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## Free, Forced & Damped vibrations Q-1 (5)

Free vibrations :- When a body is displaced from its position of equilibrium and then released, it begins to vibrate. The time period of frequency of vibration depends upon the dimensions, moment of inertia and elastic constant of the vibrating system.

Such vibrations are called free vibrations and the frequency with which a body vibrates when left free to itself is called its natural frequency. The motion of a simple pendulum is an example of free vibration.

Forced vibrations :- The phenomenon of setting a body into vibrations with the help of a strong periodic force having a frequency different from the natural frequency of the body is called forced vibration.

If the frequency of the applied force is not equal to the natural frequency of the body, then the body tends to vibrate with its own period. The

applied force sometimes helps and sometimes oppose the motion of the body. Hence there is a tussle and the body is unable to attain a large amplitude. Finally, the body is forced to vibrate with any frequency depending upon that of the applied force, but the vibration die out so soon as the applied force is removed.

Damped vibrations: When a vibrating body vibrates in air or any other resisting medium, the amplitude of vibration does not remain constant but decreases gradually and ultimately the body comes to rest. This is due to resisting force acting upon the oscillating systems. Such a motion is called damped vibration.

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