



Question 4:

- a) Definition of w
- b) Calculation of w & centripetal force
- c) Calculating the resultant force of a sock
Weight and friction are not considered in the calculation

d) **QER**

1-2 Marks

- Dampers reduce amplitude
- Define resonance

3-4 Marks

- Relationship of driving frequency and natural frequency
- Leading to amplitude of oscillation increases on resonance

5-6 Marks

- Forced oscillations on a rotating drum at natural frequency (drum rotational frequency)
- Due to rotation of unbalanced drum

Question 5:

- a) SHM graph plotting (5 marks) acceleration against displacement
Explanation of SHM prove by graph (negative gradient \rightarrow show SHM)
Calculator of w
- b) Prove 2π with no units

Question 6:

- a) Kinetic theory, use of $3/2kT$
- b) Derive $\overline{c^2} = Ek_{molecule} \div m$
- c) Constant temperature \rightarrow KE per molecule is same \rightarrow Even their mass is different

Question 7:

- a) Thermodynamics
 - Q is an energy transfer due to a temperature differences
 - Reference to heat as an energy transfer
 - Initial rate of heat flow with the initial temperature difference
 - Rate of heat flow was zero when equilibrium was reached
- b) $Q = mc\Delta\theta$
- c) Creative question
 - 1) \rightarrow Benefits of limited CO₂ emissions
 - 2) \rightarrow Drawback of pollution