MidTerm Exam

MDP 444

Benha University

Mechanical Engineering Department (Production)

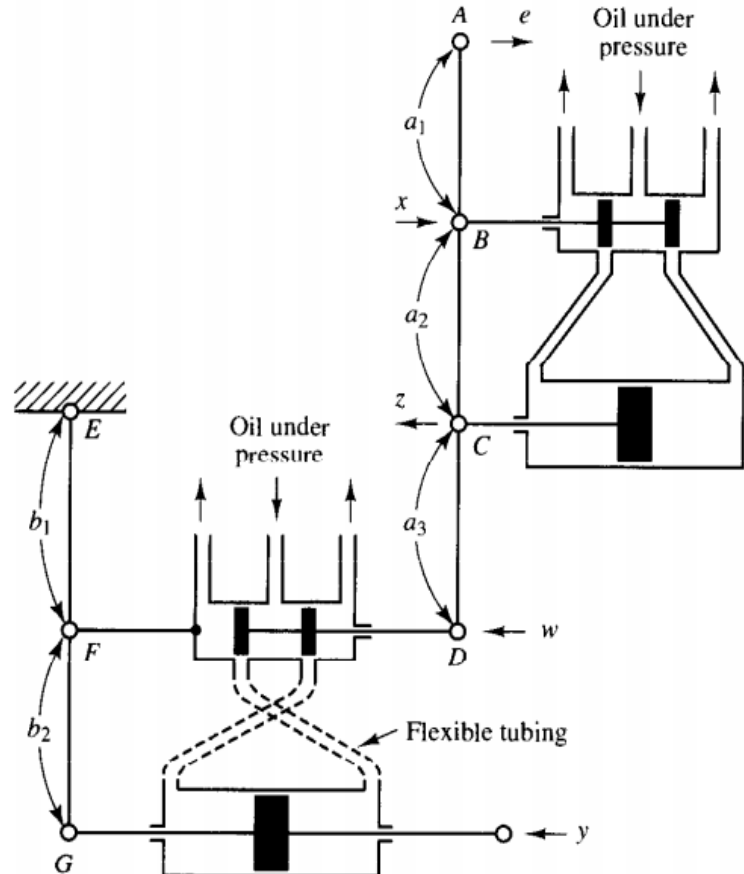Shoubra Faculty of Engineering

4th year (Design section) 2017/2018

1. **Question (1)**   **Marks (12)**

Consider the **Hydraulic Servo system** shown in Figure (1). Assuming that signal e(t) is the input signal and power piston displacement y(t) the output. Neglect flexible tubing.

a) Sketch a block diagram for model, describe a closed-loop feedback control system.
b) Write governing equation of physical model, also frequency equations.
c) Draw block diagram for model of the servo system and select many of its parameters.
d) Determine an appropriate Transfer function Y(s)/E(s)

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Fig. 1. Hydraulic Servo system.

2. **Question (2)**   **Marks (3)**

For the given open loop transfer function system with unity feedback, determine the rise time tr, peak time tp, maximum overshoot Mp, and settling time ts in the unit-step response

$$G(s) = \frac{20}{s^2 + 14s + 50},$$