Printed Pages: 02 **Sub Code:KOE096**

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B. TECH.
(SEM VIII) THEORY EXAMINATION 2022-23
MODELLING AND SIMULATION OF DYNAMIC SYSTEMS

Time: 3 Hours ***Total Marks: 100***

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

(a) Define Modelling
(b) Explain simulation.
(c) Explain pneumatic systems.
(d) Define causality.
(e) Draw any basic model of electrical systems.
(f) Explain the generation of system equations in brief
(g) Explain system transfer function.
(h) Explain any two performance measures of second order system.
(i) Define optimization.
(j) Explain planner mechanisms in Simulation in brief.

SECTION B

2. Attempt any *three* of the following: **10 x 3 = 30**

(a) Discuss the various models with suitable examples.
(b) Discuss the basic models of hydraulic systems in detail.
(c) Discuss the system models of electro mechanical systems.
(d) Describe the simulation using SIMULINK in detail.
(e) Draw the Bode Plot for the transfer function G(s).

$$G(s) = \frac{36\,(1+0.2\,s)}{s^2(1+0.05s)(1+0.01s)}$$

From the bode plot determine-

(i) Phase crossover frequency
(ii) Gain crossover frequency
(iii) Gain Margin
(iv) Phase Margin

SECTION C

3. Attempt any *one* part of the following: **10 x 1 = 10**

(a) Describe MATLAB and its use as a simulation tool.
(b) Discuss modelling of dynamic system in detail.

4. Attempt any *one* part of the following: 10 x 1 = 10

(a) Explain the basic models of thermal systems in detail.
(b) Describe the method of drawing bond graph model for mechanical systems.

5. Attempt any *one* part of the following: 10 x 1 = 10

(a) Discuss the modelling of combined rotary and translatory system.
(b) Explain linearity and non-linearity in systems.

6. Attempt any *one* part of the following: 10 x 1 = 10

(a) Find the transfer function Y_8/Y_1 of the signal flow graph shown in Fig. 1

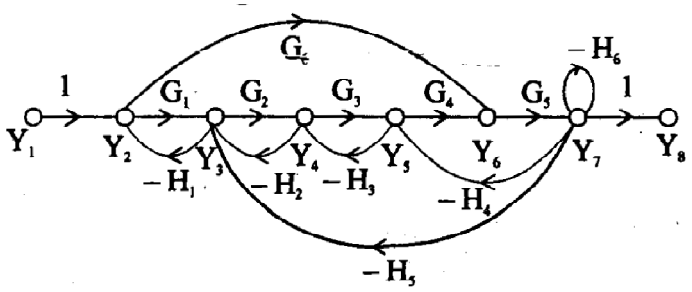

Fig. 1

(b) Discuss the dynamic response of first order system and second order system.

7. Attempt any *one* part of the following: 10 x 1 = 10

(a) Explain the simple and the compound pendulum simulation problem.
(b) Discuss the parameter estimation methods in simulation.