**MAASAI MARA UNIVERSITY**

**HIGHLANDS STATE COLLEGE**

**APRIL 2017 DRAFT EXAMINATIONS**

**SCHOOL OF ARTS AND SOCIAL SCIENCES**

**BACHELOR OF ARTS**

**YEAR 1 SEMESTER 1**

**UNIT CODE: BBM 108**

**UNIT TITLE: BUSINESS MATHEMATICS 11**

***INSTRUCTION TO CANDIDATES***

***Answer Question ONE (compulsory) and any other TWO***

***Question one carries 25marks***

***All other questions carry 15 marks each***

**QUESTION ONE**

1. Find the limit of the function y = x + 2 as x 0
2. What is the limit of y = 3 + (½)x as x increases without limit?
3. A firm’s demand function is given as P = 24 – 3x Where P = price and x quantity produced and sold. Determine the output for maximum revenue and show it is a maximum. What is the price at maximum revenue?

b) In a given exam the scores for 10 students were as follows

|  |  |
| --- | --- |
| Student | Mark (x) |
| A | 60 |
| B | 45 |
| C | 75 |
| D | 70 |
| E | 65 |
| F | 40 |
| G | 69 |
| H | 64 |
| I | 50 |
| J | 80 |
| **Total** | **618** |

Required

Determine the absolute mean deviation **(6marks)**

1. The demand function of a certain commodity in quadratic and passes through the points (p, q) = (5,1600); (10,900); (20,100);

Determine the function in form;

Q = a + b1p + b2p2, thus determine the demand function **(7mks)**

1. The following data was obtained from a given financial institution. The data refers to the loans given out in 1996 to several firms

|  |  |
| --- | --- |
| Firms (f) | Amount of loan per firm (x) |
| 3 | 20000 |
| 4 | 60000 |
| 1 | 15000 |
| 5 | 12000 |
| 6 | 14000 |
| Σf = 19 |  |

Required

Calculate the mean deviation for the amount of items given

**QUESTION TWO**

In a social survey in which the main purpose was to establish the intelligence quotient (IQ) of resident in a given area, the following results were obtained as tabulated below:

|  |  |  |  |
| --- | --- | --- | --- |
| IQ | No. of residents | Upper class bound | CF |
| 1 – 20 | 6 | 20 | 6 |
| 21 – 40 | 18 | 40 | 24 |
| 41 – 60 | 32 fo | 60 | 56 |
| 61 – 80 | 48 f1 | 80 | 104 |
| 81 – 100 | 27 f2 | 100 | 131 |
| 101 – 120 | 13 | 120 | 144 |
| 121 – 140 | 2 | 140 | 146 |

Required

1. Calculate the modal value of the IQ’s tabulated above using
2. The graphical method and
3. Formula
4. Calculate the median value of the IQ’s tabulated above using
5. The graphical method and
6. Formula (20marks)

Question 3

1. Plot a graph of the function y =x2  (3mks)
2. A salesman’s daily wages is composed of a fixed amount and a variable component, which is dependent on the number office cream units sold. He finds that when he sells 10 units on a given day, he earns Sh 600 whereas when he doubles his sales his earnings increase by only Sh 100.

Determine:

i) Fixed daily earnings;

ii) Level of commission per unit sold and hence;

iii) What are the salesman’s earnings if he sells 30 units?

iv) On a given day the salesman is determined to earn Sh 3500. Suppose on the previous day he had guaranteed orders of 20 units, how many more must he sell in order to achieve his target earnings? (10mks)

c. A product has selling price as sh. 200 whereas unit variable cost is sh. 140. The annual fixed cost is sh. 720,000. You are required to determine the following (B.E.P.)

(i) Breakeven sales units

(ii) Profit to be made if 20000 units are sold

(iii) Sales required for a profit of Sh. 2,000,000 **(7mks)**

Question 4

A firm sells a product whose data in two periods is as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| **Period** | **Sales (Shs)** | **Variable cost (Shs)** | **Profit (Shs)** |
| I | 100000 | 60000 | 20000 |
| II | 150000 | 90000 | 40000 |

Assume the price, unit variable cost, and fixed costs are the same in the two periods.

**Required:**

a) Determine the fixed cost

b) Determine the breakeven sales revenue

c) What is the profit when sales are sh. 600000

d) What are the sales required for a profit of sh.110000

e) Determine the profit if variable cost incurred is Sh 300000 (20mks)

Question 5

1. A firm’s demand function is given as P = 24 – 3x

Where P = price and x quantity produced and sold.

Determine the output for maximum revenue and show it is a maximum. What is the price at maximum revenue? (8mks)

1. A car selling firm has determined through regression analysis that its sales (S) are a function of the amount of advertising (measured in units) in two different media. This is given by the following relationship:

S(x,y) = 200x + 100y – 10x2 – 20y2 + 20xy

where x = newspapers, and

y = magazines

Determine the firm’s optimal level of sales. (12mks)