

PSG COLLEGE OF ARTS & SCIENCE  
(AUTONOMOUS)

BCom DEGREE EXAMINATION DECEMBER 2023  
(Fifth Semester)

Branch – COMMERCE (BUSINESS ANALYTICS)

ACTUARIAL STATISTICS

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(5 x 1 = 5)

- 1 The amount at the end of  $n$  years is \_\_\_\_\_.  
(i)  $(1 + i)^n$       (ii)  $(1 - i)^n$       (iii)  $(1 + i)^{n-1}$       (iv)  $(1 + i)^{-n}$
- 2 The annuity of which the payments are to continue forever is called \_\_\_\_\_.  
(i) assurance      (ii) perpetuity      (iii) insurance      (iv) annuity
- 3 The probability that a person aged  $x$  dies within the next  $m$  years is \_\_\_\_\_.  
(i)  $q_x$       (ii)  $P_m$       (iii)  $d_x e$       (iv)  $m q_x$
- 4 The benefit is payable only at the end of the selected period is \_\_\_\_\_ endowment assurance.  
(i) life      (ii) temporary      (iii) term      (iv) pure
- 5 \_\_\_\_\_ life annuities are a serve of periodical payments to a person as long as he is die.  
(i) endowment      (ii) life      (iii) pure      (iv) deferred

SECTION – B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks

(5 x 3 = 15)

- 6 a) The amount with compound interest of a certain principal at 5% p.a is Rs 3969. Find that principal when the period is 2 years.  
(OR)  
b) Find the value of  $V^{62}$  @ 4%.
- 7 a) Evaluate  $(1 + i)^5 a_8$  @ 7%  
(OR)  
b) Derive the accumulated value of an annuity due of 1 p. a for a term of  $n$  years, certain at the end of  $n$  years.
- 8 a) Establish algebraically the relationship  ${}_{n-1}P_{x+1} - {}_n P_x = q_x \times {}_{n-1}P_{x+1}$   
(OR)  
b) Of two people A aged (35) and B aged (42), find the probability that one of the two survives 10 years while the other dies within that period.

Cont...

- 9 a) Explain Pure Endowment Assurance  
(OR)  
b) Explain Endowment Assurance.
- 10 a) Briefly explain temporary immediate life annuity.  
(OR)  
b) On the basis of LIC (1970-73) table and 6% interest. Calculate net annual premium for an Endowment Assurance for Rs.10000/-on the life of (30) for term of 30 years. Death benefit is payable immediately on death.

**SECTION – C (30 Marks)****Answer ALL Questions****ALL Questions Carry EQUAL Marks****(5 x 6 = 30)**

- 11 a) Find the present value of Rs. 1000 due 10 years hence at a rate of discount 5% p.a.  
(OR)  
b) Construct the formula for present value.
- 12 a) Find the present value of an immediate increasing annuity of 1 p. a for 10 years @ 8%  
(OR)  
a) Derive the accumulated values of variable annuity.
- 13 a) Determine the following probabilities  
i) that a life aged 30 survives 10 years  
ii) that a life aged 30 dies within the next 10 years  
iii) that a life aged 30 dies after 10 years  
(OR)  
a) Find the probability that the survivor of (x) and (y) will die in the  $(t + 1)^{th}$  year.
- 14 a) Explain life insurance premiums and its types.  
(OR)  
b) Explain Temporary Assurance.
- 15 a) On the basis of LIC (1970-73) Table and 6% interest. Calculate the Net annual premium payable throughout life for a Whole Life Insurance of Rs.15,000/- on the life of (45) where the death benefit is payable immediately on death.  
(OR)  
b) Explain variable life annuity.

Z-Z-Z

END