Final Exam
ME 3200 - Fall 2001

Wednesday, December 12, 2001

Notes:
1. DO NOT OPEN THIS EXAM UNTIL YOU ARE NOTIFIED.
2. One page of single sided notes (8.5" x 11" = 93.5 sq. in. allowable area), a compass, protractor, ruler, calculator, pencil, and eraser are permitted. This is a closed book exam.
3. A 120 minute period will be provided to take this exam.

Name: ___________________________________________

Student Number: ________________________________

#1. _______
#2. _______
#3. _______
#4. _______
#5. _______

TOT: _______
1) Use graphical techniques to design a Four-bar linkage to move the block through the three positions shown. Your linkage must connect to the block at the points A and B. (40 pts)
2) Use graphical techniques (where ever possible) to determine the angular velocity $\omega_2$ necessary to produce the velocity of point C, $V_c = 10$ mm/sec, given the position of the system shown in the figure below. (40 pts)

Note the following dimensions:
\[ |O_1A| = 40.0\text{mm}, \quad |AB| = 103.0\text{mm}, \quad |BO_2| = 25.0\text{mm}, \quad \text{and} \quad \theta_{V_c} = 90.0^\circ \]
3) Consider the planetary gear train below. Determine the angular velocity, $\omega_6$, given that:
$\omega_{arm}= -50 \text{ RPM}$, $\omega_2 = 30 \text{ RPM}$, $N_2 = 35$, $N_3 = 25$, $N_4 = 55$, $N_5 = 35$, $N_6 = 45$ (40 pts)
4) Consider the cam SVAJ diagram shown below. The rise and fall segments are described by cycloidal cam functions. The rise and fall segments are each 60° in duration, and each dwell segment is 120° in duration. Specify the S functions for each of the cam segments. Be sure to indicate on the SVAJ diagram where the functions are valid. (40 pts)
5) Consider the linear graph below.

![Linear Graph](image)

a) Determine the state equation for the system. (25 pts)

b) Determine the output equation for the POWER flowing through the resistor $R_2$. (15 pts)