MACHAKOS UNIVERSITY

University Examination 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

SECOND YEAR SECOND SEMESTER EXAMINATION FOR

DIPLOMA IN ELECTRICAL AND ELECTRONIC ENGINEERING

EEE 217: CONTROL SYSTEMS 1

DATE: 29/4/2019 **TIME: 8.30-10.30 AM**

INSTRUCTIONS:

answer question and any other two questions

QUESTION ONE (30 MARKS)

a) Identify

i. the manipulated input

ii. dynamic variable

iii. measurable out put

iv. Explain its operation. (10 marks)

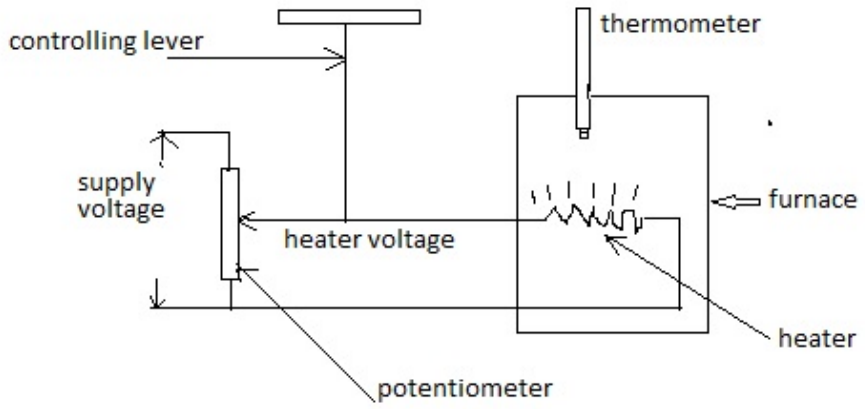
b) name three types of input signals. (6 marks)

c) with an aid of a canonical block diagram of a closed loop system derive

a) Closed loop tranfer function

b) Error ratio

c) Primary feed back ratio. (9 marks)



d) define the following terms

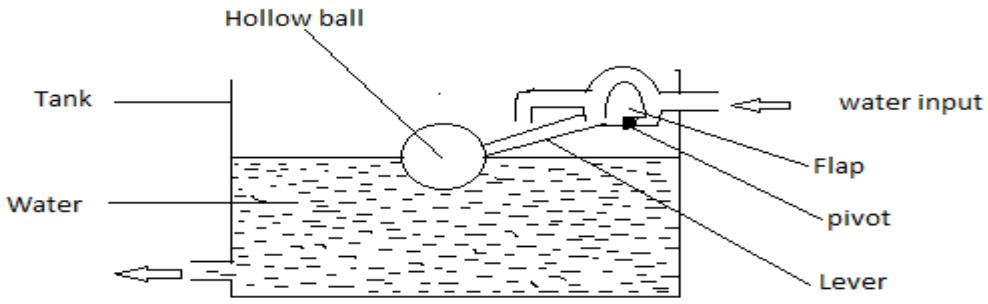
i. a system

ii. a control system (2 marks)

e) State any three advantages of a feedback in a control system. (3 marks)

QUESTION TWO (20 MARKS)

Fig below shows a control system used to maintain constant water level in the tank.



Identify the following

a) controlled variable

b) error signal

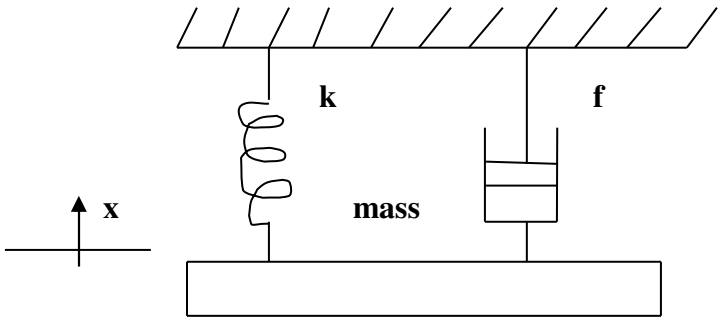
c) correction element

d) measuring device

e) state wheather the system is open or closed loop

QUESTION THREE (20 MARKS)

a) A mechanical system consisting of of a mass M attached to a spring (of stiffness **K**) and a dash pot (viscous friction coefficient **f**)on which a force **F** opperates as shown beolw.



derive the transfer function. (5 marks)

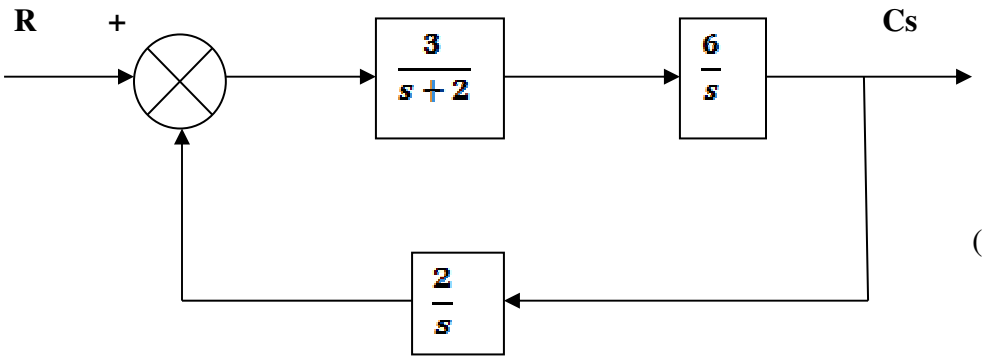
b) for the system shown below, determine

i. open loop transfer function

ii. closed loop transfer function

iii. error ratio

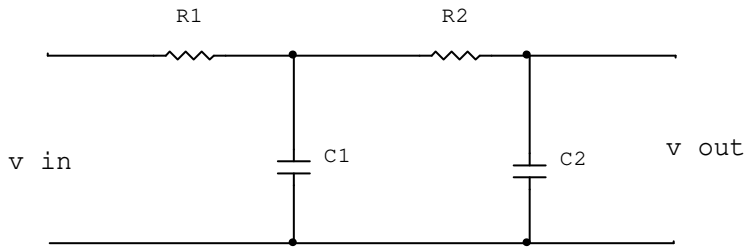
iv. feed back transfer function.



(15 marks)

QUESTION FOUR (20 MARKS)

Determine the transfer function of the network shown below



(20 marks)

QUESTION FIVE (20 MARKS)

a) with an aid of a diagram , explain

i. overshoot

ii. rise time

iii. settling time

iv. delay time

v. peak time (10 marks)

b) for the multi input system below, obtain the transfer function (10 marks)