plan terminates on 9/30/2008, the minimum is pro-rated 9/12:

Minimum = $300,000 × 9/12 = $225,000

The minimum funding due date is 9/15/2009, 8½ months after the close of the plan year. Note that a plan termination does not result in a short plan year. See Revenue Ruling 79-237.
The excess of the 2012 funding shortfall over the outstanding balance of the prior waiver amortization base is equal to the 2012 shortfall amortization base:

$70,000 - $52,279 = $17,721

The 2012 shortfall amortization base is amortized over 7 years using the 2012 segmented interest rates. The first segment interest rate is used to determine the present value of payments made during the first 5 years (payments 1 through 5) and the second segment interest rate is used to determine the present value of payments made for the 6th through 20th years (payments 6 and 7).

Amortization of 2012 funding shortfall = $17,721  
\[ \frac{\ddot{a}_{\bar{3},0.0535} + \ddot{a}_{\bar{2},0.0565} \cdot 0.0565}{\ddot{a}_{\bar{5},0.0565}} = $2,955 \]

The minimum required contribution is equal to the sum of the target normal cost, the amortization of the funding shortfall bases, and the amortization of the waived deficiency. The amortization of past waived deficiencies cannot be waived in any subsequent year. Therefore, the portion of the minimum required contribution for 2012 that is waived is everything other than the amortization of the 2011 waived deficiency.

Waived deficiency for 2012 = $35,000 + $2,955 = $37,955
**Question 30**

Data for this question is the same as the previous question, including the valuation results determined in the solution to that question.

Contribution for 2012: $11,573 on 1/1/2012

Selected actuarial assumptions for 2013:

- Segment interest rates: (5.35%, 5.65%, 6.00%)
- Effective interest rate: 5.55%

Selected valuation results as of 1/1/2013:

- Target normal cost: $40,000
- Funding target: 270,000
- Actuarial value of assets: 160,000

What is the **minimum required contribution** for 2013 as of 1/1/2013?
Solution to question 30

The funding shortfall as determined under IRC section 430(c)(4) is equal to the excess (if any) of the funding target over the actuarial value of assets (reduced by the funding standard carryover and prefunding balances). Since the contribution for 2012 was equal to the minimum required contribution that was not waived (the amortization of the 2011 funding deficiency), there was no contribution in excess of the minimum and, therefore, no prefunding balance.

Funding shortfall as of 1/1/2013 = $270,000 – $160,000 = $110,000

With no funding balance, the plan is not exempt from a new shortfall amortization base for 2013.

The shortfall amortization base is equal to the excess of the funding shortfall over the present value of the future shortfall and waiver amortization installments. The 2012 waiver base is amortized using the 2012 segment interest rates, as follows:

\[ \text{Amortization of 2012 waived deficiency} = \frac{\$37,955}{a_{4\,0535} + v^5_{0.0565}} = \$8,874 \]

The outstanding balance of the 2011 and 2012 waived deficiency bases as of 1/1/2013 is determined using the 2013 segment interest rates.

Outstanding balance of 2011 waived deficiency = $11,573 \times \ddot{a}_{4\,0535} = $42,884

Outstanding balance of 2012 waived deficiency = $8,874 \times \ddot{a}_{5\,0535} = $40,087

The outstanding balance of the 2012 shortfall base, as of 1/1/2013, is also determined using the 2013 segment interest rates.

Outstanding balance of 2012 shortfall base = $2,955 \times (\ddot{a}_{5\,0535} + v^5_{0.0565}) = $15,594

The excess of the 2013 funding shortfall over the outstanding balance of the prior shortfall and waiver amortization bases is equal to the 2013 shortfall amortization base:

$110,000 - $42,884 - $40,087 - $15,594 = $11,435
The 2013 shortfall amortization base is amortized over 7 years using the 2013 segmented interest rates. The first segment interest rate is used to determine the present value of payments made during the first 5 years (payments 1 through 5) and the second segment interest rate is used to determine the present value of payments made for the 6th through 20th years (payments 6 and 7).

\[
\text{Amortization of 2013 funding shortfall} = \frac{11,435}{\bar{a}_{3.0535} + \bar{a}_{2.0565} \cdot v^{5.0565}} = 1,907
\]

The minimum required contribution is equal to the sum of the target normal cost, the amortization of the funding shortfall bases, and the amortization of the waived deficiency bases.

