Ministry of Higher Education
& Scientific Research
Tikrit University
College of Engineering
Mechanical Engineering Dept.

جامعة تكريت

Final Exam
2015-2016

Class : 4th year
Subject: *Engineering Control*
Time:3Hours.
Date : 22 / 5 / 2016
Form: (1)

Q.1 -Complete the following sentences.

1- A linear time invariant system initially at rest, when subjected to a unit-step input gives a response $y(t) = 0.3333 + 0.1667e^{-3t} - 0.5e^{-t}$ ..The transfer function of the system is _____ [2 marks]

2- The transfer function of a contril system is given as; $G(S) = \frac{K}{(s^2 + 8s + K)}$ .For this system to be critically damped ,the value of K should be _____. [2 marks]

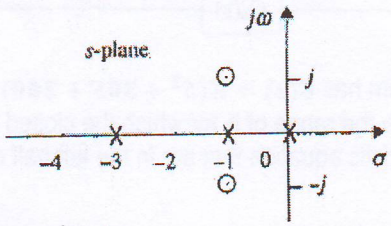
3- For a second order system, if both the roots of the characteristic equation are real and equal then the value of damping ratio will be _____. [2 marks]

4-The first element of each of the rows of a Routh-Hurwitz stability test showed the sign as follows

Rows	1	2	3	4	5	6	7	8	9
Signs	+	-	-	-	+	-	+	-	-

The number of roots of the system lying in the right half of s-plane is _____.and the system is [2 marks]

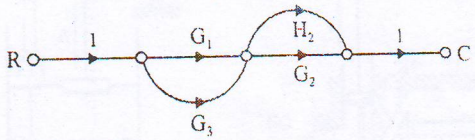
5 - The pole –zero configuration for a control system shown in figure below



The intersection of asymptotes with the real axis is _____. [2 marks]

6-The equation governing a control system is given by $3\frac{d^2c(t)}{dt^2} + \frac{12dc(t)}{dt} + 32c(t) = 32r(t)$ .The transfer function for the system is _____. [2 marks]

7- The number of closed loops and forward paths in the signal flow graph shown below is_____ and_____. [2 marks]



8 - Match list A with list B. [2 marks]

List A (characteristic equation)	List B (Natural of damping)
A - S^2+ 15 S+26.25	1- un damped .
B - S^2+5S+6.25	2-under damped.
C - S^2+20.25.	3-critically damped.
D - S^2+4.5 S + 42.45.	4-over damped.

9-what is the advantage and disadvantage of the open loop control system . [2 marks]

10 -Sketch a typical transient response of a second order control system in cases of under damped for i- Stable control system ii-Unstable control system. [2 marks]

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