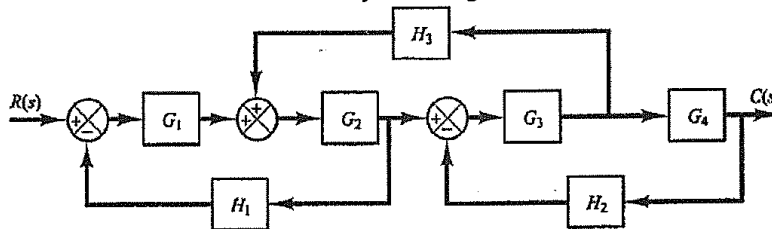




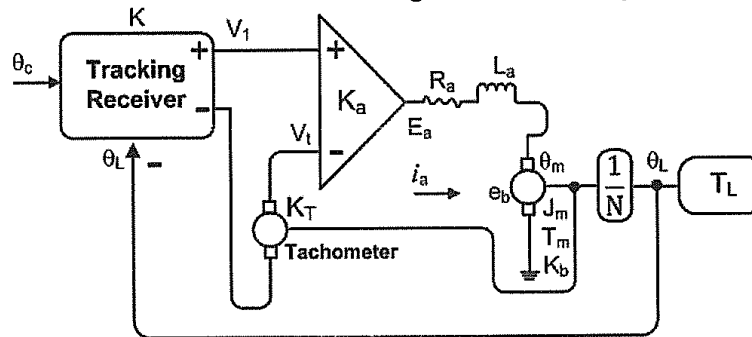
The maximum mark for the examination paper is 90 marks, and the mark obtainable for each part of a question is shown in brackets alongside the question.

QUESTION NUMBER ONE [40 MARKS]

1. Compare simple feedback and feed-forward control configurations based upon performance along with proper justifications. [10 Marks]
2. Draw the corresponding signal flow graph for the given block diagram and then find the overall transfer function of the system using Mason's formula. [15 Marks]



3. Find the overall transfer function for the following electro-mechanical system. [15 Marks]



QUESTION NUMBER TWO [50 MARKS]

1. Prove that an armature controlled D.C. motor can be considered as an integrator. [10 Marks]
2. State the major advantages of Routh criterion. Then, find the marginal value of K and frequency of oscillation, for the given unity feedback system. [15 Marks]

$$G(S) = \frac{K}{S(1 + 0.4 S)(1 + 0.25 S)}$$

3. Sketch the root locus for the system whose open loop transfer function is given by; [15 Marks]

$$G(S) = \frac{K(S + 5)}{(S^2 + 4S + 20)}$$

4. Assume that a voltage of 4V is the input to 4-bit ADC device with a dynamic range of 0 to 10V. Show how the ADC with successive approximation register arrive the digitized value for the output. [10 Marks]