



**ENGINEERING 141**  
**MID-TERM TEST**  
**10:30 AM 25 MARCH 1994**  
**TIME 1 hour 15 min**

NOTE: Do all three questions.  
The test will be marked on methods as well as numerical solutions, therefore explain logic clearly and draw good diagrams. Be careful to budget the time that you spend on each of the questions.

20% 1. A carousel accelerates uniformly from 2 RPM to 8 RPM while it executes 4 revolutions. Determine the time required to make this change in angular speed.

40 %

2. In FIG. 1 the piston at D is moving downward with a velocity of 1.25 m/s. Determine the angular velocity the linkages AB and BD. Show clearly direction of the angular velocities.

40 %

3. The wheel in FIG. 2 is rolling without slipping on the belt. The belt has a constant velocity 50 mm/s to the left as shown. The centre of the wheel A has a velocity of 100 mm/s to the right and an acceleration of 90 mm/s<sup>2</sup> to the left as shown. Determine (a) the angular velocity of the wheel and (b) the total acceleration of point D showing clearly the angle that it makes with the horizontal.

