

**UNIVERSITY OF ZAMBIA
SCHOOL OF ENGINEERING
EEE3112 ELECTRICAL ENGINEERING PRACTICE**

ASSIGNMENT 3 QUESTION DUE 12th MAY 2015

(a) Given the lumped parameter physical system shown in **Figure Q3 (a)** where mass moment of inertia are $J_1 = 10\text{kgm}^2$, $J_2 = 5\text{kgm}^2$, coefficients of friction $B_1 = 0.2\text{Nms/rad}$, $B_2 = 0.3\text{Nms/rad}$, and the number of teeth for the gears are $N_1 = 10$, $N_2 = 30$;

- (i) Write the dynamic equation of motion.
- (ii) Evaluate the equivalent coefficient of friction and the equivalent mass moment of inertia reflected on the drive shaft.
- (iii) What is backlash in gearing systems?

(b) An electric cable is being unwound from a drum, **Figure Q3 (b)**, whose radius is 250mm at a force of 1000N. The drum and hub has combined mass of 100kg and a radius of gyration about its center of 375mm. Calculate the angular acceleration of the drum. Friction is neglected.

FIGURE PAGE

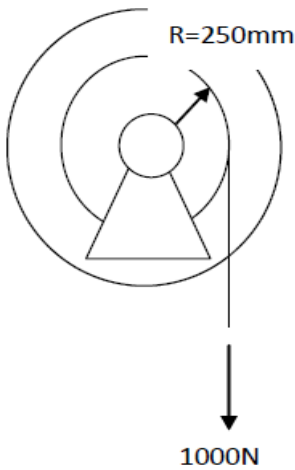


Figure Q3 (b)

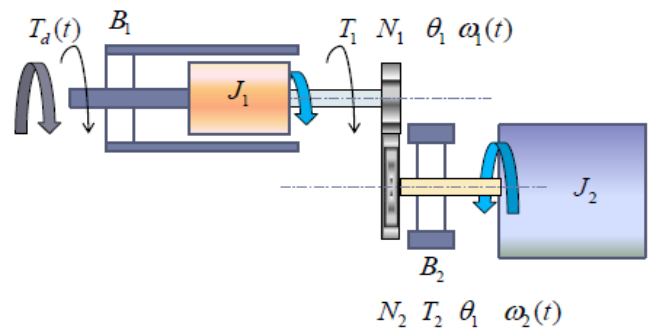


Figure Q3 (a)

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