Board Meeting Beta

PHYSICS 203: PROF. BEAN
JOHN JAY COLLEGE OF CRIMINAL JUSTICE, THE CUNY

Make certain to read THESE procedures BEFORE beginning to solve problems.

1) Take at least one large white board for each group.

   With as much clarity, completeness, color, vivacity and verity as possible, on group white boards, respond to all the PROBLEMS below the CONCEPTUAL BACKGROUND.

   You may certainly use more than one white board per group.

2) We will leave AT LEAST 45 minutes to 1 hour for the following:

   Gather in an approximate circle, all Boards facing in.

   Discuss the Boards with respect to and for any leading questions posed by the Instructor.

   The Instructor, however, will play a noticeably minimal role. Whenever s/he is silent and whenever you wonder what to discuss, do the following:

   a) Begin by attempting to identify and reconcile disagreements among boards,

   b) Freely but respectfully follow whatever conceptual/conversation paths emerge from the attempt to reconcile boards.

   c) Emphasize ***Depth*** over ***Breadth***:

      Once the class discovers that it is disagreement or confusion over a particular and fundamental point—

      whether or not this point was originally intended for discussion--

      STICK WITH THE CONCEPT ***PAST*** THE POINT OF FRUSTRATION & SEEMING 'CIRCLES'.

   d) Do not interrupt colleagues.

Super Pendulum Graph

A simple pendulum is constructed by attaching a bob of mass M to a string of length 2 meters. The bob is placed at equilibrium and given an initial speed of 10 m/s.

The pendulum swings upwards and goes all the way around in a circle.

Ultimate Goal:
make a graph of T (magnitude of tension) as a function of theta (angle from the vertical).

Follow these steps:

Find the initial value of T, at the bottom of the swing:

- **A.** Compute the kinetic energy of the bob at the bottom.
- **B.** Compute the centripetal acceleration of the bob at the bottom.
- **C.** Draw an FBD of the bob at the bottom.
- **D.** Apply Newton's second law and compute the ***tension on the string***.

Find the value of T when the pendulum has swung up to a 45 degree angle from the vertical.

- **E.** Compute the height of the bob from the ground a this point.
- **F.** Compute the gravitational potential energy energy of the bob at this point.
- **G.** Compute the kinetic energy of the bob.
  Hint: use total mechanical energy.
- **H.** Compute the speed of the bob.
- **I.** Compute the ***centripetal acceleration*** that the bob is experiencing.
- **J.** Draw an FBD of the bob.
- **K.** Apply Newton's Second Law to both axes.
- **L.** Compute the ***tension on the string***.

Repeat steps E-L to find the value of T when the pendulum has swung up to a 90 degree angle from the vertical.

Repeat steps E-L to find the value of T when the pendulum has swung up to a 135 degree angle from the vertical—i.e. when it reaches a 45 degree angle ***above*** *the horizontal.*

Repeat steps E-L to find the value of T when the pendulum has swung all the way to the top.