School of Engineering

B.TECH Mechanical Engineering
Semester End Examination - Jun 2024

Duration : 180 Minutes
Max Marks : 100

### Sem VI - G3UB605T - Automatic Control Systems

General Instructions
Answer to the specific question asked
Draw neat, labelled diagrams wherever necessary
Approved data hand books are allowed subject to verification by the Invigilator

1)	What is Bode plot?	K1(2)
2)	Name three approaches to the mathematical modeling of control systems.	K2(4)
3)	What will be the Stability of the system when the roots of characteristic equation are lying on imaginary axis?	K2(6)
4)	Find the transfer function, X(s)/F(s), for the system shown in Figure	K3(9)
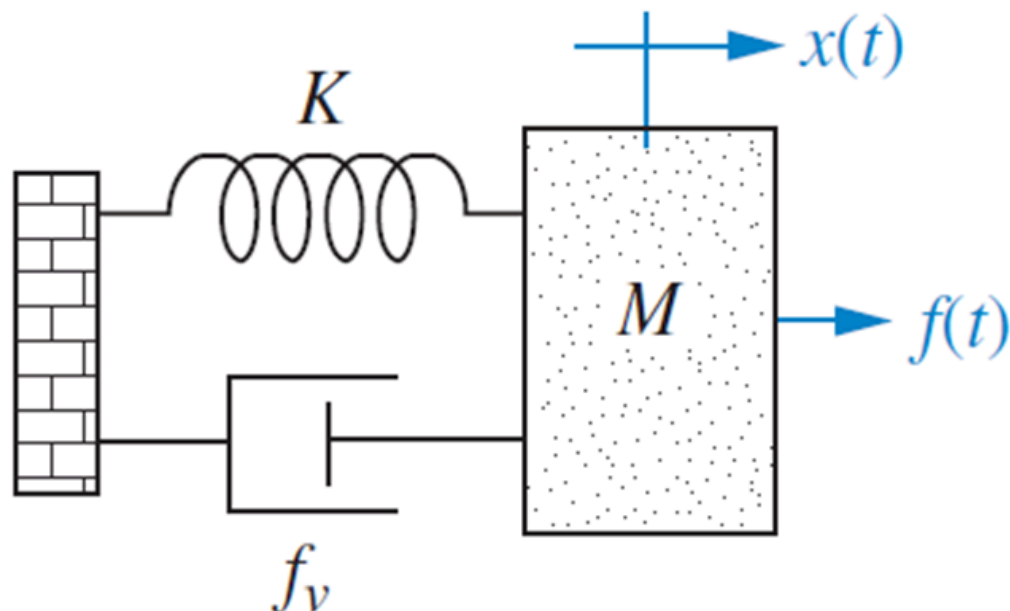
5)	Describe a typical control system analysis task.	K3(9)
6)	What are the basic elements of mechanical rotational systems? Write its force balance equation	K5(10)
7)	What is the relation between stability and coefficient of characteristic polynomial?	K4(12)

8) For the following transfer function draw polar plot with proper nomenclature
$$G(S) = \frac{15}{(S+1)(S+3)(S+6)}$$

K5(15)

9) What are Sampled Data control systems? With an aid of a block diagram show basic elements of a sampled data control systems and give functioning of these elements.

K5(15)

10) Derive a relationship for Peak time, Percent overshoot, settling time and rise time for a second order system.

K6(18)