

**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**



**B.Sc. DEGREE EXAMINATION – STATISTICS**

**FIFTH SEMESTER – APRIL 2013**

**ST 5404 - ACTUARIAL STATISTICS**

Date : 08/05/2013  
Time : 1:00 - 4:00

Dept. No.

Max. : 100 Marks

Section – A

Answer all the questions

(10 x 2 = 20)

1. Calculate the Accumulated value of Rs. 567 invested for 25 years at compound interest 8 % p.a.
2. Find the value of  $V^{50}$  at 15%.
3. What is the effective rate p.a. corresponding to the nominal rate of 24 % p.a. convertible quarterly.
4. Compute the present value of Rs.4500 due 15 years hence at the rate of discount 7% p.a.
5. Find  $(Ia)_n$  of 10 p.a. for 20 years @ 5%.
6. Evaluate  $\ddot{s}_{15}$  @ 10%
7. Prove that  $T_x = \frac{1}{2} l_x + N'_{x+1}$ .
8. Define the probability  ${}_{10}q_{65}$  express in terms of the  $l_x$  function.
9. How single premium is calculated in Assurance benefits?
10. Write the formula for commutation function  $M_x$

Section – B

Answer any five questions

(5 x 8 = 40)

11. Mr.Roy has invested Rs. 5000 at rate of interest 6% p.a. After **five** years, the rate of interest was changed to 6% p.a convertible half yearly. After a further period of **four** years, the rate was again changed to 7% p.a. convertible quarterly. What is the amount at the end of twelve years?
12. The Accumulated value for a certain sum with compound interest at a certain rate in five years and in six years are Rs.10000 and 15000 respectively. Find the rate and Sum.
13. The difference between the Accumulated values of a sum of money accumulated for 12 years at an effective rate 5% p.a. and accumulated value of the same sum of money over the same period 5% p.a. payable quarterly is Rs. 900/-. Find the sum.
14. Derive the relation between accumulated value and present value of immediate annuity.
15. Find the present and accumulated value of immediate annuity due.
16. Using LIC (1970 -73) Ultimate Table fin the following probabilities
  - (i) a life aged 42 survives 5 years
  - (ii) a life aged 30 dies within the next 20 years
  - (iii) a life aged 53 will not die in the 7<sup>th</sup> year from now.

17. In what respect the method of preparation of mortality table for annuitants differ from the table prepared for the assured lives.
18. What facilities can an insurer offer at the time of settlement of a claim, if the claimant does not like to have the benefit amount in a lump sum?

Section – C

Answer any two questions

(2 x 20 = 40)

19. Find the present value of the following

- a)  $\ddot{a}_n$
- b)  $m | \ddot{a}_n$
- c)  $(Ia)_n$
- d)  $(I\ddot{a})_\infty$

20. a) Find the present value and accumulated of an immediate annuity of an immediate annuity of 1 p.a. for term n years under which payments are made **p** times a year, the rate of interest being **i** p.a.

b) Raju has taken loan of Rs, 5300 at rate of interest 5% p.a. payable half yearly. He repaid Rs 1000 after 4 years, Rs.1500 after a further period of 4 years and cleared all outstanding dues at the end of 10 years from the commencement of transaction. What is the final payment made by him?

(10 +10)

21. Explain the following for construction of life table.

- a) Deciding upon the data to be used.
- b) Choosing the period of investigation.
- c) Deciding the unit of investigation.
- d) Deciding the method of investigation to be followed.
- e) Determination of 'Exposed to Risk' and enumeration details.
- f) Obtaining observed rates of mortality.
- g) Graduation of observed death rates.
- h) Constructing the mortality table from the graduated rates.

22. Find the present value of the following Assurances

- a)  $A'_{x:n}$
- b)  $A_x$
- c)  $A_{x:n}$
- d)  $A_{x:n|}$
- e)  $(IA)'_{x:n|}$