**A-4**

May, 2016          **SPECIALISED DIPLOMA EXAMINATION**          Reg. No.

**(CASUALTY ACTUARIAL SCIENCE NON-LIFE)**  ☐☐☐☐☐☐☐☐☐☐

**ESTIMATING UNPAID CLAIMS USING BASIC TECHNIQUES**

[Time : 3 Hours]                                             [Total Marks: 100]

Answer EIGHT questions only. Q. No. 10 is compulsory which carries 16 marks.
Any SEVEN questions from Q. No. 1 to Q. No. 9 which carries 12 marks each.

|  |  | **Marks** |
|---|---|---|

Q.1.  Answer **any three** of the following :                                4 each

   a)  What are the different type of claims reserves held by an insurer?
   b)  What is the appropriate reserving technique for estimating the unpaid
       claim liabilities at 12 months maturity for an excess of loss reinsurance
       with an average deductible of INR 10 crores on product liability policies.
   c)  What are the advantages & disadvantages of using report year
       aggregation?
   d)  How do you as an actuary deal with aggregate limits and reinsurance in
       valuation of outstanding claims as at 31$^{st}$ December 2015 for a property
       book?

Q.2.  Answer **any three** of the following :                                4 each

   a)  Outline the lifecycle of a motor liability claim in a general insurance
       company.
   b)  Write a short note on collision & subrogation.
   c)  Describe the factors to consider in deriving the large loss threshold for a
       book of business.
   d)  How will the change in business mix impact a reserving method & the
       underlying assumptions?

Q.3.  Answer **any three** of the following :                                4 each

   a)  How will the reserves differ when using underwriting year and occurrence
       year data?
   b)  When using the Bornhuetter-Ferguson technique, what are the ways &
       data sources to establish the loss ratio estimate?
   c)  Outline the importance of estimating unpaid claims for
       (i) Investors and (ii) Internal Management
   d)  What are the different types of ULAE & ALAE expenses? Describe any 2 of
       each type

Q.4.  Answer **any two** of the following :                                  6 each

   a)  Key Assumptions on Development Technique
   b)  Features of Development Triangles
   c)  i) Multiple Currencies claim                                           3

ii) Umbrella & Excess Insurance                                                  3

Q.5.   Write Short notes on **any two** of the following :                        6 each

    a)   Accident Benefits

    b)   Claims Professionals

    c)   Medical malpractice

Q.6.   Answer **any two** of the following :                                      6 each

    a)   Given the following :

| Accident Year | Earned Premium (INR 000s) | On level Adjustment | Reported Claims (INR 000S) | Pure Premium Trend Factors | Total reform Factors |
|---|---|---|---|---|---|
| 2012 | 50,000 | 0.90 | 25,000 | 1.061 | 0.75 |
| 2013 | 52,000 | 0.95 | 20,000 | 1.030 | 0.90 |
| 2014 | 54,000 | 1.00 | 10,000 | 1.000 | 1.00 |

Accident Year 2012 reported CDF to ultimate is 1.25 and 1.75 & 2.50 are the CDF to ultimate for accident year 2013 & 2014 respectively. Use the cape cod technique to estimate IBNR for accident year 2013.

    b)   Given the following:

Reported claim counts

| AY | 12 months | 24 months | 36 months |
|---|---|---|---|
| 2012 | 291 | 274 | 273 |
| 2013 | 301 | 289 | |
| 2014 | 254 | | |

Reported Claims (INR 000s)

| AY | 12 months | 24 months | 36 months |
|---|---|---|---|
| 2012 | 11,058 | 12,330 | 12,375 |
| 2013 | 11,739 | 13,005 | |
| 2014 | 13,970 | | |

Assume no further development after 36 months. Using a frequency – security technique, estimate the ultimate's for all accident years.

    c)   Briefly explain three types of frequency severity approach

Q.7.   i)   Explain the environmental and social factors that influence claims development.                                                                         6

    ii)   Discuss the assumptions and situations when expected claims method is most appropriate to compute reserves.                                             6

