

S.3 WEEK 5

1. (a) State the principle of moments.
 (b) A uniform beam is pivoted at its centre.

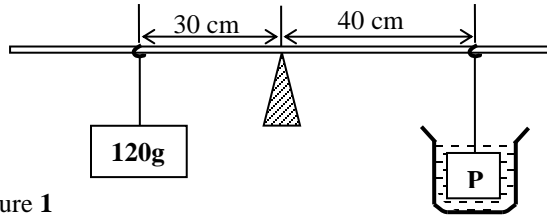


Figure 1

A mass of 120 g is suspended at 30 cm from the centre of the beam. The beam remains horizontal when a block P suspended at 40 cm from the centre of the beam is immersed in a liquid of density 800 kg m^{-3} as show in figure 1. If the volume of the liquid displaced is 10 cm^3 , find

- (i) the mass of the liquid displaced.
 (ii) the weight of P in air.
- (c)

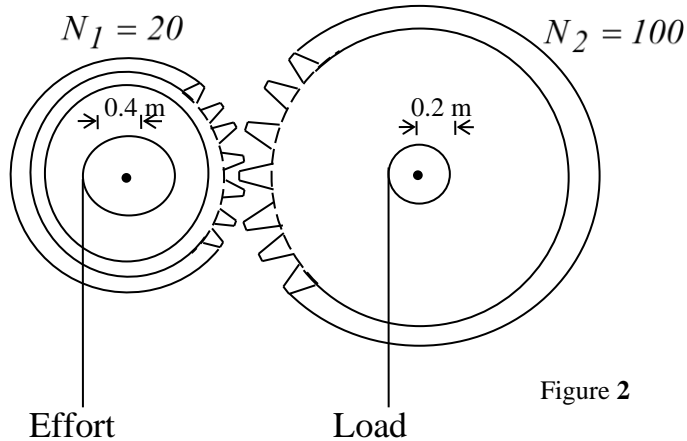


Figure 2

In the gear system sketched in figure 2, N_1 and N_2 are the number of teeth on the wheels. If the shaft radii are 0.4 m and 0.2 m respectively and the efficiency is 30%, find

- (i) the velocity ratio.
 (ii) the load that can be raised by an effort of 200 N