Ladybug Lab Report

Physics

This lab report is an individual assignment. Make sure you do your own work, show your calculations, and **VERIFY YOUR RESULTS** using the Ladybug Revolution applet. Your error analysis should consist of clear corrections to any calculation errors you made initially.

Using the Ladybug Revolution applet, the Big 6, and the other equations we've used for angular motion, answer the following questions. For these questions, the ladybug will be 2.28 meters from the center of rotation and is accelerating from rest with an angular acceleration (α) of 7.2 rad/s^2. (You will need to know that the ladybug will fly off of the turntable at an angular velocity (ω) of about 41.6 rad/s at this distance from the center of the turntable.) Do all the calculations on paper first; then **verify** your results with the applet (where possible).

1. What is the ladybug's final linear velocity at the moment it leaves the turntable?

2. What is the ladybug's angular displacement at the moment it leaves the turntable?

3. How far does the ladybug travel before it leaves the turntable?

4. How much time passes between the start of the ladybug's acceleration and the time it leaves the turntable?

5. What is the ladybug's tangential linear acceleration?

6. What is the ladybug's final centripetal linear acceleration?

7. What is the ladybug's final overall net acceleration (include direction)?

8. What is the coefficient of friction between the ladybug and the turntable? (Hint – you do not need to know the mass of the ladybug to find this.)

9. Error analysis: test your results using the applet and correct any errors you made (do not erase your original work – instead, amend or rework your calculations as necessary).