1. Question (1) **Marks (10)**

Consider the servo system shown in Figure (1). The motor shown is a servomotor, a dc motor designed specifically to be used in a control system.

a) Sketch a block diagram for model, also 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 for the system *C(s)/R(s).*

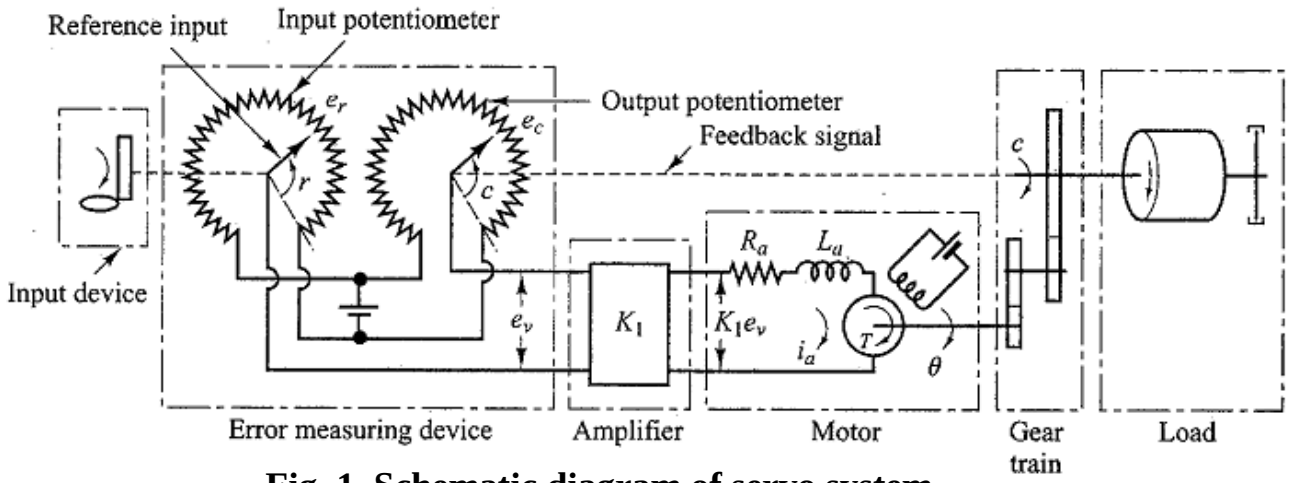

Fig. 1. Schematic diagram of servo system

. Question (2) **Marks (5)**

For the system with unity feedback shown in Figure 2, determine the steady-state error for a step and a ramp input, Then obtain the rise time tr, peak time tp, maximum overshoot Mp, and settling time ts in the unit-step response

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

Fig. 2. Feedback system