Minimum required contribution = $40,000 + $2,955 + $1,907 + $11,573 + $8,874

= $65,309
Question 31

Plan effective date: 1/1/2009

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

Normal form of benefit: Life annuity

Optional form of benefit: Life annuity with 10 years certain, equal to 95% of life annuity.

Actuarial assumptions for 2012:

Segment interest rates: (5.00%, 4.75%, 4.85%)
Salary increases: None
Probability of electing optional form: 30%

Annuity values at selected interest rates:

<table>
<thead>
<tr>
<th></th>
<th>4.75%</th>
<th>4.85%</th>
<th>5.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td>$a_{65}^{(12)}$</td>
<td>9.194</td>
<td>9.131</td>
<td>9.000</td>
</tr>
<tr>
<td>$a_{10}^{(12)} + 10\ddot{a}_{65}^{(12)}$</td>
<td>10.426</td>
<td>10.353</td>
<td>10.200</td>
</tr>
</tbody>
</table>

Data for plan participant Smith as of 1/1/2012:

Date of birth: 1/1/1974
Date of hire: 1/1/2004
2011 salary: $100,000

The plan was not at-risk prior to 2012.

a) What is the target normal cost for Smith as of 1/1/2012 if the plan is not at-risk?
b) What is the at-risk target normal cost for Smith as of 1/1/2012 if the plan is at-risk?
c) What is the target normal cost for Smith as of 1/1/2012 if the plan is at-risk, and the optional form of benefit adjustment was 85% of the life annuity (instead of 95% of the life annuity)?
Solution to question 31

a) The target normal cost is equal to the present value of the difference between the 12/31/2012 accrued benefit (taking into account the expected salary increase for 2012) and the 1/1/2012 accrued benefit (ignoring the expected salary increase for 2012). Since there are no assumed salary increases, the salary for both purposes is $100,000.

1/1/2012 accrued benefit = 1% × $100,000 × 8 years of service = $8,000
12/31/2012 accrued benefit = 1% × $100,000 × 9 years of service = $9,000
2012 accrued benefit increase = $9,000 - $8,000 = $1,000

The optional form of benefit must be taken into account. The equivalent 10C&C benefit is equal to $950 ($1,000 × 95%). There is an assumed 30% chance of Smith electing a 10C&C benefit (and a 70% chance of electing a life annuity).

In determining the present value, the segment interest rates must be used. Smith is 38 as of 1/1/2012. Only the third segment interest rate is used since the first annuity payment to Smith will be in 27 years (the third segment rate applies to payments 20 or more years from the valuation date).

Target normal cost = (1,000 × \(\ddot{a}_{65(4.85\%)}^{(12)}\) × \(v_{0.0485}^{27}\) × 70%)
+ (950 × (\(\ddot{a}_{65(0.0485)}^{(12)}\) + \(10q\ddot{a}_{65(4.85\%)}^{(12)}\)) × \(v_{0.0485}^{27}\) × 30%)
= (1,000 × 9.131 × 0.27839 × 70%)
+ (950 × 10.353 × 0.27839 × 30%) = 2,601

This is the target normal cost if the plan is not at-risk.

b) If the plan is at-risk, additional actuarial assumptions must be used to determine the target normal cost. First, Smith must be assumed to retire at the earliest possible retirement age. Since there is no early retirement age in this plan, that assumption has no impact. The second assumption change is that it must be assumed that Smith elects the most valuable form of benefit. This would be the 10C&C benefit since the pure actuarial equivalence using the annuity assumptions is:

\(\ddot{a}_{65(4.85\%)}^{(12)} / (\ddot{a}_{65(0.0485)}^{(12)} + 10q\ddot{a}_{65(4.85\%)}^{(12)}\) = 9.131/10.353 = 88.197%

The reduction of 95% provides for a greater benefit, indicating that the 10C&C option is more valuable than the normal form. Therefore, the target normal cost must be recalculated assuming that Smith elects the 10C&C benefit.
Frozen Initial Liability

This method is similar to the aggregate method with the exception of an unfunded liability, which is initially equal to the entry age normal accrued liability. A description of the entry age normal accrued liability is discussed in that section of this outline.

