33. Explain the method of calculating premium under endowment insurance.

34. a) Explain the following :
    i) Force of mortality.
    ii) Complete expectation of life.
    iii) T_x.
    iv) L_x.

    b) If $S(x) = 1 - \frac{x}{100}, 0 \le x \le 100$
    i) Confirm that this expression is suitable as a survival function.
    ii) Calculate the probability that a new born life from this population will survive to age 60.
    iii) Calculate the probability that a new born life will die before age 70. **(2×6=12)**

Reg. No. : .....

Name : .....

VI Semester B.Sc. Degree (CBCSS – Reg./Supple./Improv.) Examination, April 2021
(2015-2018 Admissions)
Core Course in Statistics
6B13STA : ACTUARIAL STATISTICS

Time : 3 Hours Max. Marks : 48

***Instruction** : **Use** of Calculators and Statistical Tables are **Permitted**.*

PART – A : **Short Answer**
Answer **all** the **6** questions

1. Define stationary population.
2. What is the basic principle of insurance ? Explain.
3. Define annuity. Give an example.
4. How much money should be deposited today so that after 5 years, the investor will get 1,00,000 rupees ? Suppose the effective rate of interest is 0.08.
5. What is meant by labour force participation rate ?
6. a) Define child-women ratio.
   b) What is T(x) ? **(6×1=6)**

PART – B : **Short Essay**
Answer **any 7** questions

7. Write a note on housing loan.
8. A bank lends a company £ 5,000 at a fixed rate of interest of 10% pa. The loan is to be repaid by five level annual payments. Calculate the level annual repayment.
9. a) What is life table ? Briefly explain the various components of a life table.
   b) Define L_x and T_x.

10. Derive an expression for accumulated value of an annuity due.

11. Briefly explain term insurance policy.

12. a) Define force of interest. Calculate i if $\delta = 7\%$.
    b) Describe the concept of reverse mortgage.

13. Write a note on mathematical models of mortality.

14. Define :
    i) Total Fertility Rate
    ii) Age specific fertility rate.

15. Briefly explain about child-woman ratio.

16. Write a short note on disability insurance.

17. Describe the term superannuation.

18. Define general insurance. Give any two examples.

19. Describe the process of evaluating a single contingent payment.

20. Define contingent event. Which is the contingent of one-year term insurance ? **(7×2=14)**

PART – C : **Essay**

Answer **any 4** questions

21. For a certain insect population, the probabilities q_x obtained for five weeks are $q_0 = 0.4$, $q_1 = 0.3$, $q_2 = 0.5$, $q_3 = 0.6$, $q_4 = 0.7$ and $q_5 = 1$. Taking $l_0 = 1000$, construct life table with the values for p_x, l_x, d_x, L_x, T_x.

22. A life insurance company uses the following assurance to calculate the premium, payable annually in advance for a whole life insurance policy under which the sum insured is payable at the end of the year of death. Calculate the annual premium for a policy with sum assured 5,00,000, when $\mu = 0.03$ and $\delta = 0.05$.

23. Explain the relationships between various actuarial functions.

24. Explain national insurance.

25. Explain the role of actuary in general insurance.

26. Explain the concept demographic transition.

27. a) Distinguish between simple interest and compound interest.
    b) An investor puts £ 5,000 in a savings account that pays 10% simple interest at the end of each year. Compare how much the investor would have after 6 years if the money was :
    i) Invested for 6 years.
    ii) Invested for 3 years, then immediately reinvested for a further 3 years.

28. Derive an expression for the present value :
    i) Annuity in arrear.
    ii) Deferred annuity. **(4×4=16)**

PART – D : **Long Essay**

Answer **any 2** questions

29. Explain the role of actuary in life insurance.

30. From the data given below :

Age group (years)	A		B	
	Population	Deaths	Population	Deaths
under 10	25000	700	14000	410
10 – 20	14000	320	28000	610
20 – 40	55000	1320	65000	1680
40 – 60	27000	1030	18000	600
above 60	12000	550	4000	260

    a) Calculate crude death rate for each population.
    b) Calculate age specific death rate for each population.
    c) Calculate a standardized crude death rate for population A, using population A as standard population.
    d) Comment on your results.

31. Explain various population projection models.

32. Discuss about unitised insurance policies.