

Total No. of Pages : 2

Register Number :

**7393**

Name of the Candidate :

**P.G. DIPLOMA IN ACTUARIAL STATISTICS EXAMINATION  
DECEMBER 2013.**

**130 — ADVANCED TOPICS IN ACTUARIAL STATISTICS**

Time : Three hours

Maximum : 100 marks

**SECTION A**

**Answer any FIVE questions.**

**(5 × 8 = 40)**

1. Describe apportionable premium.
2. What is paidup insurance formula?
3. Define benefit reserves interms of prospective method.
4. State the basic ideas of continuous insurance.
5. The future life time  $T(x)$  and  $T(y)$  are independent, and each has the distribution defined by pdf
 
$$f(t) = \begin{cases} 0.02(10 - t) & \text{for } 0 < t < 10 \\ 0 & \text{elsewhere} \end{cases}$$
 Determine the distribution function and survival function of this distribution.
6. Discuss in detail the various aspects of the last survivor status.
7. Describe Lexis diagram.
8. Explain the applications of Gompertz law in actuarial science.

**SECTION B**

**Answer ALL the questions.**

**(5 × 12 = 60)**

9. (a) Derive an expression for the calculation of fully discrete premium.

Or

- (b) Discuss in detail, true fractional premium and true annual benefit premiums.

10. (a) Describe in detail the fully continuous benefit reserves.

Or

- (b) Obtain the expression for benefit reserves based on true  $m$ -thly benefit premiums.

11. (a) Discuss in detail the benefit reserves at fractional duration.

Or

- (b) Obtain the differential equations for fully continuous benefit reserves.

12. (a) Obtain the distribution of the time until failure of a joint life status.

Or

- (b) For two lives  $(x)$  and  $(y)$  the joint p.d.f. of their future life times,  $T(x)$  and  $T(y)$  is

$$f_{T(x)T(y)}(s, t) = \begin{cases} 0.0006(t - s)^2 & \text{for } 0 < s < 10, 0 < t < 10 \\ 0 & \text{elsewhere} \end{cases}$$

Determine the joint survival function.

13. (a) Describe a continuous model for population theory.

Or

- (b) Distinguish between stationary population and stable population.

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