

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

2014

Subject CA3 – Communications

Paper 2

Time allowed: 2 hours

INSTRUCTIONS TO THE CANDIDATE

1. *The work you submit MUST be saved in Microsoft PowerPoint 2007 format, e.g. using the pptx file extension.*
2. *You have two hours to prepare and upload your exam attempt.*
3. *You may print one copy of your slides in preparation for giving the presentation tomorrow. You are not permitted to make any further copies of your presentation.*
4. *Copies of Formulae and Tables and core reading for subjects CT1–CT8 inclusive and CA1 will be available electronically during the exam. These documents are for your use during the exam period only and not for general use. No other material can be referred to.*
5. *In addition to this paper you should have available your own electronic calculator from the approved list, <http://www.actuaries.org.uk/research-and-resources/documents/exam-policies>*
6. *You are not permitted to use the internet to help you during the exam.*
7. *You are required to work through the exam assignment without assistance from another person. You are reminded that by undertaking this exam you are bound by the Institute and Faculty of Actuaries' Examinations Rules and Regulations. By submitting your files you are confirming that all material is entirely your own work and you wish this to be taken into account for this assessment. Only the first submission will be accepted.*
8. *Save your work regularly. Saving your work is your responsibility so failure to do so will not be a significant mitigating circumstance.*
9. *At the end of the exam, save your presentation and follow the upload instructions that have been provided. All related material that you have printed including slides, notes, etc. must be confidentially stored until we have informed you to delete/destroy them once the exam is over. Do NOT log off the application until you receive confirmation of receipt from the Online Education Team.*
10. *If you encounter any difficulties please email online_exams@actuaries.org.uk or call the Online Education Team on +44 (0)1865 268255.*
11. *Professional behaviour is mandatory and no material relating to the exam may be disclosed or discussed with others, nor used in a further attempt at the exam. Failure to comply with this will be deemed to be a breach of the examination regulations and may result in disciplinary action.*

PLEASE NOTE THAT THE CONTENT OF THIS PAPER IS CONFIDENTIAL AND STUDENTS ARE NOT TO DISCUSS OR REVEAL THE CONTENTS UNDER ANY CIRCUMSTANCES.

You are a newly qualified actuary working for XYZ Consulting Services Limited (XYZ CSL). Your manager, Karen, has received an email from the secretary to the Trustees of the ABC Defined Contribution Pension Plan.

Karen

We have a trustees' meeting scheduled for next week and wondered if you would be able to come and give us a brief presentation on annuity purchase at retirement. We are increasingly reading negative information in the press on annuities.

Brian, one of our employee nominated trustees, mentioned to me in passing the other day that he was reading something in the media about members' life expectancy at retirement typically being 19 years. He said that in the current market a fund of £100,000 will buy you an annuity of only £6,000 p.a. So the annuity is poor value and our members can do better if they just withdraw money from the fund they've accumulated at retirement. He finished off by stating that it's therefore not worth buying an annuity as you can do just as well leaving the money in the bank and using it as you need.

Our Plan booklet also recommends that our members take advice from an independent financial adviser as they approach retirement.

I'm wondering if we need to make any changes to the wording in the booklet to reflect Brian's comments. Can we discuss this during the meeting please?

Regards

Tim

*Secretary to the Trustees
ABC Defined Contribution Pension Plan*

Karen has asked that you attend the Trustees' meeting next week on her behalf to make the presentation. She has suggested that your presentation should last 8-10 minutes and should respond to each of the statements that have been raised by Brian and the comment on the Plan booklet from Tim.

Karen has passed you her notes on the statements and comments raised in the above email, together with some information and analysis that has been prepared by an actuarial student in your team.

Karen's notes and the information and analysis carried out by the student are factually correct for the purpose of this question. You should ignore tax, current/proposed legislation and any statutory limits applied to the amount of fund withdrawn etc.

Karen's notes

- *“members’ life expectancy at retirement typically being 19 years”*: See analysis of ABC plan mortality projections for a male age 65 now below confirming this is correct. *“a fund of £100,000 will buy you an annuity of only £6,000 p.a.”*: OK - agrees latest annuity rates checked online by student for male age 65 in standard health for a single-life flat-rate annuity with no attaching guarantees such as minimum duration.
- You should include a simple example showing the time until the funds run out if take £6,000 p.a. from fund.
- *“you can do just as well leaving the money in the bank and using it as you need”*: I suggest you illustrate on a range of interest rates how funds may run out depending on longevity and return earned on the funds.
- *“the annuity is poor value”*: illustrate / provide appropriate comments based on findings. You should mention the other types of annuity which may be available e.g. higher annuities for those in poor health, inflation protection, spouses’ benefits and the guarantee that the annuity will be paid for life.
- *“I’m wondering if we need to make any changes to the wording in the booklet”*: This is the trustees’ decision but suggest the wording is reviewed. The current advice for the member to take independent financial advice should remain.

