

INDIAN MARITIME UNIVERSITY
(A Central University, Govt. of India)

B.Tech. (Marine Engineering) - Semester -VIII
December 2015 End Semester Examinations

Advanced Marine Control Engineering & Automation
Subject Code: UG11T1802

Time: 3 hrs
Date: 1.1.2016

Max Marks: 100
Pass Marks: 50

Part - A

(10x3 = 30 Marks)

Compulsory Question

- 1) (a) Define the time constant of a system.
- (b) What do you mean by transfer function of a system?
- (c) Define type and order of a system.
- (d) Define path and forward path of a system.
- (e) Write down the Mason's gain formula for signal flow graph of a system.
- (f) What do you mean by Off-set in a control system?
- (g) What is Reset gain in a PID system?
- (h) Define Micro-controllers.
- (i) What is Modulating control?
- (j) Explain Flapper nozzle function in a control system.

Part - B

(5 x 14 = 70 Marks)

Answer Any Five of the following

- 2) (a) Drive the mathematical expression for the first-order thermal system. 7
- (b) Derive the transfer function of the network shown in figure 1. 7

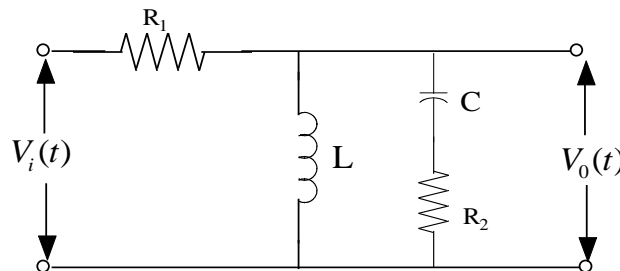


Figure 1.

- 3) (a) Derive the expression for steady state error co-efficient i.e position error, velocity error and acceleration error. 7
- (b) Write the advantages and disadvantages of transfer function for a system. 7

- 4) (a) Drive the expression of Time Response for 2nd order system with unit step input. 10
 (b) Define rise time and peak time of a system. 4
- 5) (a) Explain three term control action with their characteristics. 6
 (b) Sketch and describe Main engine LO temperature control system. 8
- 6) (a) Find the overall transfer function for PID controller by using two operational Amplifier. 7
 (b) Refer to figure 2 calculating the following: (i) damping ratio (ξ) and natural frequency (ω_n) without K_D . (ii) K_D for $\xi = 0.60$ with controller. 7

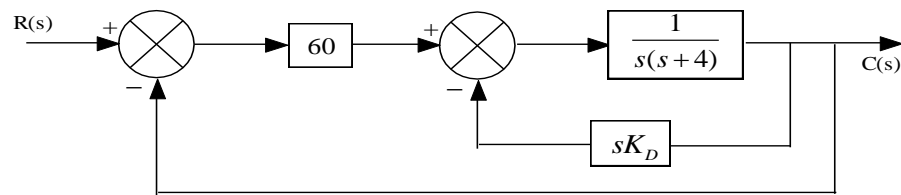


Figure 2.

- 7) (a) What is Actuator in a control system? 4
 (b) Explain with sketch Electro Hydraulic Actuator with positioned (feedback). 10
- 8) (a) Describe with sketch Boiler combustion control with cross loop system for Air Fuel control. 10
 (b) What are the Alarms and Trips in a Boiler control system? 4
- 9) (a) What is Active and Passive sensors? 6
 (b) Explain with sketch Electro-pneumatic transducer. 8