Q.8. You are given the premium and claim data as on 31$^{st}$ March 2015 in the following table    **12**

| Accident Year | Earned Premium | Reported Claim | CDF to ultimate factors |
|---|---|---|---|
| 2011 | 8614 | 5757 | 1.011 |
| 2012 | 9176 | 5698 | 1.023 |
| 2013 | 9412 | 5678 | 1.051 |
| 2014 | 9527 | 5664 | 1.110 |
| 2015 | 9518 | 4885 | 1.292 |

Given the expected loss ratio is 69.5% using any suitable approach, calculate ultimate claims.

Q.9. "Development and continuous mentoring of credible data is of the utmost importance to an Actuary for implementing actuarially sound reserving method". Discuss this statement in detail in view of the emerging challenges.    **12**

Q.10. Given the following data for 2 companies :

**Company A**

Paid losses (INR 000s)

| AY | 12 | 24 | 36 | 48 |
|---|---|---|---|---|
| 2010 | 400 | 2400 | 9600 | 12000 |
| 2011 | 400 | 2400 | 9600 | |
| 2012 | 400 | 2400 | | |
| 2013 | 400 | | | |

Reported Losses (INR 000s)

| AY | 12 | 24 | 36 | 48 |
|---|---|---|---|---|
| 2010 | 800 | 4800 | 12800 | 14400 |
| 2011 | 800 | 4800 | 12800 | |
| 2012 | 800 | 4800 | | |
| 2013 | 800 | | | |

Reported Counts

| AY | 12 | 24 | 36 | 48 |
|---|---|---|---|---|
| 2010 | 2000 | 3000 | 3000 | 3000 |
| 2011 | 2000 | 3000 | 3000 | |
| 2012 | 2000 | 3000 | | |
| 2013 | 2000 | | | |

Closed Claims Counts

| AY | 12 | 24 | 36 | 48 |
|---|---|---|---|---|
| 2010 | 1000 | 1500 | 2000 | 2500 |
| 2011 | 1000 | 1500 | 2000 | |
| 2012 | 1000 | 1500 | | |
| 2013 | 1000 | | | |

**Company B**

Paid losses (INR 000s)

| AY | 12 | 24 | 36 | 48 |
|---|---|---|---|---|
| 2010 | 12 | 45 | 176 | 230 |
| 2011 | 4 | 39 | 192 | |
| 2012 | 6 | 51 | | |
| 2013 | 8 | | | |

Reported Losses (INR 000s)

| AY | 12 | 24 | 36 | 48 |
|---|---|---|---|---|
| 2010 | 50 | 144 | 264 | 278 |
| 2011 | 34 | 144 | 288 | |
| 2012 | 34 | 147 | | |
| 2013 | 40 | | | |

3

Reported Counts

| AY | 12 | 24 | 36 | 48 |
|------|----|----|----|----|
| 2010 | 40 | 60 | 60 | 60 |
| 2011 | 40 | 60 | 60 | |
| 2012 | 40 | 60 | | |
| 2013 | 40 | | | |

Closed Claims Counts

| AY | 12 | 24 | 36 | 48 |
|------|----|----|----|----|
| 2010 | 20 | 30 | 40 | 50 |
| 2011 | 20 | 30 | 40 | |
| 2012 | 20 | 30 | | |
| 2013 | 20 | | | |

Both companies write primary motor liability policies. On 31$^{st}$ December 2013, the two merge to form Company C.

a) Discuss actuarial considerations for designing a reserve study for Company C.                     4

b) Compute any three diagnostics to determine whether to combine past data of A and B                     3

c) Following diagnostics from part (b), actuary decides to combine the data in the absence of other information. Using an appropriate method & stating any assumptions, calculate the total unpaid claims estimate as at 31$^{st}$ December 2013                     9

**End**