

**PGDM (Insurance Business) 2013-15**  
**Elements of Actuarial Science (Life & Non Life)**  
**INS-401**

**Trimester – IV, End-Term Examination, September, 2014**

Time allowed: 2½ Hours

Max Marks: 50

Roll No: \_\_\_\_\_

**Instruction:** Students are required to write Roll No on every page of the question paper, writing anything except the Roll No will be treated as **Unfair Means**. In case of rough work please use answer sheet.

**Note :** - *Please be relevant and brief in your answers.*

- *Section C is compulsory.*

- *Do not write anything on this question paper except your roll no.*

**Section-A**

**There are 5 questions in this section. Attempt any 3 questions. Each question carries 5 marks.**

A-1.(a) Write the notations for annuity and assurance functions for the following at any age:

- i) Expected Present Value of premiums payable for 15 years. [1.5]
- ii) Expected Present Value of death benefits (only) payable in 20 years. [1.5]
- (b) What is 'No claim discount (NCD)' under Motor Insurance? [2]

A-2.i) Draw the generic graph of mortality between ages and no. of deaths. [2]

ii) What will be the impacts on premiums due to improving mortality experience (fewer deaths) under Term Insurance and Annuity Plans? [3]

A-3. Kamlesh is withdrawing annual salary of 3 lacs per annum and investing 10% of his annual salary in mutual funds in the beginning of each year. If he invests for 4 years from now and getting 8% annual return on his investments then calculate the accumulated money at the end of the 4<sup>th</sup> year. [5]

A-4. If the mortality of ages 40 to 45 is constant e.g. 0055 then what is the probability of

- i) Surviving a 40 years male until age 42, [2]
- ii) Dying a 40 years female during her 43<sup>rd</sup> year. [3]

A-5.i) List the names of various employee benefits. [2]

ii) Why defined benefit pensions plans are becoming unpopular among employers? [3]

**P.T.O.**

**Section-B**

**[Note: Answer 2 out of the 3 Questions below. Each Question carries 10 marks.**

**[2x10=20]**

B-1.i) List the types of Health Insurance plans available in the market and briefly explain their features and benefits. [4]

ii) ABC Insurance is a one year old Health Insurance company planning to launch a mediclaim insurance plan (indemnity insurance) on yearly renewal basis. You have been provided the company own past year business and claim information to price the product.

No. of plans sold	No of patients	Total Claim Amount (INR)
1000	45	5500000

a) Calculate the risk premium. [3]

b) Calculate the office premium/gross premium given: [3]

Commission	Expense (INR Per Policy)	Profit Loadings (Per Gross Premium)
10%	30	20%

B-2. i) Explain which one parameter e.g. mortality, investment etc is the most crucial factor for the Term Insurance and Endowment Insurance plans and why? [4]

ii) Why surrender values are not offered under term insurance plans (in general) but available under Endowment plans? [3]

iii) What are the three stages of underwriting of life insurance plans? Explain in brief. [3]

B-3. The Life Insurance regulator of a country allows Life Insurance companies to introduce three (3) years term insurance plan 1<sup>st</sup> time.

i) What are the data sources available to price such products? [3]

ii) Calculate the risk premium based on the following information: [7]

Age (Years)	Sum Assured (INR)	Interest (Compounded Yearly)	Mortality (Constant)
35	10,000,00	5%	.00065

**P.T.O.**

### Section-C

#### Case Study

**15 Marks**

The table below shows the numbers of motor insurance claims reported in each development year for accident years from 2010 to 2013. Use the basic chain ladder method to estimate the total ultimate number of claims arising from accidents occurring between 1 January 2010 and 31 December 2013.

No of claims reported	Development Year				
		0	1	2	3
Accident Year	2010	786	1410	2216	2440
	2011	904	1575	2515	
	2012	995	1814		
	2013	1220			

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