

**UNIVERSITY OF SASKATCHEWAN
GE 226.3 – MECHANICS III
MIDTERM EXAM – FEBRUARY 12, 2004**

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**A CLOSED BOOK EXAMINATION
TIME: 2 HOURS**

For Marker's
Use Only

LAST NAME (printed): _____

1. _____

FIRST NAME (printed): _____

2. _____

STUDENT NUMBER: _____

3. _____

EXAMINATION ROOM: _____

SIGNATURE: _____

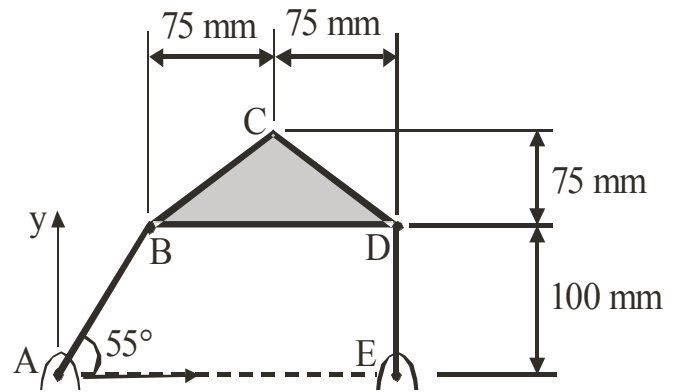
Total: _____

INSTRUCTIONS

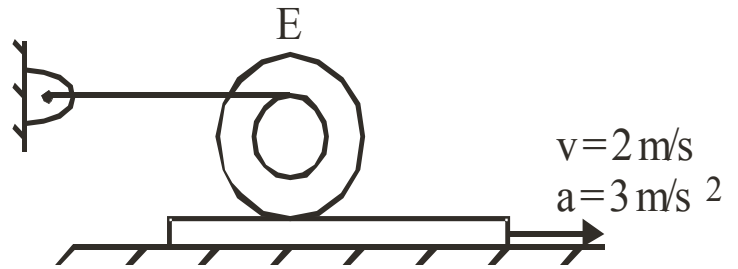
1. The examination consists of 3 questions.
Answer all three questions.
All 3 questions have equal value.
PRINT YOUR NAME AT THE TOP OF EACH PAGE.
2. This is a closed book exam.
Calculators are permitted.
A list of formulas is given on a separate page.
3. **SHOW YOUR WORK CLEARLY.**
Give final answers to 3 significant figures.
4. Your answers are to be given in the space below the question.
The back of the page may be used as a continuation sheet if required.

1. In the mechanism illustrated, links AB and DE are pin connected to the triangular plate BCD. At the instant shown, link DE is vertical and the bottom of the plate, BD, is horizontal. The angular velocity of link AB is 4.00 rad/s counterclockwise.

USING THE VECTOR METHOD ONLY, determine the velocity of point C on the plate at the instant shown. Give your answer as a vector quantity.



2. A spool rolls without slipping on a plate which is pulled so that at the instant shown the plate has a velocity of 2 m/s and an acceleration of 3 m/s^2 , both directed to the right. A cord is wrapped around the spool at its inner radius as shown, and remains tight throughout the motion. The spool has an inner radius of 200 mm and an outer radius of 400 mm.



USING THE VECTOR METHOD ONLY, determine the acceleration of the topmost point of the spool (i.e., point E) at the instant shown. Clearly label all points used in the analysis and give your answer as a vector quantity.

3. In the assembly shown, link AB is pin connected to sliders A and B. Slider A moves along a vertical slot while, at the instant shown, slider B moves at 2 m/s along a slot inclined at 20° from the horizontal.

USING THE IC METHOD ONLY, determine the angular velocity of link AB and the velocity of slider A at the instant shown. Give both the magnitude and direction of $\vec{\omega}$ and \vec{v}_A .

