DYNAMICS OF SHM (EXAMPLES)
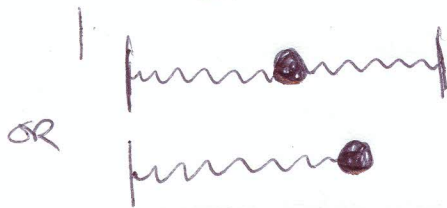
To show a system of forces leads to SHM we must:
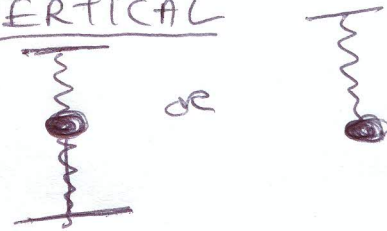
— Establish an equilibrium (mean) position [where $a=0$]

— Show Nett $F = -m\omega^2 x$

where $x=0$ is the equilibrium position

by examining forces at a typical position x from the mean position.

Basically two situations,

HORIZONTAL

OR

VERTICAL

or

' Horizontal ' Examples

Eg1   A particle of mass 5 kg rests on a smooth horizontal table between two vertical walls, 7 m apart. It is attached to the left hand wall by means of an elastic spring of natural length 1 m and elastic constant 12 N/m and to the right hand wall by means of an elastic string of natural length 1 m and elastic constant 8 N/m. The particle is released from rest 1.5m from the right hand wall.

(i) Show the particle performs S.H.M.

(ii) Calculate the time to travel from a point 2.8 m from the right hand wall to the mean position

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Left spring

$\kappa = 12$

$\ell_0 = 1$

Right spring

$\kappa = 8$

$\ell_0 = 1$