



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

**M.Sc. DEGREE EXAMINATION - STATISTICS**

**THIRD SEMESTER – NOVEMBER 2013**

**ST 3956/2962 - ACTUARIAL STATISTICS**

Date : 12/11/2013  
Time : 9:00 - 12:00

Dept. No.

Max. : 100 Marks

**Section – A**  
**(Answer all the questions) (10 x2 =20)**

1. Write the formula for nominal rate of interest.
2. Calculate the present value of Rs. 5689 due 12 years hence a rate of discount 7% per annum.
3. Find the value of  $V^{58}$  @ 5%.
4. Evaluate  $(1 + i)^8 a_{10}$  @ 15%.
5. Compute the present value of immediate increasing annuity 1 per annum for 12 years @ 15%.
6. Define office premium.
7. Write down the expression for probability then life aged 35 dies between 55 and 60.
8. What is meant by education annuity plan?
9. Provide the formula increasing temporary Assurance
10. Give the formula for commutation function  $S_x$ .

**Section – B**  
**(Answer any five questions) (5 x 8 =40)**

11. Jerome has taken loan of Rs 4891 at a rate of interest 5 % p.a. payable half yearly. He repaid Rs 1000 after 2 years, Rs 900 after a further 2 years and clears all outstanding dues at the end of 8 years from the commencement of transaction. What was the final payment made by him?
12. In settlement of a single payment Rs.12456 at the present moment Mr. James agrees to receive three equal payments at the end of 4 years, 8 years and 12 years respectively. Assuming a rate of interest of 5 %p.a. what should be the value each of three payments?
13. Find the expression for present value and accumulated value of an immediate annuity certain for n years.
14. Calculate the value as at the end  $10\frac{1}{2}$  years of an annuity of Rs.140 p.a payable half yearly for 15 years certain, the rate of interest being taken as 4 % p.a convertible half yearly. (Using all the three ways)
15. Find the present value and accumulated value of Increasing annuity where in the successive installment form a arithmetic progression.
16. Explain  $l_x$ ,  $p_x$ ,  $d_x$  and  $q_x$ .
17. Write short notes on the following

- a) Expected of life
- b) Central death rate

18. Describe term assurance and whole life assurance.

**Section – C**  
**(Answer any two questions) ( 2 x20 =40)**

19. Derive and find the expression for any four variable annuities.

20. a) Define the following term ( 6 + 14)

- i) Annuity due
- ii) Deferred annuity due
- iii) Perpetuity

b) Mr. Siva has taken loan of Rs.24000 and he is repayable by 6 uniform installments to be made every 2 years, the first installment being due at the end of 2 years from the present time. Calculate the uniform installment and draw a schedule showing interest and principal contained in each installment. The effective rate of interest is 9 % p.a.

21. Explain the various steps involved in the construction of life table.

22. a) Derive the expression for commutation functions  $D_x$ ,  $C_x$ ,  $M_x$  and  $R_x$  and give an example.

b) Derive the formula for  $a_{x:\overline{n}|}$  and  $\ddot{a}_{x:\overline{n}|}$  (10 + 10)  
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