



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2016/2017

FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF ARTS
(PUBLIC POLICY AND ADMINISTRATION)

APP 102: QUANTITATIVE METHODS FOR PUBLIC POLICY

DATE: Monday, 21st November 2016

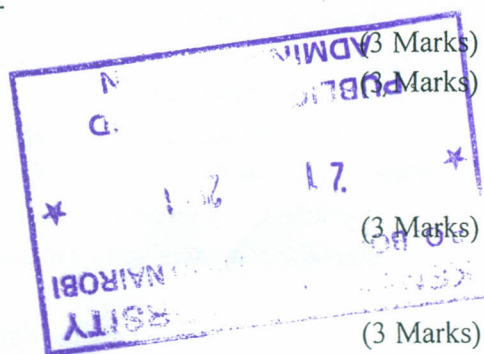
TIME: 8.00 a.m. - 10.00 a.m.

INSTRUCTIONS:

Answer Question ONE and any other TWO Questions

QUESTION ONE: (30 Marks)

- a) Distinguish between dependent variable and independent variable (4 Marks)
- b) Find a number such that 6 more than one half of the number is two thirds the number. (4 Marks)
- c) Mwangi, a stock dealer has Sh. 20,000 to invest. If he invests part of it at 8% and the rest at 12%, how much should be invested at each rate to yield 11% on the total amount invested? (5 Marks)
- d) Chia Afa manufactures and sells specialty watches. The financial research department using statistical and analytical methods determined that at a price of Sh. 880 each, the demand would be 2,000 watches and at Sh. 380 each, 12,000 watches. Assuming a linear relationship between price and demand, determine what the price would be at a demand of :-
- Ten thousand watches
 - Three thousand watches
- (a) Evaluate:
- $$\frac{\log 125 - \log 25}{\log 25 + \log 5}$$
 - $$\frac{\log 16 + \log 256}{\log (1/16) - \log (1/64)}$$
- e) A factory produces x calculators per day. The total daily cost in shillings incurred is $5x^2 - 800x + 500$. if the calculators are sold for Sh. $(100 - 10x)$ each, find the number of calculators that would maximize the daily profit. (5 Marks)



QUESTION TWO: (20 Marks)

- a. The cost accountant of a firm producing colour television has worked out the total cost function for the firm as $TC = 120Q - Q^2 + 0.02Q^3$. A sales manager has provided the sales forecasting function as $P = 114 - 0.25Q$ where P is price and Q the quantity sold. Required: -
- Find the level of production that will yield minimum average cost per unit and determine whether this level of output maximizes profit for the firm.
 - Determine the price that will maximize profit for the firm.
 - Determine the maximum revenue for this firm (15 Marks)
- b. Find the value of x in these expressions $2x^2 - 5x + 3 = 0$ and $x^2 - 9x + 14 = 0$ (5 Marks)

QUESTION THREE: (20 Marks)

- a. A company sells two products. Total revenue from the two products is estimated to be a function of the numbers of units sold of the two products. Specifically, the function is $R = 30000x + 15000y - 10x^2 - 10y^2 - 10xy$ where R equals total revenue and x and y equal the number of units sold of the two products. Determine the number of each product that should be produced in order to maximize total revenue and hence the maximum revenue. (15 Marks)
- b. A building cost Sh. 500,000 and it is decided to depreciate it at 10% p.a. on the reducing balance method. What will be its written down value be after 25 years? (5 Marks)

QUESTION FOUR: (20 Marks)

- a) Of the 200 students enrolled in a Bomet University Campus
- 89 students take Economics
 - 57 students take Law
 - 47 students take statistics
 - 11 students take both Economics and Law but not statistics
 - 3 students take all the three subjects
 - 5 students take Economics and Statistics but not Law
 - 8 students take Statistics and Law but not Economics

Required: -

Using a Venn diagram and appropriate analysis, determine the number of students who take: -

- Economics only
- Law only
- At least two subjects
- None of the three subjects (12 Marks)

- a) Find the critical values of $Y = \frac{1}{3}x^3 - \frac{5}{2}x^2 + 6x + 23$ and determine whether the function attains the maximum or minimum value at such points (5 marks)
- b) Integrate $\int 3r^2 - 5r$ (3 Marks)

QUESTION FIVE: (20 Marks)

- a. A sample of 200 voters revealed the following information about the three candidates A, B and C who are running for Chairman, secretary and treasurer respectively. 28 were in favour of both A and B. 98 in favour of A or B but not C. 42 in favour of B but not C or A. 122 in favour of B or C but not A. 64 in favour of C but not A or B. 14 in favour of A and C but not B. Determine the percentage of voters who were in favour of the three candidates (15 Marks)
- b. Find an equation for the line that has a slope of $\frac{2}{3}$ and passes through (6, -2). (5 Marks)