The following are other special points of interest concerning this funding method.

1. The assets are not adjusted by the credit balance, funding deficiency, and undeducted contributions (as is the case with the aggregate and individual aggregate methods). As a result, the IRC section 404 and 431 normal costs are the same.

2. The normal cost is not affected by the amount of the contribution for the prior year. This is because the contribution increases the assets by the same amount as it reduces the unfunded liability. That causes the same reduction in the present value of future benefits in the normal cost formula regardless of the contribution.

3. The normal cost in the first year that the funding method used is frozen initial liability is the same as the normal cost under the entry age normal method. This is due to the fact that the initial past service liability under FIL is identical to that under the entry age normal method. In addition, the normal cost in each subsequent year will continue to be the same as the normal cost under the entry age normal method provided that there have never been any experience gains or losses.

Calculate the normal cost as of 1/1/2012 using the “data for examples”, assuming that the unfunded liability as of 1/1/2012 is $60,000.

Normal Cost = \((\text{PVFB} - \text{Assets} - \text{Unfunded liability})/(\text{PVFS/Salary})\)

\[
= \frac{(122,928+44,858) - 20,000 - 60,000}{(604,242+671,010)/(108,000+36,000)} \\
= 9,913
\]
Next, calculate the normal cost as of 1/1/2013, assuming the following:

- The contribution for 2012, in the amount of $18,000, was deposited on 12/31/2012.
- There are no new participants as of 1/1/2013.
- Salaries increased by 5% in 2012, and investment earnings were 10% in 2012.

Each item used in the determination of normal cost must be adjusted from 1/1/2012 to 1/1/2013.

\[
\begin{align*}
PVFB_{1/1/2013} &= PVFB_{1/1/2012} \times 1.07 \times 1.05/1.04 \\
&= 167,786 \times 1.07 \times 1.05/1.04 \\
&= 181,257 \\
Assets_{1/1/2013} &= (Assets_{1/1/2012} \times 1.1) + 18,000 \\
&= (20,000 \times 1.1) + 18,000 \\
&= 40,000 \\
PVFS_{1/1/2013} &= (PVFS_{1/1/2012} - Salary_{1/1/2012}) \times 1.07 \times 1.05/1.04 \\
&= (1,275,252 - 144,000) \times 1.07 \times 1.05/1.04 \\
&= 1,222,078 \\
Salary_{1/1/2013} &= Salary_{1/1/2012} \times 1.05 \\
&= 144,000 \times 1.05 \\
&= 151,200 \\
UL_{1/1/2013} &= [(UL_{1/1/2012} + NC_{1/1/2012}) \times 1.07] - 18,000 \\
&= [(60,000 + 9,913) \times 1.07] - 18,000 \\
&= 56,807
\end{align*}
\]

The normal cost can now be calculated.

\[
\begin{align*}
\text{Normal Cost} &= (PVFB - Assets - Unfunded liability)/(PVFS/Salary) \\
&= (181,257 - 40,000 - 56,807)/(1,222,078/151,200) \\
&= 10,448
\end{align*}
\]
**Question 99**

Plan effective date: 1/1/2007

Normal retirement benefit: 50% of final year’s salary

Actuarial cost method: Frozen Initial Liability (with normal cost determined as a level dollar amount)

Selected actuarial assumptions:

- Interest rate: 7% per year
- Salary increases: None
- Pre-retirement deaths and terminations: None
- Retirement age: 65
- $d_{65}^{(12)} = 10$

Valuation data:

<table>
<thead>
<tr>
<th></th>
<th>Date of Birth</th>
<th>Date of Hire</th>
<th>Annual Salary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smith</td>
<td>1/1/1952</td>
<td>1/1/2002</td>
<td>$50,000</td>
</tr>
<tr>
<td>Brown</td>
<td>1/1/1977</td>
<td>1/1/2007</td>
<td>$10,000</td>
</tr>
</tbody>
</table>

There have been no changes in salary in any year of employment.

