



KABARAK

UNIVERSITY

UNIVERSITY EXAMINATIONS

2008/2009 ACADEMIC YEAR

FOR THE DEGREE OF BACHELOR OF COMMERCE

COURSE CODE: FNCE 120

COURSE TITLE: MANAGEMENT MATHEMATICS I

STREAM: Y1S2

DAY: THURSDAY

TIME: 2.00 – 4.00 P.M

DATE: 7/8/2008

INSTRUCTIONS:

1. Answer Question **One** and any **other two** of the three questions
2. All workings leading to answers must be clearly shown

PLEASE TURN OVER

QUESTION ONE: (Compulsory) (40 marks)

- (a) Determine the linear function which passes through (2, 5) and (5, 17). **(3mks)**
- (b) Highlight the five assumptions of break-Even analysis. **(5mks)**
- (c) A survey was conducted on Newspaper readership of three local dailies in Nairobi. The following data was obtained; the number of people who read metro, nation and Times was 55, 45 and 40 respectively. Those who read metro and times were 19. Those who read Nation and metro were 15, while those who read times and nation 14. Those who read all the dailies were found to be only 4. Determine the number of people who:
- (i) Read Metro only. **(2mks)**
- (ii) Total number of people interviewed in the survey, if 5 people read none of the three papers. **(8mks)**
- (d) A factory manufactures two types of heavy duty machines in quantities x and y . The joint cost function is given by: $C = X^2 + 2y^2 - xy$. How many machines of each type should be produced if they have to be a total of 8 and what is the associated minimum cost? **(6mks)**
- (e) The sets A, B and C are in a Universal set U which consists of the whole numbers 0-9 are given as $A = \{0, 1, 2\}$; $B = \{1, 2, 3, 4\}$ and $C = \{0, 3, 4, 5\}$. With the aid of a venn diagram, find the members of $B \cap C$, $A \cup C$, $A \cap B \cap C$ and A' . **(8mks)**
- (f) Given the exponent decline in value as $V_t = V_0 e^{-rt}$. A company purchases an equipment in January 2004 at Kshs.50,000 and expected to depreciate exponentially at 10% per year.
- (i) What will be the expected value of the equipment at the end of 2008 and 2012? **(4mks)**
- (ii) The company has a policy to dispose their equipment after 10 years. What will be the disposal value of this equipment? **(4mks)**

QUESTION TWO

- (a) The revenue function of a product is given as $R = 28 - q^2$ and the unit variable cost $V = q - 8$ while the fixed cost is Kshs.60. Determine the total cost function, profit function, the output and price for maximum profit. **(8mks)**

- (b) The supply function of a commodity is quadratic and passes through the following points;

P	30	40	50
Q	500	3600	6300

- Determine the supply function as being the function of price. **(4mks)**
- (c) Solve the following simultaneous equations: $3x + 4y = 12$; and $6x - 7y = 16$. **(3mks)**

QUESTION THREE

- (a) Given the demand function; $D = f(p) = 360 - 45p$; where D is the demand and p is the price. Determine the quadratic revenue function and the price to be charged to maximize total revenue. **(5mks)**
- (b) A group of engineers are interested in forming a company to manufacture smoke detectors. They have developed a design and estimated the revenue cost per a smoke detective. The variable cost per unit including material, labour and marketing costs are Ksh.22. The fixed cost associated with the information, management and operations of the company, including purchase of machinery and equipment totals to Kshs.250,000. The estimate selling price per a detector is Kshs.30.
- (i) Determine the number of smoke detectors which must be sold in order for the company to break even. **(4mks)**
- (ii) Preliminary report indicates that the firm can expect to sell approximately 30,000 units of the smoke detectors over the life of the project. If the detectors are sold for Kshs.30 per unit, determine the expected profit at this level of output. **(6mks)**

QUESTION FOUR

- (a) Moplax Ltd sells two products (x and y) which cost Kshs.20 and Kshs.25 respectively. The profit function is considered to be $\Pi = 60x + 120y - x^2 - 2y^2$. Determine the value of x and y which will maximize profit. **(5mks)**
- (b) A sales lady monthly earnings comprise of a fixed and a variable component which is dependent on the number of handkerchiefs sold. She finds that when she sell 300 pieces on a given month, she earns Kshs.60,000, whereas when she double her sales, her salary increases by Kshs.10,000. Determine the monthly fixed earnings; and what will be her earnings if she sells 200 pieces. **(10mks)**