CHUKA UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF PROCUREMENT & LOGISTICS MANAGEMENT AND BACHELOR OF COOPERATIVE MANAGEMENT AND AGRIBUSINESS MANAGEMENT

BPLM 102: BUSINESS MATHEMATICS

STREAMS: AGBM,BCOP,BENS,Y1S1   **TIME: 2HOURS**

DAY/DATE: MONDAY 4/12/2017   **8.30 A.M – 10.30 A.M**

INSTRUCTIONS:

- **Answer question one and any other two questions**

1.   (a) Explain the following terms as used in sets and sets theory and give an example for each.

   (i) Union of sets   [2marks]

   (ii) Universal set   [2arks]

   (iii) Venn diagram   [2marks]

   (iv) Intersection of a set   [2marks]

   (v) Disjoint set   [2marks]

   (b) Explain the importance of mathematical techniques in business management.
                                                                                             [2marks]

   (c) Solve the following pairs of simultaneous equation

      $4x + 3y = 7$

      $3x - 2y = 9$ [4marks]

(d) Ksh P is invested for n years at a rate compounded annually. The future value that occrues is given by A = $P(1+\frac{R}{100})^n$ and interest earned I =A-P. Find the amount (A) and interest (I) for the given P,n,R.

(i) Ksh 2400 for 2½ years at 6%. [3marks]

(ii) Ksh 1800 for 3½ years at 20% . [3marks]

(e) A manufacturer sells a product for ksh 10 per unit. The manufacturer's fixed cost is ksh 1200 per month and the variable cost is ksh 2.50 per unit. How many units must the manufacturer produce each month to break even? Also calculate the profit maximizing output. [5marks]

(f) In a recent survey of 500 students in a college,200 were listed as studying Bcom and 150 were listed as studying Bcop; 85 were registered for both courses. Find the number of students in the college who were not registered for either course. Use a venn diagram. [3marks]

2. (a) Explain the following terms as used in probability . Give examples .

(i) Sample point [2marks]

(ii) Events [2marks]

(iii) Mutually exclusive events. [2marks]

(Iv) Exhaustive events. [2marks]

(b) A bag contains 5 red balls, 4 blue balls and 3 white balls. Two balls are drawn one after the other without replacement. Draw a tree diagram representing the experiment and find.

(i) Probability (drawing a blue ball and white ball) [2marks]

(ii) Probability (second ball is red) [2marks]

(c) Determine the composition of the given sets given that;

P = { 2,4,6,8,10}

R = {1,3,5,6,9}

Q = {2,4,6,7}

(i)P∩Q [2marks]

(ii) ∩(R U P) [2marks]

(d) A firm produces energy saving balls and sell them at ksh 2500 each. The fixed production cost is ksh 400,000 plus ksh 500 for each bulb produced and sold. Take P as the number of bulbs produced and sold and assume that the total cost revenue functions are linear.

Required :

(i) Write down the profit function [2marks]

(ii) Determine the level of output at which there will be neither profit nor loss. [2marks]

3. (a) Solve for X: $log_x (8x - 3) \, log_x 4 = 2$. [3marks]

(b) A public transportation company has been experimenting on a possibility of developing a system of charging fares. The demand function which expresses ridership as a function of fare charged is given below.

Q = 10,000 -125P where Q equals the average number of riders per hour and P equals the fare in shillings.

(i) Determine the fare which should be charged in order to maximize hourly bus fare revenue. [3marks]

(ii) What the expected maximum revenue. [2marks]

(c) A manufacturing process for computer chips is such that 5 out 100 clips are defective. If 10 chips are chosen of random from a box containing 100 newly manufactured chips, what is the probability that:

(i) None of the chips will be defective. [2marks]

(ii) 8 will be good and 2 defective. [2marks]

(d) Suppose the profit functions of a product is linear and marginal profit is ksh 5. If the profit is ksh 400 when 250 units are sold, write the equation for the profit function. [4marks]

4. (a) Explain two areas where calculus can be applied in business. [2marks]

(b) A certain microfinance bank in Chuka town provides low cost retail lending services. A client wishes to borrow a loan at the prevailing interest rate of 9% p.a. The loan is to be repaid in equal installments of ksh 1,285.40. Determine ;

(i) The amount of loan a client can borrow now to the nearest whole number. [3marks]

(ii) Prepare an amortization schedule for the loan.   [5marks]

(c) A problem in statistics is given to three students A,B and C whose chances of solving it independently are ½,⅓ and ¼ respectively. Find the probability that :

(i) The problem is solved.   [2marks]

(ii) At least two of them are able to solve the problem.   [3marks]

(iii)Exactly two of them are able to solve the problem.   [3marks]

(iv)Exactly one of them is able to solve the problem.   [2marks]