



UNIVERSITY OF EMBU

2020/2021 ACADEMIC YEAR

TRIMESTER EXAMINATIONS

FIRST YEAR EXAMINATION FOR THE MASTER OF SCIENCE IN LAND AND WATER MANAGEMENT

ALM 603 – WATER RESOURCES DEVELOPMENT AND MANAGEMENT

DATE: AUGUST 10, 2021

TIME: 2:00-5:00PM

INSTRUCTIONS:

Answer Any FOUR Questions

QUESTION ONE (25 MARKS)

- (a) A farmer in Mwingi is planning to rear livestock and grow crops in his 100 acre farm and needs professional advice. On the basis of water requirement, explain to him how he can best utilize his farm. (10 Marks)
- (b) Examine the roles of the key stakeholders necessary for the success of the project envisaged in part (a) above. (15 Marks)

QUESTION TWO (25 MARKS)

A family of 12 persons living in Embu town is planning to put up a concrete tank to supply water for domestic use. The tank will require 50 bags of cement @ 800/- per bag, two skilled laborers @ 1500/- per MD for 15 days, 5 unskilled laborers @ 700/- per MD for 21 days, 20 sachets of water proof cement @ 500/- per sachet, 5 tons of ballast @ 2500/- per ton, 7 tons of sand @ 3000/- per ton, 100 units of water for construction and curing @ 320/- per unit, timber for frame support (200 running feet of 6'x1' @ 45 per foot and 50 running feet of 3'x2' @ 52/-per foot); 27 pieces of Y-8 @ 750/- per piece, 5 pieces of weld-mesh @ 2,700/- per piece; plumbing works @ 25,000/-; 10 tons of foundation hardcore @ 3,500/- per ton; 24 m waterproof sheet (damp lining) @ 175/- per meter, 2 security guards per day @ 2000/- per day shift and 3500/- per night shift, or night) for one month; project approvals @ 80,000/-; drainage system @ 30,000/-; access rails @ 13,000/-; bank charges @ 2300/-



ISO 27001:2013 Certified

Knowledge Transforms



ISO 9001:2015 Certified

- (a) Explain why the family will be opting to have the water tank. (10 Marks)
(b) Prepare a typical Bill of Quantities for them to realize their water requirement budget. (15 Marks)

QUESTION THREE (25 MARKS)

- (a) Evaluate the factors that affect the quality of groundwater in Kenya. (10 Marks)
(b) Explain the working of a ‘hydraulic ram’ for lifting water in rural areas. (15 Marks)

QUESTION FOUR (25 MARKS)

- (a) Explain the importance of proper design of earth dams for rural areas in Garisa County. (12 Marks)
(b) Explain the relationship between ‘catchment yield’ and ‘storage capacity’ as used in the design of small dams in Kenya. (13 Marks)

QUESTION FIVE (25 MARKS)

- (a) Policy development is pre-active when it responds to triggers that are recognized by scanning the operating environment, identifying potential issues and factors that could affect people, and predicting and preparing for mitigation and/or contingency. Discuss this statement with respect to developing of water resources in Kenya. (13 Marks)
(b) Residents of urban slums often experience flood that cause loss of life and property. The need for early warning signs can be a key mitigating factor for this natural disaster. As a water resources expert, provide a brief on how the residents can recognize drainage problems in their localities to avert flood eventualities. (12 Marks)

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