



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2018/2019

FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE

(REAL ESTATE MANAGEMENT)

BRE 103: INTRODUCTION TO REAL ESTATE MATHEMATICS

DATE: Monday 17th December 2018

TIME: 2.00 p.m. – 4.00 p.m.

INSTRUCTIONS:

ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)

- (a) The first term of a geometric progression is 3, the fourth term is 24. Find the 10th term and the sum of the first 10 terms. (10 marks)
- (b) Find the sum of the numbers between 2 and 1000 inclusive. (3 marks)
- (c) Jane buys a computer worth 1600 pounds. She makes a down payment of 100 pounds and agrees to repay the rest in 5 equal installments per month. Determine how long she will pay per month. (4 marks)
- (d) A shopkeeper sells an item at ksh 3500 thereby making a profit of 25%. Determine the buying price of this item. (5 marks)
- (e) An investor deposits \$10,000. Ten years later it is worth \$17,910. Determine the rate of return did the investor earn on the investment. (5 marks)
- (f) Determine the value of \$1,000 in one year if compounded at 12% continuously. (3 marks)
- (g) Determine the present value of a 4-year annuity, if the annual interest is 5%, and the annual payment is \$1,000. (6 marks)

QUESTION TWO (30 MARKS)

- (a) Define the following terms as used in real estate statistics.
 - (i) Mortgage (1 mark)
 - (ii) Redemption (1 mark)
 - (iii) Annuity (1 mark)
 - (iv) Property tax (1 mark)

INVOLVEMENT IN ANY EXAMINATION IRREGULARITY SHALL LEAD TO DISCONTINUATION

- (b) Differentiate between annuity certain and annuity contingent. (2 marks)
- (c) Briefly discuss any three (3) discounting cash flow methods and state their decision criteria. (6 marks)
- (d) Determine the future value of a 4-year annuity, if the annual interest is 5%, and the annual payment is \$1,000? (4 marks)
- (e) You borrow \$60,000 and repay in 8 equal annual installments of \$12,935 with the first payment made exactly 1 year later.
 - (i) Find the rate of interest you would be paying on your loan. (2 marks)
 - (ii) Compare the payments of the annuity due, above, with those of the ordinary annuity earlier. (2 marks)

QUESTION THREE (20 MARKS)

- (a) Find the value of \$10,000 in 10 years if the investment earns 5% per year. (3 marks)
- (b) Find the value of \$20,000 in 10 years if the investment earns 8% for four years and then earns 4% for the remaining six years. (3 marks)
- (c) Ole Naya bought a cow for Ksh. 5000, after two years, he sold the cow for Ksh. 8,600.
 - (i) Compute the annual rate of appreciation in the value of the cow. (3 marks)
 - (ii) Determine what would the value of the cow be after 5 years if the rate of appreciation is a constant during the first five years. (3 marks)
- (d) Onyango takes a job that offers a monthly starting salary of Ksh 4000 and guarantees him a monthly raise of Ksh. 45 during his first year of training.
 - (i) Find his monthly salary at the end of his training period. (2 marks)
 - (ii) Determine his total amount paid to him after his training period. (2 marks)
- (e) The ratio between the 5th and 2nd terms of a G.P is $\frac{27}{8}$. If the 3rd term is 4.5, find the 4th term. (4 marks)

QUESTION FOUR (20 MARKS)

- (a) The cash price of a fridge is Ksh 30,000. The fridge may be bought by making a down payment of Ksh 5,000 followed by 24 equal monthly installments of Ksh 1,200 each.
 - (i) Calculate the carrying charge. (2 marks)
 - (ii) By selling it at Ksh 30,000 the retailer made a profit margin of 10%. Determine the profit make up if the fridge was sold by hire purchase (to 2 dp). (2 marks)

- (b) A man buys a used bicycle for Ksh. 600 and agree to pay Ksh 100 down payment and Ksh 100 per month plus 6% per annum on the outstanding indebttness until the bicycle is paid for fully. Determine how much will the bicycle cost. (5 marks)
- (c) The 4th term and the sum of the first 5 terms of an AP are 14 and 55 respectively. Find the sum of the first 100 terms. (4 marks)
- (d) The compound interest on Rs. 30,000 at 7% per annum is Rs. 4347. Find the period (in years) of this investment. (3 marks)
- (e) 2 merchants sell, each an article for Ksh 1000. If Merchant A computes his profit on cost price, while Merchant B computes his profit on selling price, they end up making profits of 25%. Determine by how much is the profit made by Merchant B greater than that of Merchant A. (4 marks)

QUESTION FIVE (20 MARKS)

- (a) The value of a plot appreciates at the rate of 8% of its value at the beginning of each quarter of a year. If it's valued at 5 million now, calculate its expected value in 5 years' time. (4 marks)
- (b) Determine the number of terms of the arithmetic sequence -3, 2, 7 ... which must be added together for the sum of the series to be 116. (4 marks)
- (c) The value of a food processing machine depreciates at the rate of 1% per month of its value at the beginning of each month. The machine was valued at ksh 1,200,000 three years ago. Determine the value of the food processing machine now to the nearest 5 cents. (6 marks)
- (d) There is 60% increase in an amount in 6 years at simple interest. Calculate compound interest of Ksh 12,000 after 3 years at the same rate. (6 marks)