Test No. 6   Physics (Chapter 7) Class: First Year   Total Marks = 40

Name of the Student: _____

Question No. 1 Encircle the correct option.   (20)

i.   The maximum distance of vibrating body from the mean position when the body is executing SHM is called
        a. displacement   b. time period   c. frequency   d. amplitude

ii.   The sharpness of resonance is -------------- proportional to dampaing
        a. directly   b. exponentially   c. inversely   d. not related

iii.   The wave form of SHM is
        a. pulsed wave   b. sine wave   c. square wave   d. cosine wave

iv.   The time period of second pendulum is
        a. 1 s   b. 2 s   c. 3 s   d. 4 s

v.   The formula for frequency of simple pendulum is
        a. $1/2\pi \sqrt{l/g}$ b. $2\pi \sqrt{l/g}$ c. $2\pi \sqrt{g/l}$ d. $1/2\pi \sqrt{g/l}$

vi.   A simple harmonic oscillator completes 30 vibrations in 5 seconds. Its frequency is
        a. 30 Hz   b. 150 Hz   c. 6 Hz   d. 5 Hz

vii.   The process in which energy is dissipated from oscillation system is known as
        a. Damping   b. Conduction   c. Convection   d. Thermionic

viii.   The vibration of a factory floor caused by the running of heavy machinery is an example of
        a. Forced vibration   b. Free vibration   c. both a&b   d. None of these

ix. $[T^{-1}]$ is the dimension of
        a. Time   b. Frequency   c. Force   d. Acceleration

x.   Heating is produced in a microwave oven by the phenomena
        a. Total Internal Reflection   b. Refraction   c. Resonance   d. Dispersion

xi.   If mass of the bob of a pendulum is doubled, its period
        a. becomes half   b. becomes one third   c. becomes double   d. remains same

xii.   Time period of horizontal mass spring system is given by____
        a. $2\pi \sqrt{m/k}$ b. $2\pi \sqrt{k/m}$ c. $1/2\pi \sqrt{m/k}$ d. $1/2\pi \sqrt{k/m}$

xiii.   A system under going forced vibrations is known as
        a. simple pendulum   b. simple harmonic oscillator c. 2nd pendulum   d. Driven harmonic oscillator

xiv.   Damping is a process whereby energy is ------------ from the oscillating system
        a. conserved   b. dissipated   c. both a&b   d. none of these

xv.   If projection N starts it motion from upper extreme and subtends an angle of 45^0, then total phase is
        a. 45^0 b. 90^0 c. 120^0 d. 135^0

xvi.   The angular speed of the mass attached to a spring is
        a. $1/2\pi \sqrt{m/k}$ b. $2\pi \sqrt{m/k}$ c. $\sqrt{m/k}$ d. $\sqrt{k/m}$

xvii.   When a particle is moving along a circular part, its projection performs -------- along the diameter.
        a. linear motion   b. vibratory motion   c. SHM   d. rotatory motion

xviii. In SHM the velocity of a particle is maximum at
        a. mean position   b. extreme position   c. between mean and extreme   d. none of these

xix.   Time period of simple pendulum is independent of
        a. mass   b. length   c. acceleration due to gravity   d. restoring force

xx.   If F = 0.08 N and x = 4cm then K is equal to
        a. 8 N/m   b. 6 N/m   c. 4 N/m   d. 2 N/m

Question No. 2 Write the short answers of the following questions.   2x6=12

 I. Describe some common phenomena in which resonance plays an important role.

 II. Does frequency depends on amplitude for harmonic oscillators?

III. Can we realize an ideal simple pendulum?

IV. If a mass spring system is hung vertically and set into oscillations, why does the motion eventually stop?

 V. What is the total distance travelled by an object moving with SHM in a time equal to its period, its amplitude is A?

VI. Show that in SHM the acceleration is zero when the velocity is greatest and the velocity is zero when the acceleration is greatest?

Question No.3

a.   Explain SHM and uniform circular motion and calculate displacement of projection N. Also prove that when a particle P moves in a circle of radius r, its projection N performs SHM.   **(5)**

b.   What should be the length of a simple pendulum whose period is 1 second at a place where g= 9.8 m/s^2 ? What is the frequency of such a pendulum?   **(3)**