



- 7 An electric motor may be used to lift loads. The efficiency η of a motor is given by

$$\eta = \frac{\text{mechanical power output}}{\text{electrical power supplied}}.$$

The efficiency of a motor is thought to depend on the angular velocity ω of the motor. The relation between the efficiency and the angular velocity of the motor may be written in the form

$$\eta = a \omega^b$$

where a and b are constants.

You are provided with a low voltage electric motor. You may also use any of the other equipment usually found in a Physics laboratory.

Design an experiment to determine the value of b .

You should draw a labelled diagram to show the arrangement of your apparatus. In your account you should pay particular attention to

- (a) the identification and control of variables,
- (b) the equipment you would use,
- (c) the procedure to be followed,
- (d) how the efficiency and the angular velocity of the motor would be determined,
- (e) any precautions that would be taken to improve the accuracy and safety of the experiment.

Diagram

[illegible]