



12th Science : Physics
Oscillations,

DATE:

TIME: 1 hr

MARKS: 25

SEAT NO:

--	--	--	--	--	--

Note:-

1. All Questions are compulsory.
2. Numbers on the right indicate full marks.

Section A

Q.1 Select and Write the correct answer.

(4)

1. The length of second's pendulum on the surface of earth is nearly 1 m. Its length on the surface of moon should be

[Given: acceleration due to gravity (g) on moon is $1/6^{\text{th}}$ of that on the earth's surface]

- A) $\frac{1}{6}m$ B) 6m
C) $\frac{1}{36}m$ D) $\frac{1}{\sqrt{6}}m$

2. A particle performs linear S.H.M. starting from the mean position. Its amplitude is A and time period is T. At the instance when its speed is half the maximum speed, its displacement x is

- A) $\frac{\sqrt{3}}{2}A$ B) $\frac{2}{\sqrt{3}}A$
C) $\frac{A}{2}$ D) $\frac{1}{\sqrt{2}}A$

3. For particles A and B executing SHM, the equation for displacement is given by, $y_1 = 0.1 \sin(\omega t)$ and $y_2 = 0.1 \cos\pi t$. The phase difference between velocity of particle A with respect to that of B is

- A) $-\frac{\pi}{3}$ B) $\frac{\pi}{4}$
C) $-\frac{\pi}{6}$ D) $\frac{\pi}{3}$

4. Which of the equation given below represents a S.H.M.? acceleration =
(Here, k, k_0 , k_1 are force constants)

- A) $-k(x + a)$ B) $k(x + a)$
C) kx D) $-k_0x + k_1x^2$

Q.2 Answer the following.

(3)

1. What happen if Resonance frequency is equal to natural frequency ($\omega = \omega_n$)?
2. On which factor total energy of S.H.M. depends?
3. Define : Second Pendulum

Section B
Attempt any Four

- Q.3 Draw a neat and labelled diagram of a simple pendulum showing radial and tangential (2) component of a right 'mg' of a bob.
- Q.4 What do you know about restoring force? (2)
- Q.5 Define force constant. Write its formulae unit and dimensions. (2)
- Q.6 The bob of a simple pendulum is hollow sphere full of water. If a fine hole is made at the bottom of the sphere, how will time period of the pendulum be affected? (2)
- Q.7 Define frequency and hence, derive expression for frequency. (2)
- Q.8 Mention the SI unit and dimensional formulae of force constant. (2)

Section C
Attempt any Two

- Q.9 Explain damped oscillations. (3)
- Q.10 Obtain expression for displacement starting from mean and extreme position. (3)
- Q.11 Draw neat diagram to show graphical representation of K.E. , Pt. and T.E. in linear S.H.M. (3)

Section D
Attempt any One

- Q.12 Mention the SI unit, CGS unit and dimensional formula of damping constant. (4)
- State at which point during an oscillation the oscillator has zero velocity but positive acceleration?
- Q.13 Explain the force constant with oscillatory motion of a spring and set oscillating under gravity (4) through a small angle in a vertical plane.