TECHNICAL UNIVERSITY OF MOMBASA

SCHOOL OF BUSINESS STUDIES

DEPARTMENT OF FINANCE AND ACCOUNTING

BACHELOR OF COMMERCE

   (Y1S2)

UNIT NAME: BMS 4101

SUBJECT: MANAGEMENT MATHEMATICS I

INSTRUCTIONS

-This paper consists of section A and B

-Section A is compulsory and any TWO questions in section B.

-Mobile phones are not allowed in the examination room.

-Cheating leads to disqualification.

QUESTION ONE

a). The 7th term of a series is 29 and the 11th term is 54. Determine the 20th term.

[4 Marks]

b) Sum of the first 9 terms of the geometric progression 1, 4, 16, 64, 256………………

[3 Marks]

c) Explain the importance of sets

[4 Marks]

i) With the aid of Venn diagrams, define the following set operations

(i)AUB

(ii) AnB

iii) A'

[3 Marks]

d) The cost of making 8 tables and 5 chairs is 2,800. The cost of making 3 tables and 7 chairs is 1460.

i)Write the expression in form of a simultaneous equation   (2marks)

ii) What is the cost of making a table and a chair   (2marks)

e) Hassan gets employed and the employment agreement provides for a regular annual increase of Kshs.6,200. If the salary in the first year is Kshs. 80,000, what is the salary in the 8th year. (4marks).

f) Solve the following quadratic function

i) $6x^2 + 7x - 5 = 0$

[2 Marks]

ii) A survey of 120 local farmers it was found that 50 read New Forest Magazine (N), 52 read the farmer (T) and 52 read farming weekly (F). Additionally, 18 read both N and F, 22 read N and T, 16 read none of the three magazines.

Required:i) Determine the number of farmers who read all the three magazines.   [2 Marks]

ii) Determine the number of farmers who read precisely one magazine.

[2 Marks]

iii) Draw a suitable Venn diagram to represent the above information   [2 Marks]

Q. 2. a) Calculate the rate or interest when Kshs. 30,000 investment now provides a perpetual annuity of Kshs. 1,500 p.a.   [2 Marks]

b) Determine Linear function which has slope b = -4 and goes through points (3, 24)

[3Marks]

c) What is the present value of a perpetual annuity of Kshs. 500 p.a at 12%   [3 Marks]

d) Omondi takes a child to standard one. Fees in the first year is shs 18,000 with an annual fees increase Kshs. 4,200. Calculate how much fees the father will have paid in eight years.

[4 Marks]

e) Determine the sum of the first 9 terms of the geometric progression 1, 4, 16, 256

f) Importance of management mathematics

[4 Marks]

3. a) A principal of Kshs. 60,000 is invested at 12% for four years. Determine the future value if interest is compounded

i) Annually   (3marks)

ii) Semi-annually   (3marks)

iii) Quarterly period   (3marks)

b) Solve the following equation

$Log(x-1)+ Logx +8 = 2Log(x+2)$ [4 Marks]

c) Solve the following equation by completing the square

$2x^2 + 4x + 1 = 0$ [3 Marks]

(d) Solve $3x + 5(x+1) \leq 4x - 1$ [4   Marks]

Q.4.(a) The sum of twice a number and 5 is equal to the difference between the number and three. Find the number   [3 Marks]

b) Two planes which are 2,400 Kilometres a part, Fly toward each other. Their speeds differ by 60 Kilometres per hour. They pass each other after five hours find their speeds.

[5 Marks]

c) A firm sells a single product for $65 per unit. Variable costs are $ 20 for materials and $ 27.50 for labour. Annual fixed costs are $100,000.

Required:

i) Construct the profit function stated in terms of x, the number of units produced and sold.

ii) Determine the profit earned if annual sales are 20,000 units.

ii) To determine profit is annual sales are 20,000 units during the year [2 Marks]

d) Find the sum of the first 12 terms of the series 5, 9, 13, 17

[3 Marks]

e) The first term of a geometric progression is 4 and the 6th term is 126. Determine the 12th term

[3 Marks]

Q. 5. (a) What is the straight line which has slope b = -2 and goes through (x, y) = 16, 20

[3 Marks]

(b) Calculate the rate of interest when Kshs. 30,000 investment now provides a perpetual annuity of Kshs. 2,000 p.a. [2 Marks]

(c) Calculate the linear function which goes through the following points

(x, y) = (2, 6) (x, y) = (5, 24) [3 Marks]

(d) A gas station sells unleaded regular gasoline and unleaded premium. The price per galions charged by the station is $1.299 for unleaded regular and $1.379 for unleaded premium. The cost per gallon from the supplier is $1.219 for unleaded regular and $1.289 for premium. if x equals the number of gallons sold of regular and x^2 the number of gallons sold of premium.

i) Calculate the revenue function from selling x_1 and x_2 gallons respectively of the two grades of gasoline.

[2 Marks]

(ii) Determine the cost function
[2 Marks]

(iii) Determine the profit function
[2 Marks]

c) Abdalla decides to deposit Kshs. 12,000 at the end of each year in a bank account which pays interest at the rate of 8% per annum. What will be his total accumulation at the end of 15 years, the annuity is immediate

e) In a geometric progression, the 6th term is 8 times the 3rd. Calculate the common ratio

[3 Marks]