BRAINWARE UNIVERSITY

Term End Examination 2023
Programme – B.Tech.(CSE)-2018/B.Tech.(CSE)-2019
Course Name – Control System
Course Code - OEC-801B
(Semester VIII)

Full Marks : 70 **Time : 3:0 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) For critically damped second order system, if the gain constant(K) is increased, the system behavior

a) Becomes oscillatory b) Becomes under damped
c) Becomes over damped d) Shows no change

(ii) What is the algebraic sum of the reference input and feedback?

a) Error Signal b) Error Detector
c) Controlled system d) Controlled output

(iii) The characteristic equation of a system is given as 3s^4+10s^3+5s^2+2=0. Select this system is :

a) Stable b) Marginally stable
c) Unstable d) Linear

(iv) Tell a tachometer is added to servomechanism because

a) It is easily adjustable b) It can adjust damping
c) It reduces steady state error d) It converts velocity of the shaft to a proportional DC voltage

(v) For the system 2/s+1, the approximate time taken for a step response to reach 98% of its final value is:

a) 1s b) 2s
c) 4s d) 8s

(vi) The polynomial s^4+Ks^3+s^2+s+1=0 the range of K for stability is _____

a) K>5 b) -10<K
c) K>-4 d) K-1>0

(vii) The Positiveness of the coefficients of characteristic equation is necessary as well as sufficient condition for:

a) First order system b) Second order system
c) Third order system d) None of the mentioned

(viii) Identify Backlash in a stable control system may cause

a) Under damping
b) Over damping
c) High level oscillations
d) Low level oscillations

(ix) The system in originally critically damped if the gain is doubled the system will be :

a) Remains same
b) Overdamped
c) Under damped
d) Undamped

(x) Which one of the following statements is not correct?

a) Root loci can be used for analyzing stability and transient performance
b) Root loci provide insight into system stability and performance
c) Shape of the root locus gives idea of type of controller needed to meet design specification
d) Root locus can be used to handle more than one variable at a time

(xi) Normalized response of a dynamic system refers to:

a) Characteristic feature of a response due to specific excitation irrespective of its amplitude
b) Response of dynamic system divided by its maximum value
c) Response of dynamic system divided by a standard value
d) None of the mentioned

(xii) In a temperature control system, what conversion in signal takes place?

a) Digital to Analog
b) Analog to Digital
c) Error to Digital
d) Error to Analog

(xiii) While increasing the value of gain K, the system becomes

a) Less stable
b) More stable
c) Unstable
d) Absolute stable

(xiv) The characteristic equation of a system is given by 3s^4+10s^3+5s^2+2=0. This system is:

a) Stable
b) Unstable
c) Marginally stable
d) Linear

(xv) Define a node having only outgoing branches.

a) Input node
b) Output node
c) Incoming node
d) Outgoing node

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Write the applications of ac tachogenerators. (3)
3. Define resonant frequency and bandwidth. (3)
4. State necessary but not sufficient conditions for stability. (3)
5. Explain Lyapunov stability theorem. (3)
6. Explain the advantages pof dc tachometers. (3)

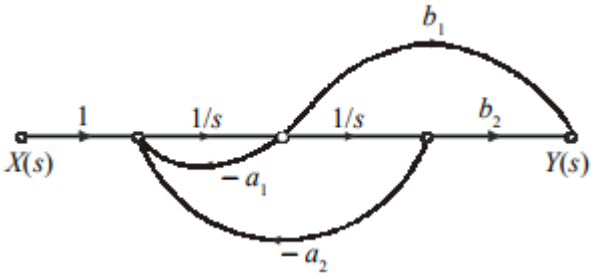
OR

Explain derivative control action. (3)

Group-C

(Long Answer Type Questions) 5 x 8=40

7. Derive the time constant of thermometer. (5)
8. Define loop, self loop, path gain, loop gain of SFG. (5)
9. Explain the working of teachometers. (5)
10. How to assess marginally stable system. (5)
11. Compare open loop and closed loop control system. (5)
12. Derive the transfer function of the system. (5)



13. Define path, non-touching loop, path gain, loop gain of SFG. (5)
14. Choose the most important five rules of block diagram reduction technique. (5)

OR

Transfer translational system into the rotational system. (5)

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