



COLLEGE OF ENGINEERING & TECHNOLOGY

Department : Electrical and Control Engineering

Lecturer : Prof. Alaa El-din Ahmed Khalil

Course : Fundamentals of Control

Course Code: EE 311

Date : 1 / 6 / 2015

Time : 2 hours

Marks: 40

Final Exam

Answer the following Questions:

For the system shown in figure (1), determine the overall transfer function $\frac{C(s)}{R(s)}$

A.15 (10 marks)

by using:

(a) Block diagram reduction technique.

(5 marks)

(b) Signal flow graph.

(5 marks)

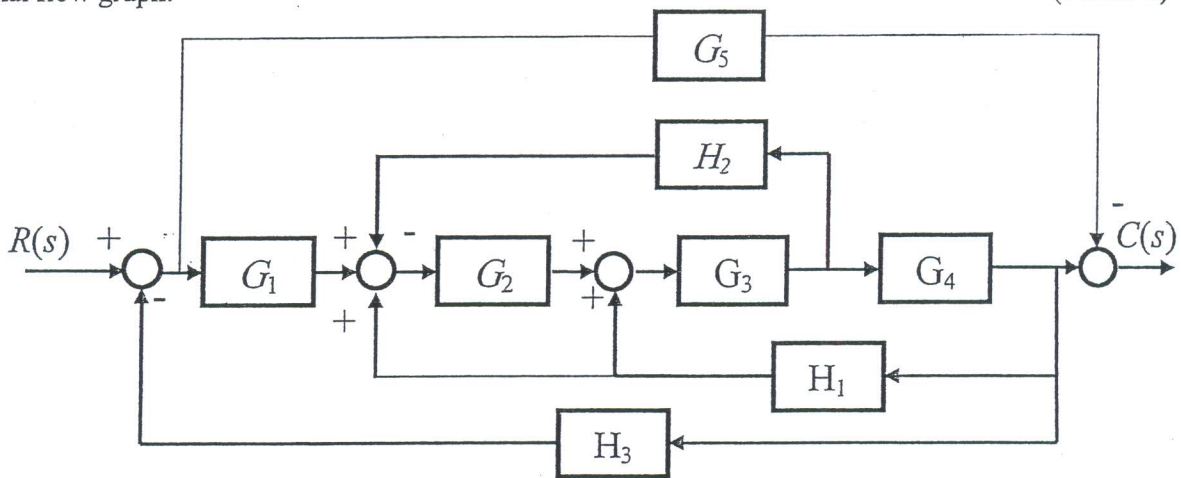


Figure (1)

2- Obtain the transfer functions $E_o(s) / E_i(s)$ of the bridge network shown in figure (2).

A.5 (10 marks)

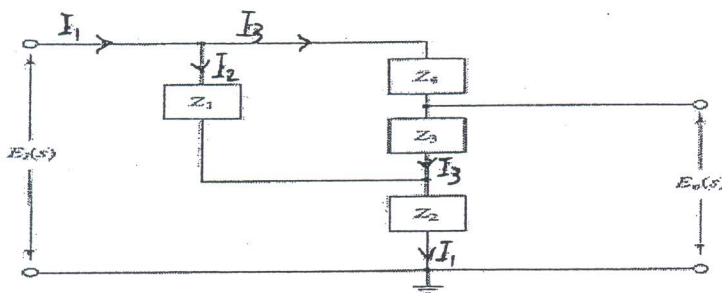


Figure (2)

Members of course Examination Committee:	Signature:	Date:
Lecturer: Prof. Alaa Eldin Ahmed Khalil	Alaa Eldin Ahmed	17/5/2015
Course Coordinator : Dr. Ahmed Alshenawy	Hamdy	18/5/2015
Head of Department: Prof. Hamdy Ashour	Hamdy	17/5/2015

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3- For the second order system shown in figure (3) with the damping ratio of 16%

A.27 (10 marks)

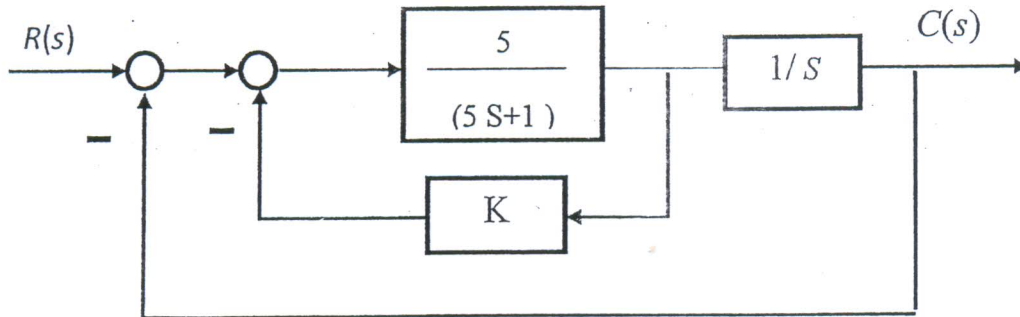


Figure (3)

Determine:

- (a) The rise time t_r . (2 Marks)
- (b) The peak time t_p . (2 Marks)
- (c) The settling time for 2% and 5% error (2 Marks)
- (d) The steady-state error coefficients (2 Marks)
- (e) Steady - state error to a ramp input, i.e. $r(t) = t$ (2 Marks)

4- For the system shown in the figure (4):

B.1 (10 marks)

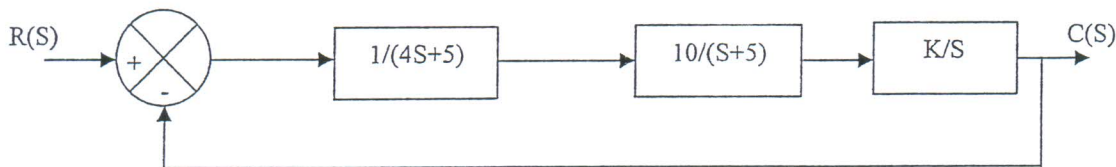


Figure (4)

Determine:

- (a) the range of K for system stability. (5 Marks)
- (b) the critical gain value. (2 Marks)
- (c) the roots for this value of critical gain and the other root. (3Marks)

GOOD LUCK

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