

Attempt question **ONE** and **any Two**

QUESTION ONE

(a) Distinguish between:

- (i) Integral Calculus and differential Calculus. (2 mks)
- (ii) Range and Domain of a function. (2mks)
- (iii) Mutually exclusive and collectively exhaustive events (2)
- (iv) Ordinary annuity and annuity due (2)

(b) Determine the local and global optima and their nature for the following function

$$F(x) = 1/3x^3 - 4x^2 + 12x + 2 \quad 0 \leq x \leq 10 \quad (12\text{mks})$$

(c) A company has issued a five- year loan of sh.900, 000 to a new CEO to finance a home improvement project. The terms of the loan are that it is to be paid in full at the end of 5 years with simple interest computed at the rate of 8% per annum. Determine the interest which must be paid on loan for the period and the final amount. (10mks)

QUESTION TWO

The demand for the product of a firm varies with the price that the firm charges for the product. The firm estimates that annual total revenue (R) stated in (KSH.1, 000) is a function of price P in (ksh.). Specifically,
 $R=f(p) = -50p^2 + 500p$

- (a) Determine the price which should be charged in order to maximize total revenue.
- (b) What is the maximum value of annual total revenue? (20mks)

QUESTION THREE

A research in Nairobi has randomly interviewed individuals in the city centre .The following are the data he collected: 40 of those interviewed are Christians; 25 Kenyans; 10 were Kenyan Christians; 35 were neither Kenyan nor Christians .Using Venn diagram, find the following:

- i) The number of Christians non-Kenyans.
- ii) The number of Kenyan non-Christians.
- iii) The total number of individuals interviewed. (20mks)

QUESTION FOUR

In an investment project, a ksh.1, 000,000 (1m) investment results in no cash flow during the first year.

However, at the end of each of the following 5 years the investment generates a stream of positive net returns as follows: ksh.350, 000; ksh.400, 000; ksh450, 000; ksh.275, 000;ksh.100,000;for end of year 2,3,4,5,6 respectively. Suppose that the minimum desired return on investment is 12 percent.

Calculate the Net Present Value (NPV) of the Cash flows and comment on the viability of the project.

(20mks)

QUESTION FIVE

A company has estimated that when the principal product is sold at a price of sh.400,800 units are sold .While at the price of ksh.370,900 units are sold ;The variable cost per unit sh.225,while the fixed cost is sh.7,500.

- i) Advise the company on which price to charge
- ii) Determine the Break Even Point at the two price levels.