**SENIOR PHYSICS OLYMPIAD**

**1]** The diagram below shows a lever which was used as a simple machine to lift a mass of 100kg. The dotted diagram shows the position of the lever after more effort was added.

 y

100kg

 A B

 60cm 1m

100kg

 500N

 Z

 a) Define simple machine.

 b) Is the beam going to balance? If NO state if end A will move upwards or downwards. Give a numerical reason.

 c) If the answer in (b) is YES calculate the moment clockwise and moment anticlockwise and if it is NO how far from the pivot should a 500N effort be placed.

 d) Calculate the mechanical advantage of a machine if mass is 100kg and effort is 500N

 e) Calculate the velocity ratio of a lever above is distance from A to Y is 50cm and from B to C is 1.2m.

 f) What was the efficiency of the machine?

 g) Why is the machine not 100% efficiency?

 h) Using an arrow, show the fulcrum on the diagram.

**END OF QUESTION**