Example.1

The compressor mechanism shown in the figure below is driven clockwise by a DC electric motor at a constant rate of 800 rpm. In the position shown, the cylinder pressure is 70 psi, and the piston weighs 0.75 lb. The coefficient of friction between the piston and the compressor cylinder is 0.1. The weight of all other links is negligible. At the instant shown,

a. Determine the torque required from the motor to operate the compressor.

b. Determine the torque required from the motor if the motor is rotating at 800 rpm and accelerating at a rate of 5000 rad/s².

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Example.2

The materials handling mechanism, shown in the figure below, slides 4-kg packages along a counter. The machine operates with the crank rotating counterclockwise at a constant rate of 120 rpm. The coefficient of kinetic friction between the package and counter is 0.15. The weight of all the mechanism links is negligible.

a. Determine the instantaneous torque required from the motor to operate this mechanism.

b. Determine the torque required from the motor if the motor is rotating at 120 rpm and accelerating at a rate of 100 rad/s².