



MACHAKOS UNIVERSITY

University Examinations 2017/2018

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

SECOND YEAR SECOND SEMESTER EXAMINATION DIPLOMA IN ELECTRICAL
ENGINEERING

EED 217: CONTROL SYSTEMS 1

DATE: 11/12/2017

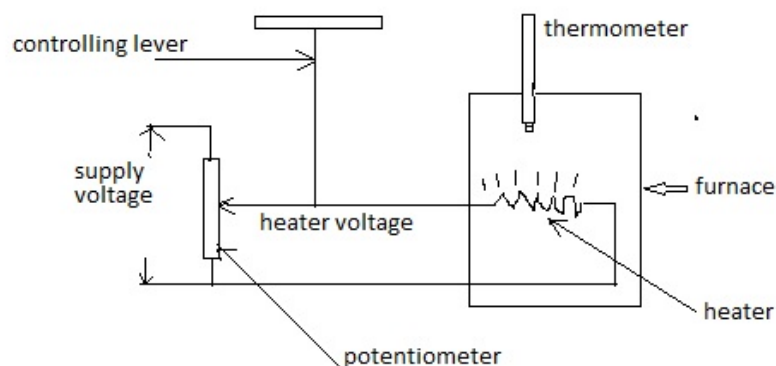
TIME: 8.30-10.30 AM

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

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

(i) closed loop tranfer function

(ii) error ratio

(iii) primary feed back ratio.

(9 marks)

(d) Define the following terms

(i) a system

(ii) a control system

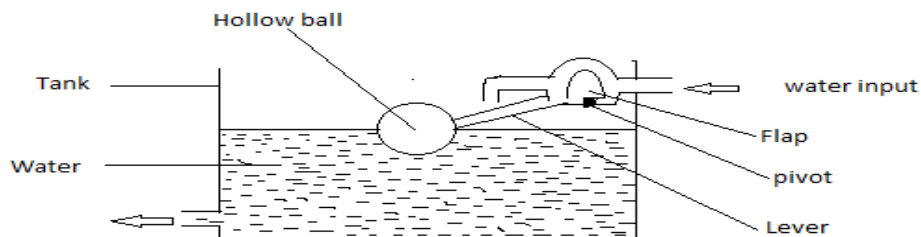
(2 marks)

(d) State any three advantages of a feedback in a control system.

(3marks)

QUESTION TWO (20 MARKS)

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



Identify the following

i) controlled variable

ii) error signal

iii) correction element

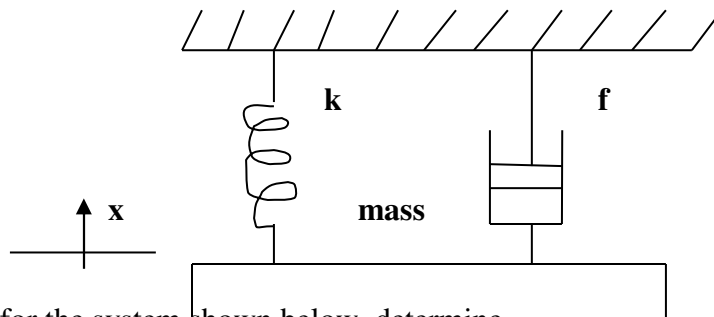
iv) measuring device

v) state wheather the system is open or closed loop

(20 marks)

QUESTION THREE (20 MARKS)

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

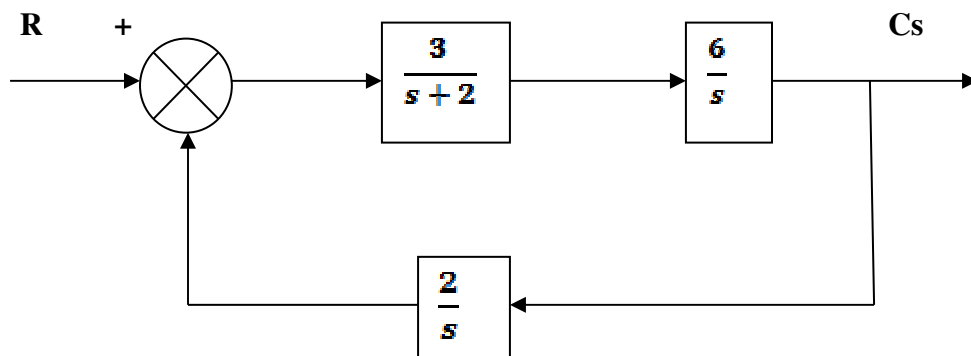


derive the transfer function.

(5 marks)

- (b) for the system shown below, determine

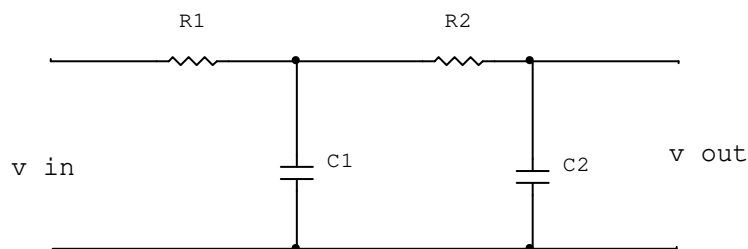
- open loop transfer function
- closed loop transfer function
- error ratio
- feed back transfer function.



(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

