



TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering and Technology

DEPARTMENT OF MECHANICAL AND AUTOMOTIVE ENGINEERING

UNIVERSITY EXAMINATION FOR:

DIPLOMA IN MARINE ENGINEERING

MARINE INSTRUMENTATION AND CONTROL 2

EMR 2311

END OF SEMESTER EXAMINATION

SERIES: MAY 2016

TIME: Pick HOURS

DATE: Pick Date Select Month Pick Year

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **five** Questions;. Attempt any **THREE** Questions.

Do not write on the question paper.

Question 1

a) Define the following terms

1 Controller

2 Plants

3 Disturbance 6 marks

b) State and explain 3 ways in which control system are classified . 6 marks

c) Give 4 comparison between open loop and closed loop system . 8 marks

Question 2

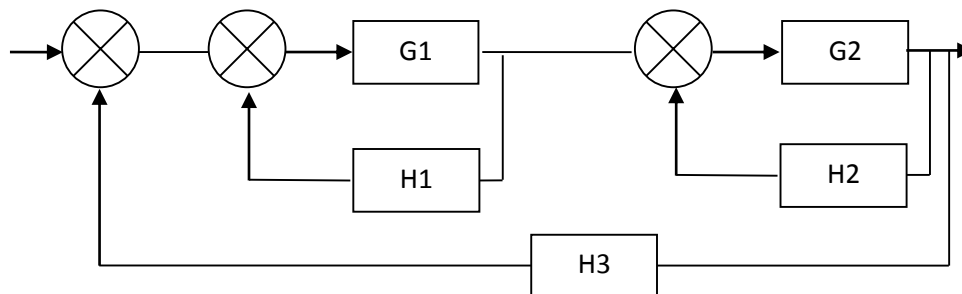
a) Explain how a block reduction is done if the block are

1 In cascade

2 In parallel

3 Has a feedback loop (6 marks)

b) Reduce the block diagram shown below and state its transfer function (14 marks)



Question 3

a) Define the following terms while giving examples

1 Manipulated variable

2 Controlled variable

3 Set points 6 marks

c) State and explain 3 reasons why manufacturers control the production process. 6 marks

d) With the aid of a diagram explain the four essential elements of a process. 8 marks

Question 4

a) Define the following terms

1 Rise time

2 Setting time

3 Steady-state error

4state change (8 marks)

b) Briefly explain the following modes of analogue controllers and for each give advantage and disadvantage .

1 Proportional control

2 Integral control

3 Derivative control

12 marks

Question 5

a) Draw control system block diagram for toilet tank filling system. 6 marks

b) Write short notes about PID control. 8 marks

c) Explain one way of tuning the PID controller . 6marks