

E & M Unit I: Worksheet 1

Behavior of Sticky Tapes

1. Two T tapes have been identically prepared by pulling them off a base tape. Sketch a diagram of the two tapes and indicate the directions of the forces caused by the tapes by drawing arrows whose lengths are proportional to the amount of force. Explain your reasoning for any similarity or difference between these force arrows.
2. If the same T tapes in question 1 are positioned twice as far apart from one another, indicate with arrows the direction of the force acting on each tape due the other tape. If you think the force is bigger or smaller, draw a relatively longer or shorter arrow. Explain your reasoning for any similarity or difference between these force arrows and the arrows in question 1.
3. T and B tapes have been prepared by pulling them off each other. Sketch a diagram and indicate the directions of the forces caused by the tapes by drawing arrows whose lengths are proportional to the amount of force. Explain your reasoning for any similarity or difference between these force arrows.
4. If the same tapes in question 3 are positioned twice as far apart from one another, indicate with arrows the direction of the forces acting on each tape due the other tape. If you think the forces are greater or smaller, draw relatively longer or shorter arrows. Explain your reasoning for any similarity or difference between these force arrows and the arrows in question 3.

5. T and B tapes have been prepared by pulling them off each other. The T tape is brought near an uncharged piece of paper. Indicate the direction of the forces on the tape and the paper with vector arrows whose lengths are proportional to amount of force. Explain your reasoning for any similarity or difference between these force arrows and the arrows drawn for questions 1 through 4.

6. Two pieces of tape are stuck one on top of the other. The net charge on the two tapes is zero. When the tapes are separated each becomes charged. Describe the relative charge on each tape, and using charge notations (+ and -) illustrate the net charges for each piece of tape below.

7. Describe the change in attractive force between two charged objects as the distance between two objects decreases.

8. Computers are very sensitive to electrical shock. Describe how you could use the sticky tape to determine whether an object has an excess charge that could be transmitted to your computer (and ruin your processor). In addition, your procedure must include a way to determine the kind of excess charge on the object.