



**Avinashilingam Institute for Home Science and Higher Education for Women**

Deemed to be University Estd. u/s 3 of UGC Act 1956, Category 'A' by MHRD (now MoE)

Re-accredited with 'A++' Grade by NAAC. CGPA 3.65/4, Category I by UGC

Coimbatore - 641 043, Tamil Nadu, India

**Continuous Internal Assessment Test I – February 2025**

**Semester – II**

**Class: I PG**

**Time: 2 Hrs**

**Major: Mathematics**

**Max. Marks: 60**

**23MMAC11 – Mathematical Finance**

**Course Outcomes:**

- CO1: Understand financial markets and derivatives including options and futures
- CO2: Know about the concept of bonds and derivatives
- CO3: Appreciate pricing and hedging of options, interest rate swaps and no-arbitrage pricing concepts
- CO4: Learn stochastic analysis and the Black–Scholes model
- CO5: Study and use Hedging parameters, trading strategies and currency swaps

**PART-A**

**6 x 1 = 6**

**Choose the correct answer**

1. Under a simple interest rule, money invested for a period different from one year accumulates interest proportional to the ----- of the investment. CO1K2  
a. Total principal      b. total time      c. rate of interest      d. total interest
2. In which of the following methods of capital budgeting, cash flows are reinvested at the cost of capital? CO1K1  
a. Internal Rate of Return      b. Net Present Value  
c. Payback period      d. Accounting Rate of Return
3. Any periodical payment of a fixed amount made at a regular interval : CO2K1  
a. Instalment      b. Annuity      c. Fee      d. Deferred Annuity
4. Given the time to maturity, the duration of a zero-coupon bond is higher when the discount rate is CO2K2  
a. Higher      b. Lower      c. Equal to the risk free rate  
d. The bond's duration is independent of the discount rate
5. A series of forward rates can be inferred from ----- curves. CO3K4  
a. spot rate      b. PV      c. Yield      d. Immunization
6. When a new expiration date is introduced, the -----strike prices closest to the current stock price are usually selected by the exchange. CO3K2  
a. 3 or 4      b. 1 or 2      c. 2 or 3      d. first

**PART – B**

**3 x 6 = 18**

**Answer all the Questions**

7. a. A debt of \$25,000 is to be amortized over 7 years at 7% interest. What value of monthly payment will achieve this? CO1K3  
(or)
7. b. Define current yield and give an example. CO1K4

8. a. State and prove invariance theorem. CO2K2  
(or)
8. b. Define spot rate under three various possibilities and forward rate. CO2K1
9. a. Define Annual worth and give an example. CO2K2  
(or)
9. b. Consider a call option to buy 100 shares of a company for Rs.30 per share. Suppose the company makes a 2-for-1 stock split. Suggest the holder for purchase of shares, like number of shares and price per share. CO3K3

**PART – C**

**3 x 12 = 36**

**Answer all the questions**

10. a. Discuss in detail the qualitative properties of duration with suitable examples. CO1K4  
(or)
10. b. (i) Find the corresponding effective rates for: 3% compounded monthly  
18% compounded monthly  
18% compounded quarterly
- (ii) A major lottery advertises that it pays the winner \$10 million. However, this prize money is paid at the rate of \$500,000 each year (with the first payment being immediate) for a total of 20 payments. What is the present value of this prize at 10% interest? CO1K4
11. a. Define duration of a fixed income security. Show that  $\Delta P = - D_M P \Delta \lambda$  where P is the price of security,  $\lambda$  its yield and  $D_M$  the modified duration. CO2K2  
(or)
11. b. Explain the role of a hedge fund manager. Also give examples used for hedge funds together with the trading strategies followed. CO2K3
12. a. Explain in brief the difference between the hedging, speculation, and arbitrage. CO2K4  
(or)
12. b. Discuss the types of options in detail and explain the factors affecting option prices with suitable illustrations. CO3K5

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