CHAPTER -2

UNITS AND MEASUREMENTS

focus area based questions -2.10

1) Check whether the following equations are dimensionally correct

a) $\tau = I\alpha$

τ = force × distance

I = moment of inertia

= mass × distance^2

α = Angle / Time^2

b) $1/2\ mv^2 = mgh$

c)

$$v_e = \sqrt{\frac{2GM}{r}}$$

V_e = escape velocity

d) De brogile wavelength,

$\lambda = h/mv$

h = Planck's constant $[ML^2T^{-1}]$

e) $E = mc^2$

f) $T = 2\pi\sqrt{(l/g)}$

g) Velocity of sound $V = \sqrt{(P/\rho)}$

p = pressure

ρ= density

2) Find dimension of a/b

$F = a\sqrt{x} + bt^2$

F= force

x= distance

t = time

3) $X = a + bt + ct^2 + dt^3$

x= distance

t= time

Find the dimension of a, b, c

4) The velocity of water V depends on the wavelength λ density of water ρ and acceleration due to gravity g. Find the correct relationship between physical quantities.

5) The frequency V of vibration of a stretched string depends upon
*it's length l
* it s mass per unit length m and
* the tension in the string
Obtain expression for frequency V

6) obtain expression for the centripetal force F acting on a particle of mass m moving with velocity v in a circle of radius r. Take dimensional constant k=1