



K20U 0155

Reg. No. :

Name :

VI Semester B.Sc. Degree (CBCSS-Reg./Supple./Improv.)
Examination, April 2020
(2015 Admission Onwards)
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 compound interest.
2. The maturity value of Rs. 5,000 loan for 3 years at 12% simple interest is
3. What do you mean by Age specific mortality rate ?
4. Define whole life insurance policy.
5. Define child-woman ratio.
6. What is the contingent event under one year term insurance policy ? **(6×1=6)**

PART – B

Short essay. Answer **any 7** questions.

7. Define present value. Find the present value at the rate of interest 8% p.a. of Rs. 35,000 payable after 6 years.
8. What do you mean by deferred annuity ? Derive the present value expression for a deferred annuity where payments are made in arrears.
9. What is a life table ? Briefly explain the various components of a life table.

P.T.O.



10. If $S(x) = 1 - \frac{x}{100}$, $0 \leq x \leq 100$. Calculate
- Expression for μ_x .
 - Probability that a life aged 20 will survive to age 60.
11. Write a note on Stationary population.
12. Briefly explain endowment insurance policy.
13. Describe the concept of reverse mortgage.
14. Write a short note on private health insurance.
15. Describe the process of evaluating a single contingent payment. **(7×2=14)**

PART – C

Essay. Answer **any 4** questions.

16. a) Define housing loan and give the formula for calculating the level repayment.
 b) A loan of Rs. 10,000 is repayable by 5 equal annual payments. The annual effective rate of interest is 5%. Calculate the annual installment.
17. Define immediate annuity. Derive an expression for the accumulated value of an immediate annuity.
18. Distinguish between Trauma insurance and disability insurance.
19. On the basis of the male mortality table, calculate
- the probability that 30 year old surviving to age 60.
 - the probability that a 50 year old dying before age 55.
 - the probability that a 20 year old surviving for 15 years.
 - Complete expectation of life (30)
- [Given $l_{30} = 96634$, $l_{60} = 79062$, $l_{90} = 3152$, $l_{55} = 85664$, $l_{50} = 90054$,
 $l_{20} = 98033$, $l_{35} = 95874$, $T_{30} = 3962507$, $T_{31} = 3865939$].
20. Explain the relationships between various actuarial functions.
21. Explain how term insurance differs from whole life insurance. **(4×4=16)**



PART – D

Long essay. Answer **any 2** questions.

22. a) Distinguish between nominal rate of interest and effective rate of interest.
 b) Find the effective rate of interest p.a. corresponding to the nominal rate of interest of :
- 8% p.a. convertible half yearly.
 - 9% p.a. convertible quarterly.
 - 7% p.a. convertible monthly.
 - 5% p.a. convertible momentarily (force of interest).
23. Define fertility. Explain various measures of fertility.
24. Explain the role of actuary in life insurance.
25. a) Explain the method of calculating premium under endowment insurance.
 b) On the basis of a certain mortality table and interest 4% p.a. effective $\ddot{a}_{35} = 14.25$. Given that $p_{35} = 0.9968$ and $p_{36} = 0.9961$, calculate \ddot{a}_{37} and A_{37} . **(2×6=12)**