

EMTR-2019  
Assignment #4

Due: 10:00PM, ~~Tuesday, March 24~~ Thursday, March 26

Q 9.4

Suggest possible motors, d.c. or a.c., which can be considered for applications where (a) cheap, constant torque operation is required, (b) high controlled speeds are required, (c) low speeds are required, (d) maintenance requirements have to be minimised.

Q 9.11

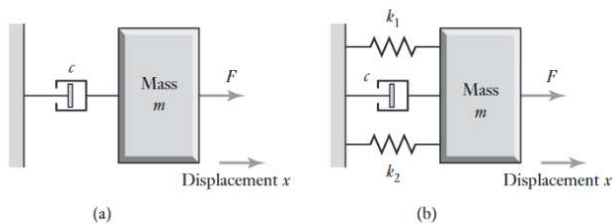
How many steps/pulses per second will a microprocessor need to output per second to a stepper motor if the motor is to give an output of 0.25 rev/s and has a step angle of  $7.5^\circ$ ?

Q 9.12

A stepper motor is used to rotate a pulley of diameter 240 mm and hence a belt which is moving a mass of 200 kg. If this mass is to be accelerated uniformly from rest to 100 mm/s in 2 s and there is a constant frictional force of 20 N, what will be the required pull-in torque for the motor?

Q 17.1

Derive an equation relating the input, force  $F$ , with the output, displacement  $x$ , for the systems described by Figure 17.20.



Q 17.3

Derive an equation relating the input angular displacement  $\theta_i$  with the output angular displacement  $\theta_o$  for the rotational system shown in Figure 17.21.

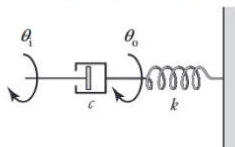


Figure 17.21