INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

August 2016

Subject CA3 – Communications

Paper 1

Time allowed: 1 hour 30 minutes + 15 minutes reading time

INSTRUCTIONS TO THE CANDIDATE

1. *You have 15 minutes before the start of the examination in which to read the question. You are strongly encouraged to use this time for reading only, but notes may be made. You then have 1 hour 30 minutes to complete the paper.*
2. *The work you submit MUST be saved in Microsoft Word 2007 format, e.g. using the docx file extension. You may only upload one document and you must not embed files in the document.*
3. *Copies of the Formulae and Tables, Core Reading for subjects CT1–CT8 inclusive and CA1 will be available electronically during the exam. These documents are for use during the exam period only and not for general use. No other material can be referred to.*
4. *In addition to this paper you should have available your own electronic calculator from the approved list, - https://www.actuaries.org.uk/studying/prepare-your-exams/authorised-calculators*
5. *You are not permitted to use the internet to help you during the exam.*
6. *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 the material is entirely your own work and you wish this to be taken into account for this assessment. Only the first submissions will be accepted.*
7. *Save your work regularly. Saving your work is your responsibility so failure to do so will not be a significant mitigating circumstance. Do NOT log off the application until you receive confirmation of receipt from the Online Education Team.*
8. *At the end of the examination, save your completed assignment and follow the upload instructions that have been provided. Once the exam is over all related material and notes made during the examination must be destroyed.*
9. *If you encounter any difficulties please email online_exams@actuaries.org.uk or telephone the Online Education Team on +44 (0)1865 268255.*
10. *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 nearly qualified actuary working for JJJ Insurance which sells a variety of savings and insurance policies. JJJ's Rectifications Team has received several quotations for some project work that needs to be undertaken to amend policyholders' records. Your manager, Kevin, has passed you the following email which he has received from Tracey, the Rectifications Team Leader:

Kevin

As you are aware we have now passed the closing date for bids to undertake the calculation work to amend our policyholders' records. We have received fifteen bids. However, once we exclude those that don't meet our risk and data protection requirements we only have three remaining. You mentioned that you or one of your team may be able to provide us with a paper providing an analysis of the likely costs for the three viable quotations for our project meeting next week. JJJ Insurance Board agreement is needed for any sign off over $150,000 and the next Board meeting isn't for six weeks. In order to get going on the project as soon as possible I think we should go for Company C as they are the only one that has come in under $150,000. This would enable us to meet our team's target of completing the work by the end of our financial year.

Regards

Tracey
Rectifications Team Leader
JJJ Insurance

Your manager Kevin is now on holiday for a week, however he has left you the following instructions:

Gordon

Could you draft a paper for the Rectifications Team project meeting next week providing an analysis of the total costs for the three eligible quotations. The paper should cover:

- *a brief introduction / some background on the project;*

- *a clear summary of the costs that have been quoted for this work (with a few relevant comments / observations);*

- *an indication of the likely total costs of the project; and*

- *appropriate commentary on whether Board sign off is required.*

Tracey has obviously missed the point about fixed and variable costs. If there are any clear messages regarding the expected total costs or which of the three eligible companies should do the work then please make them clear.

Tracey was quite critical of a paper that we produced last year which she said obviously came from the actuarial team. She said that whilst it looked very impressive, it was how she imagined a mathematical dissertation would look. Tracey said that it included far too many graphs and technical information for the Rectifications Team. Please therefore don't include details of how the total costs are calculated as this is unnecessary detail that the

Rectifications Team don't need. I think in this case a graph could help get the key messages across, but please only include one graph in this paper. I'm happy to go with your judgment on what that graph should show.

Many thanks
Kevin

Kevin has also provided the following information which includes background information on the project and the results of an analysis of the three quotations which has been carried out by an actuarial student in your team:

This job involves a rework of policyholders' insurance records to allow for the amended charge rates that should have been applied. The total number of insurance policies, and hence the number of records held in the portfolio, is 100,000. Only the three quotes that meet JJJ's risk and data protection requirements are to be considered in the paper. These quotes are from Companies A, B & C. The costs for carrying out the project have all been expressed in the same format (fixed costs plus variable costs which will depend on the number of records which give rise to data queries) which should assist your analysis.

Analysis carried out by the actuarial student

Quotations received

Company A

Fixed Costs = $270,000.00

Variable Costs = No charge if number of records giving rise to a query is up to or equal to 10% of the portfolio*. Charge for each query over 10% of the portfolio* is $5.00 per query.

Company B

Fixed Costs = $240,000.00

Variable Costs = $5.00 per query up to 10% of the portfolio*; $6.00 per query for queries over 10% of the portfolio*.

Company C

Fixed Costs = $145,999.99

Variable Costs = $49.99 per query up to 5% of the portfolio*; reduces to $29.99 per query for queries between 5% and 10% of the portfolio*, and then further reduces to $9.99 per query for queries in excess of 10% of the portfolio*.

*Note: this refers to the total number of records in the portfolio.

Total costs (TC) = Fixed Costs (FC) + Variable Costs (VC)

PLEASE TURN OVER

The table below shows the calculation of the TC dependent on the percentage of the portfolio (between 0% and 20%) that has data queries.

E.g. Total Costs for Company C if 11% of the portfolio has data queries **(highlighted in bold in the table)**
= $145,999.99 + $409,890.00
= $555,889.99

Where:

FC = $145,999.99
VC = (5,000 × 49.99) + (5,000 × 29.99) + (1,000 × 9.99) = $409,890.00

Total number records in portfolio = 100,000

Percentage of queries	Number of queries	Total Costs $'000		
		A	B	C
0%	0	270	240	146
1%	1,000	270	245	196
2%	2,000	270	250	246
3%	3,000	270	255	296
4%	4,000	270	260	346
5%	5,000	270	265	396
6%	6,000	270	270	426
7%	7,000	270	275	456
8%	8,000	270	280	486
9%	9,000	270	285	516
10%	10,000	270	290	546
11%	11,000	275	296	**556**
12%	12,000	280	302	566
13%	13,000	285	308	576
14%	14,000	290	314	586
15%	15,000	295	320	596
16%	16,000	300	326	606
17%	17,000	305	332	616
18%	18,000	310	338	626
19%	19,000	315	344	636
20%	20,000	320	350	646

In addition some analysis has been carried out on the likely number of data queries that will arise. This has been based on a sample of records taken from this portfolio. Sufficient records were sampled to have credible probabilities. These results have been summarised in the table below. Note that the bands with the number of data queries are not all equal sizes. The combined bands 5,000 – 5,999 and 6,000 – 6,999 produces an overall probability of 97.53303% (= 49.13392% + 48.39911%).

Number of data queries

Number of data queries	Probability %
<100	0.00000
100–2,999	0.00008
3,000–3,999	0.12812
4,000–4,999	0.53723
5,000–5,999	49.13392
6,000–6,999	48.39911
7,000–7,999	0.98128
8,000–9,999	0.58114
> 10,000	0.23912
Total	100.00000

Note: all figures have been checked and are correct for the purpose of this question.

Draft a response to Tracey, the Rectifications Team Leader of JJJ Insurance, in approximately 600 words.

END OF PAPER