

**W1-2-60-1-6**

## JOMO KENYATTA UNIVERSITY

**OF**

**AGRICULTURE AND TECHNOLOGY**

# University Examinations 2014/2015

**SEMESTER II EXAMINATION FOR THE DEGREE OF MASTER OF SCIENCE IN CONSTRUCTION MANAGEMENT**

**ECE 3184: DESIGN OF CONSTRUCTION OPERATIONS AND SYSTEMS**

**DATE: AUGUST 2015 TIME: 3 HOURS**

**INSTRUCTIONS: ANSWER ANY FOUR QUESTIONS –**

**ALL QUESTIONS CARRY EQUAL MARKS**

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**QUESTION ONE (17.5 MARKS)**

(a) Robotics and automation in construction current status. Discuss.

(b) How does the technology of construction of the old civilizations in Egypt and Roman empire compare with the current one. Give examples.

(c) What are the main challenges in applying robotics and automation in the construction industry? Name five.

**QUESTION TWO (17.5 MARKS)**

(a) Compare the uptake in robotics between the construction industry and the automobile industry.

(b) Discuss the current developments. Give examples in construction robotics:

i) In civil infrastructure

ii) In house building

(c) Discuss the possible effects and or advantages and disadvantages of increased automation in construction.

**QUESTION THREE (17.5 MARKS)**

(a) Give a definition of linear projects in project management.

i) Where do they take their name from?

(b) What are the main advantages of the LOB?

(c) What is an LSM (Linear Scheduling Method)

**QUESTION FOUR (17.5 MARKS)**

(a) What is a “House Blanket” schedule?

i) When is it used.

(b) The construction of an elevated highway form Embakasi to Westlands is scheduled to take three years. Sketch a house blanket schedule assuming the following events:

i) Foundation construction in 7 phase as follows:

Embakasi to city Cabanas

City Cabanas to General Motors

Nyayo Stadium to Haile Selasie Roundabout

Haile Selasie Roundabout to University Way

University Way to Museum Hill

Museum Hill to Westlands

Assume this is completed on 2nd year.

ii) Assume that construction of superstructure is done in the same segments but as the construction of substructures is ongoing, the construction of the superstructure on the completed substructure can stand.

Assume this is completed on 3rd year.

**QUESTION FIVE (17.5 MARKS)**

(a) What is the queuing theory?

(b) At a borehole providing water to the community around, vehicles line up are filled with water and then live up to pay as they leave the yard. Using the queue theory principles, sketch the events taking place. Mention system, customer, server.

(c) If the average arrival rate per hour at a dentist is two people (=z) what is the probability of three people arriving per hour ? Given that

= 2.7183.