This particular set of Trustees appreciates a direct approach so please respond to the statements made in a clear way.

Information and analysis provided by actuarial student

Below is an extract of the tables based on actuarial model used for ABC Defined Contribution Pension Plan for the cohort of male pensioners reaching age 65 in 2014. (The ABC DC Plan comprises over 95% of male members.)

<i>Age (x)</i>	<i>q_x</i>	<i>l_x (start of year)</i>	<i>p_x</i>	<i>l_x / l₆₅*</i>
65	0.00763	1000.00	0.99237	-
66	0.00812	992.37	0.99188	0.99237
67	0.00900	984.32	0.99101	0.98432
68	0.00997	975.46	0.99003	0.97546
69	0.01129	965.74	0.98871	0.96574
70	0.01384	954.84	0.98616	0.95484
71	0.01566	941.63	0.98434	0.94163
72	0.01778	926.89	0.98222	0.92689
73	0.02006	910.40	0.97995	0.91040
74	0.02281	892.15	0.97719	0.89215
75	0.02643	871.79	0.97357	0.87179
76	0.02922	848.76	0.97078	0.84876
77	0.03457	823.95	0.96543	0.82395
78	0.03852	795.47	0.96149	0.79547
79	0.04612	764.83	0.95388	0.76483
80	0.05045	729.55	0.94955	0.72955
81	0.05996	692.75	0.94004	0.69275
82	0.06950	651.21	0.93050	0.65121
83	0.07993	605.95	0.92007	0.60595
84	0.08812	557.51	0.91188	0.55751
85	0.09949	508.39	0.90051	0.50839
86	0.11867	457.81	0.88133	0.45781
87	0.12751	403.48	0.87250	0.40348
88	0.13841	352.04	0.86159	0.35204
89	0.14839	303.31	0.85161	0.30331
90	0.16443	258.30	0.83557	0.25830
91	0.18851	215.83	0.81149	0.21583
92	0.19959	175.14	0.80041	0.17514
93	0.21860	140.19	0.78140	0.14019
94	0.23849	109.54	0.76151	0.10954
95	0.25903	83.42	0.74097	0.08342
96	0.27971	61.81	0.72029	0.06181
97	0.30032	44.52	0.69968	0.04452
98	0.32075	31.15	0.67925	0.03115
99	0.34095	21.16	0.65906	0.02116
100	0.36082	13.94	0.63918	0.01394
101	0.38030	8.91	0.61970	0.00891
102	0.39935	5.52	0.60065	0.00552
103	0.41790	3.32	0.58210	0.00332
104	0.43592	1.93	0.56408	0.00193
105	0.45337	1.09	0.54663	0.00109
106	0.47022	0.60	0.52978	0.00060
107	0.48644	0.32	0.51356	0.00032
108	0.50202	0.16	0.49798	0.00016
109	0.51693	0.08	0.48307	0.00008
110	0.53117	0.04	0.46883	0.00004
Total				19.0874

* for *x* greater than 65

q_x = the probability of death between the ages of *x* and (*x* + 1);

l_x = the number of people alive, relative to original cohort, at age *x*;

p_x = the probability that a life age *x* will survive to age (*x* + 1);

l_{x+n} / l_x = the probability that a life age *x* will survive to age (*x* + *n*);

e_x is the life expectancy of someone alive at age *x*.

e_x = $\sum (l_{x+n} / l_x)$ (summation from *n* = 1, ... ∞)

e₆₅ = $\sum (l_{65+n} / l_{65}) = \mathbf{19.0874 \text{ years}}$ (summation from *n* = 1, ... ∞)

Calculation of term (N) that fund of £100,000, withdrawing £6,000 p.a., would extinguish at different interest rate (i).

Formula used:

$$£6,000 \times \bar{a}_{N|}^i = £100,000$$

The term N has been found using a goal seek formula such that the annuity $\bar{a}_{N|}^i$ always equals 16.667 (=100,000 / 6,000).

<i>Interest rate (i)</i>	<i>N (years)</i>
0.00%	16.6667
0.50%	17.4003
1.00%	18.2234
1.50%	19.1562
2.00%	20.2268
2.50%	21.4741
3.00%	22.9559
3.50%	24.7608
4.00%	27.0364
4.50%	30.0524
5.00%	34.3830
5.50%	41.6287
6.00%	60.8488

Note: all figures have been checked and are correct.

END OF PAPER