Reg. No. : | | | | | | | | | | |

Question Paper Code: 54502

B.E. / B.Tech. DEGREE EXAMINATION, AUGUST 2021

Fourth Semester

Electronics and Instrumentation Engineering

15UEI402 - CONTROL ENGINEERING

(Regulation 2015)

Duration: 1:45 hour Maximum: 50 Marks

PART A - (10 x 2 = 20 Marks)

(Answer any ten of the following questions)

1. Define laplace transforn and mention its advantage.
2. What is the best damping ratio to use, why?
3. On what aspect, the initial and final value theorem is used in control system analysis.
4. What control stategy you used to improve the steady state and transient response of a system?
5. List the properties of state transition matrix.
6. Derive the transfer function of PID controller.
7. For a system having $G(s)H(s) = \frac{K(s+4)}{s(s^3+5s^2+6s)}$ find (a) type of the system (b) order of the system.
8. Draw the electrical network of lag-lead compensator.
9. State Nyquist stability criterion.
10. List the properties of state transition matrix.
11. Write Masons Gain formula.

12. What is the best damping ratio to use, why?

13. Draw the electrical network of lag-lead compensator

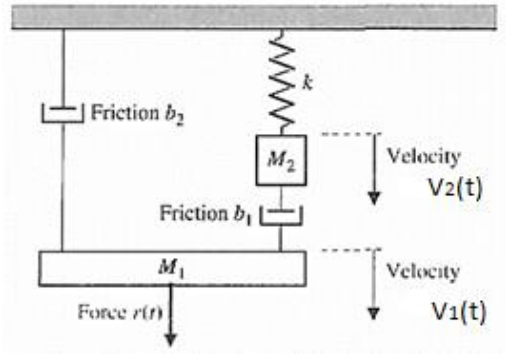
14. What control stategy you used to improve the steady state and transient response of a system?

15. What is meant by BIBO stability?

PART – B (3 x 10= 30 Marks)

(Answer any three of the following questions)

16. Derive$V_1(s)/R(s)$ the Force current analogy by transforming the given mechanical system. (10)



17. Derive the expression for second order system in under damped condition when input is unit step and also draw its response. (10)

18. Consider the unity feedback system type 1 system with open loop transfer function $G(s) = \frac{K}{s^2(0.2s+1)}$, Assume that system is required to be compensated to meet the following specifications.

(i) Acceleration error constant K_a=10

(ii) Phase margin $\geq 35°$. (10)

19 Applying Routh stability criterion and comment the range of stability of the closed loop system which have the characteristic equation as follows
$(s+2)(s+4)(s^2+6s+25)+k.$ (10)

20. Determine the state model of armature controlled DC motor. (10)