IMPORTANT QUESTIONS:

Q.1 State the basic condition for simple Harmonic motion. **1992.**

Q.2 Define simple Harmonic Motion. Derive an expression for the acceleration of a body attached with a spring lying on a smooth horizontal surface executing simple Harmonic motion. **2008, 2002 P.E., 2000.**

Q.3 Prove that motion of the projection of a particle in a uniform circular motion is simple harmonic on one of the diameter of the reference circle.

2009, 2008, 2003 P.E, 2003 P.M, 2001, 1998, 1996, 1992.

Q.4 Derive the expression for instantaneous velocity of projection of a particle moving with the uniform velocity on the circumference of a circle.

2007, 2004, 1992.

Q.5 Define simple Harmonic motion. Prove that for small amplitude of vibration, the motion of a simple pendulum is simple harmonic.

2010,2007, 2005, 2002 P.M, 2002 P.E, 2000, 1997, 1995, 1994.

Q.6 Derive an expression for the time period of a simple pendulum.

2003 P.M.1997, 1995.

Q.7 Consider the spring and mass system to show that its energy will remain constant throughout its motion. **2008, 2006.**

FORMULAE FOR S.H.M.:-

i) Time period = $\left[T = 2\pi\sqrt{\frac{m}{k}}\right]$

ii) Frequency = $\left[\upsilon = \frac{1}{T}\right]$

iii) Acceleration = $\left[a = -\frac{k}{m}x\right]$

iv) Kinetic energy = $\left[K.E = \frac{1}{2}mv^2\right]$

v) Potential energy = $\left[P.E = 1/2kx^2\right]$

vi) Total energy = $\left[T.E = K.E + P.E\right]$

vii) Amplitude = $\left[x_0 = \sqrt{\frac{2(T.E)}{k}}\right]$

viii) Maximum Acceleration = $\left[a_{max} = -\frac{k}{m}x_0\right]$

ix) Maximum Velocity = $\left[v_{max} = x_0\sqrt{\frac{k}{m}}\right]$

IMPORTANT QUESTION:

Q1. What is stationary wave? On what factors does the frequency of stationary wave in a stretched string depend? **2005, 2002 P.M.**

Q2. Derive the expression for the frequency of a stationary wave produced in a stretched string vibrating in **(i)** one loop **(ii)** two loops **(iii)** Three loops **(iv)** 'n' loops. **2013, 2008, (2006 Supp) 2004, 2001, 1999, 1998, 1996.**

Q3. State three laws of transverse vibration of a stretched string in a sonometer. **2003 P.E, 1994.**

IMPORTANT QUESTIONAS:

Q1. Explain Newton's formula for the speed of sound. How did Laplace correct it. What is the effect of temperature on the speed of sound? Derive the relevant formula.

(2006 Supp., 2006, 2004, 2002, P.M, 2002 P.E, 2000, 1997, 1994, 1992.)

Q2. Define the following terms.

(i) Intensity of Sound **(ii)** Loudness

(iii) Intensity level **(iv)** Quality of Sound.

2004, 2001, 1992.

Q3. Explain the phenomenon of Beat. Obtain an expression for beat frequency for the waves describe the following. $Y_1 = A_0 \text{ Cos } 2\pi f_1 t$. $Y_2 = A_0 \text{ Cos } 2\pi f_2 t$ where symbols have their usual meaning **(2007, 2006 Supp., 2005, 2003 P.E.)**

Q4. Distinguish between musical sound and noise. **(2003 P.M.)**

Q5. What is Doppler's Effect? Obtain an expression for the apparent frequency heard by a listener. When he moves with a velocity "v" towards a stationary source of sound emitting sound waves of frequency "υ"

(2009, 2006, 2005, 2003 P.E, 2003 P.M, 2001, 1999, 1995, 1994.)

Q.6. What is doppler's effect? Drive the expression for apparent frequency when source of sound is moving away from listner and moving towards the listner.

(2013, 2007)

Q.7. Define Intensity of Sound and Loudness. Give weber fechner Law and explain the intensity level with its unit. **(2008)**

Q.8. Discuss the Newton's formula for the speed of sound and the flaw in it. In what way did laplace correct the formula? How do the pressure and temperature affect the speed of sound. **(2012)**