OSCILLATIONS

General Instructions: Answer all the questions. If you are unable to answer any question, go through the page number that is given against that particular question in the text book. You can find the answer**.**

Test Paper-II

MAX MARKS: 30 **TIME: 90Mts**

1 Plot the graph showing the variation of Displacement as a continuous function of time for simple harmonic motion — P340 — 2

2 Plot a graph showing the — P340 — 3

a. Variation of two curves have constants ϕ=0 and -π/4 respectively.

b. Plots for ϕ=0 for two different periods

The amplitudes A is same for both the curves

3 Which of the following functions of time represent — P341 — 3

(a) Simple harmonic

(b) Periodic but not simple harmonic?

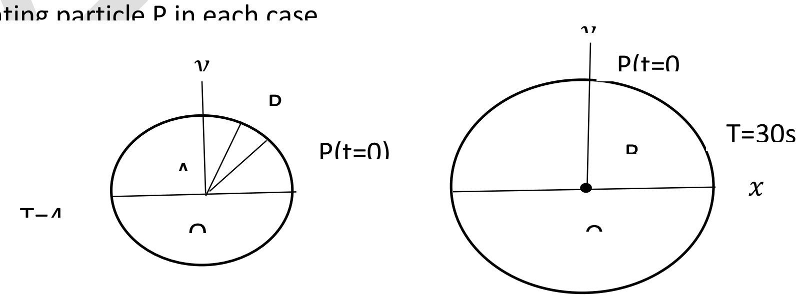
Give the period for each case.

(1) $\sin \omega t - \cos \omega t$

(2) $\text{Sin}^2\,\omega t$

4 Define Simple Harmonic Motion in terms of circular motion .Give the equation representing SHM giving the terms present in the equation. — P342 — 2

5 Figure depicts two circular motions. The radius of the circle, the period of revolution, the initial position and the sense of revolution are indicated on the figures. Obtain the simple harmonic motions of the x-projection of the radius vector of the rotating particle P in each case — P342 — 3



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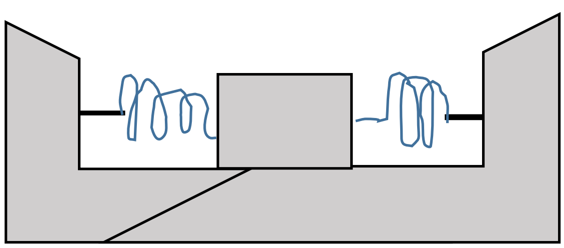
6	Show that acceleration of the particle executing SHM is equal to the negative of the displacement.	P343	3
7	Plot the graphs showing the displacement, velocity and acceleration of a particle in Simple Harmonic motion having the same period differ in phase.	P344	3
8	A body oscillates with SHM according to the equation (in SI units), $x = 5\cos(2\pi t + \frac{\pi}{4})$. At t=1.5s, calculate the (a) displacement, (b) speed and (c) acceleration of the body.	P344	3
9	Derive the Force Law for Simple Harmonic Motion executed by a particle of mass m.	P344	2
10	Two identical springs of spring constant k are attached to a block of mass m and to fixed supports as shown in fig. Show that when the mass is displaced from its equilibrium position on either side, it executes a simple harmonic motion. Find the period of oscillations.	P345	2



11	Show that the total energy of a particle executing Simple Harmonic Motion is $E = \frac{1}{2} k A^2$	P346	3
12	Draw the graph showing the variation of Kinetic energy, function of time and displacement of a particle in SHM.	P346	1