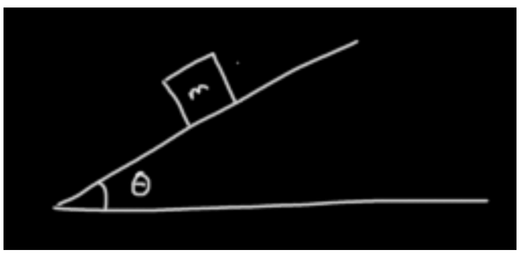
1. A.
   A = D = E > B = C
   This is because in A, it is getting 100% of the voltage or potential difference. In circuit 3, each lightbulb is getting the same voltage because it is in parallel. In series, the voltage across B and C must equal A, which means the difference is smaller than A.
   B.
   Circuit 3 will run out of energy first
   Circle 2 will run out of energy last
   The time it takes for the battery to run out is determined by current usage. The higher the current the circuit uses, the faster the battery discharges. Current can be determined from the equation $V = IR$, and from this we can discover that circuit 2 has the lowest current, and circuit 3 has the highest current.
2. A.
   I.
   

   You need to measure the angle of which the block rests/is about to move.
   II.
   Start increasing the angle between the ground and the ramp. The moment the block starts to move, stop and record the angle right before it moves. This can be achieved by recording and seeing at which angle the block starts to move.
   B.
   The force of gravity causing the block to accelerate is equal to the force of static friction
   $mgsin(\theta) = \mu mgcos(\theta)$
   $\mu = \frac{mgsin(\theta)}{mgcos(\theta)} = \frac{sin(\theta)}{cos(\theta)}$
   $\mu = tan(\theta)$
   C.
   The static and kinetic coefficients are not equal.
   Although the average between the static and kinetic coefficients are equal, this doesn't mean there was error. Group 5 have extremely high and low numbers when compared to the rest of the experiment, which is inaccurate data. After removing Group 5, we would see a major difference between the two coefficients.
   D.
   Remains the same. From the equation in 2.B, we can calculate the coefficient of friction just by using the angle, which means that the change of mass will not impact the coefficient of friction. This can also be justified by saying that the two materials did not change, and that coefficient of friction is material dependent.
3. A.
   To the right of C. This is because then the disk will exert a greater torque on the rod.

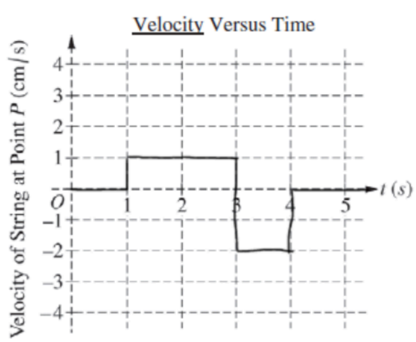
B.
Yes, as x increases, ωalso increases linearly.
C.
If m_{disk}increases, the student's equation will point that post collision velocity will be less. This does not make sense as having a higher mass increases your momentum, in this case having a higher momentum leads to less speed, which physically is not possible.
D.

$$m_{disk} v_0 x = \omega(I + m_{disk} x^2)$$

$$\omega = \frac{m_{disk} v_0 x}{I + m_{disk} x^2}$$

E.
Greater than, this becomes an elastic collision, which means no energy is lost. This means the rod is faster and so is the bouncing disk.

4. A.
No, Block 2 has a lower launch height, which means less initial potential energy that can be transferred into kinetic energy
B.
I.
The two blocks land the same distance from their respective tables, because they all have the same exit velocity and launch height, causing it to go the same distance.
II.
Block 1 because it leaves the ramp first
5. A.



B.