Each participant entered the plan on 1/1/2007.

Actuarial value of assets as of 1/1/2008: $20,000

Unfunded liability as of 1/1/2008: $55,000

What is the normal cost for 2008 as of 1/1/2008?
Solution to question 99

The present value of future benefits can be calculated for each participant.

Smith PVFB = 50,000 \times .5 \times \ddot{a}_{65}^{(12)} \times v^9 = 135,983

Brown PVFB = 10,000 \times .5 \times \ddot{a}_{65}^{(12)} \times v^{34} = 5,011

Total PVFB = 135,983 + 5,011 = 140,994

Normal cost = (PVFB – Actuarial assets – Unfunded liability)/Average temporary annuity
= (140,994 - 20,000 - 55,000)/[(\ddot{a}_{65} + \ddot{a}_{34})/2]
= 6,369

Note that the cost method in this question specifically indicates that funding is as a level dollar amount. That means that, although the benefit is determined as a percentage of salary, the normal cost will be level. That is the reason for the use of the level temporary annuities to amortize the present value of future normal cost rather than the use of future salaries.
Employee Contributions

Generally, multiemployer plan exam questions dealing with employee contributions will use the aggregate funding method. The normal cost to be paid for by the employer can be determined in one of two ways.

First, the total normal cost can be determined (taking into account the present value of both employer paid and employee paid benefits, as well as employer and employee funded assets). The total employee contribution for the year is subtracted from this amount, resulting in the employer normal cost. It is important to remember that benefits and assets provided by voluntary employee contributions are not used for this purpose.

The second method involves determining the employer normal cost directly. This method is generally used when the amount of the employee contribution is not known. The benefits and assets considered in this situation are only the employer provided benefits and employer paid assets.

The unit credit method has special considerations when considering employee contributions since it is the one method that is an accrued benefit method rather than a projected benefit method. Typically, the employee contributions are not subject to forfeiture upon death or other termination of employment, while the employer contributions are subject to such forfeitures. Therefore, the employer normal cost cannot simply be equal to the total normal cost less the employee contribution. Instead, the employee contribution must be accumulated to retirement (reflecting interest only, since there is no forfeiture of employee contributions), used to reduce the value at retirement of the benefit used to determine normal cost for the year, and discounted back using the appropriate funding assumptions, including pre-retirement mortality and turnover. The result is the employer normal cost.

For single employer plans, the target normal cost is reduced by the mandatory employee contributions.
**Question 191**

Type of plan: Contributory multiemployer plan  
Rate of employee contributions: 1% of compensation, payable December 31  
Pre-retirement death and termination benefit: Refund of employee contributions, with interest at 7%  
Actuarial cost method: Aggregate  
Valuation date: 12/31  
Valuation interest rate: 7% per year

Valuation results as of 12/31/2008:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present value of future retirement benefits</td>
<td>$2,000,000</td>
</tr>
<tr>
<td>Present value of future death and termination benefits</td>
<td>70,000</td>
</tr>
<tr>
<td>Market (actuarial) value of assets</td>
<td>700,000</td>
</tr>
<tr>
<td>Accumulated employee contributions</td>
<td></td>
</tr>
<tr>
<td>with interest (included in assets)</td>
<td>68,000</td>
</tr>
<tr>
<td>Present value of future compensation</td>
<td>9,000,000</td>
</tr>
<tr>
<td>2008 compensation</td>
<td>1,000,000</td>
</tr>
</tbody>
</table>

What is the minimum required employer contribution for 2008 as of 12/31/2008?

**Solution to question 191**

The total normal cost is:

\[
\frac{(2,000,000 + 70,000 - 700,000)/(9,000,000/1,000,000)}{9,000,000/1,000,000} = 152,222
\]

The employee contributions are:

\[
1\% \times 1,000,000 = 10,000
\]

The minimum required employer contribution is:

\[
152,222 - 10,000 = 142,222
\]