END TERM EXAMINATION

FIFTH SEMESTER [BCOM(HONS)] DECEMBER 2024

Paper Code: BCOM311   **Subject: Basics of Actuarial Science**
Time: 03:00 Hours   **Maximum Marks:75**
Note: Attempt all questions as directed. Internal choice is indicated. Log and Antilog Tables must be provided if the student asks for the calculations.

Q1 Attempt **any Five** of the following questions: **(5x5=25)**
(a) What do you mean by time value of money?
(b) What is equation of value?
(c) Explain expected present value.
(d) What do you mean by accumulated value of an annuity?
(e) Differentiate between compound interest and simple interest.
(f) Explain mortality rate.
(g) What are the meanings of these notations $_{m|n}q_x$, $_xq_0$, $_nq_x$, $\overset{o}{e}_x$, e_x.
(h) Distinguish between real interest and nominal interest rate.

Q2 Suppose that the probability of death (within age x) of a person aged zerois given by

$$F_0(x) = 1 - \left(1 - \frac{x}{110}\right)^{\frac{1}{5}} \quad \text{for } 0 \le x \le 110$$

Calculate the probability that
(a) A newborn baby survives age 30.
(b) A life aged 30 dies before age 50.
(c) A life aged 40 survives beyond age 65.
(d) What is the limiting age? Why?

OR

Q3 What do you mean by two-state model? How can it be used to calculate various probabilities?   **(12.5)**

Q4 Fill all the entries if the interest rate is 5% p.a.   **(12.5)**

Year	Premium received	Interest amount	Insurance claim	Actual reserves
0	12,25,540	?	?	?
1	?	?	35,690	?
2	?	?	75,000	?
3	?	?	60,000	?
4	?	?	89,880	?
5	?	?	104,525	?

OR

Q5. Ms. Anushka takes loan of ₹ 50,000 for purchasing a television set. The loan is to be repaid in 5 annual instalments where interest rate is 1 per cent per month. You are required to calculate the instalment amount and prepare loan amortization table.   **(12.5)**

Q6 Explain the present value of an ordinary annuity?   **(12.5)**

OR

Q7 What is a life-table? Explain its components.   **(12.5)**
P.T.O.

Q8 How will you perform the single projection of deaths, insurance claims and actual reserves?   **(12.5)**

OR

Q9 A person deposits ₹ 30 in a bank account on the last day of each month. The annual interest rate is 9% compounded monthly, and the interest is paid into the account on the last day of each month. Find the account balance after the 140th deposit.   **(12.5)**

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