

A solid cylinder of mass M and radius R rolls down an inclined plane from height h without slipping. The speed of the centre of mass when it reaches the bottom is:

(a)
$$\sqrt{\frac{6}{3}} gh$$
 (c) $\sqrt{\frac{10}{3}} gh$ (d) $\sqrt{\frac{2}{5}} gh$

The acceleration of a body rolling down an inclined plane does not depend on:

- (a) angle of inclination (b) acceleration due to gravity
- (c) mass of body (d) radius of body [Kanpur 2015]

Which of the following formula is not correct?

(b)
$$\overrightarrow{F} = m \overrightarrow{a}$$

(d) $\overrightarrow{p} = m \overrightarrow{v}$

$$\overrightarrow{J} = \overrightarrow{r} \times \overrightarrow{p}$$
 (d) $\overrightarrow{p} = m\overrightarrow{v}$ [Kanpur 2015]
Moment of inertia is:

- (a) a vector quantity (b) tensor quantity
 (c) both scalar and vector quantity (d) a scalar quantity [Kanpur 2015]
- The correct relationship among rotational kinetic energy (K), moment of inertia (I) and angular momentum (J) is:

(a)
$$K = \frac{J}{I}$$
 (b) $K = \frac{1}{2}IJ^2$

(c) $K = \frac{1}{2}JI^2$ [Kanpur 2015] The moment of inertia of rod of mass M and length *I* about an axis passing

through its centre of mass and perpendicular to its length is $\frac{1}{12}Ml^2$. The moment of inertia of the rod about an axis passing through one end of the rod perpendicular to it length will be:

(a)
$$\frac{1}{5}Ml^2$$
 (b) $\frac{1}{4}Ml^2$

(c)
$$\frac{1}{9}Ml^2$$
 [Kanpur 2015]

The radius of gyration of an object depends on:

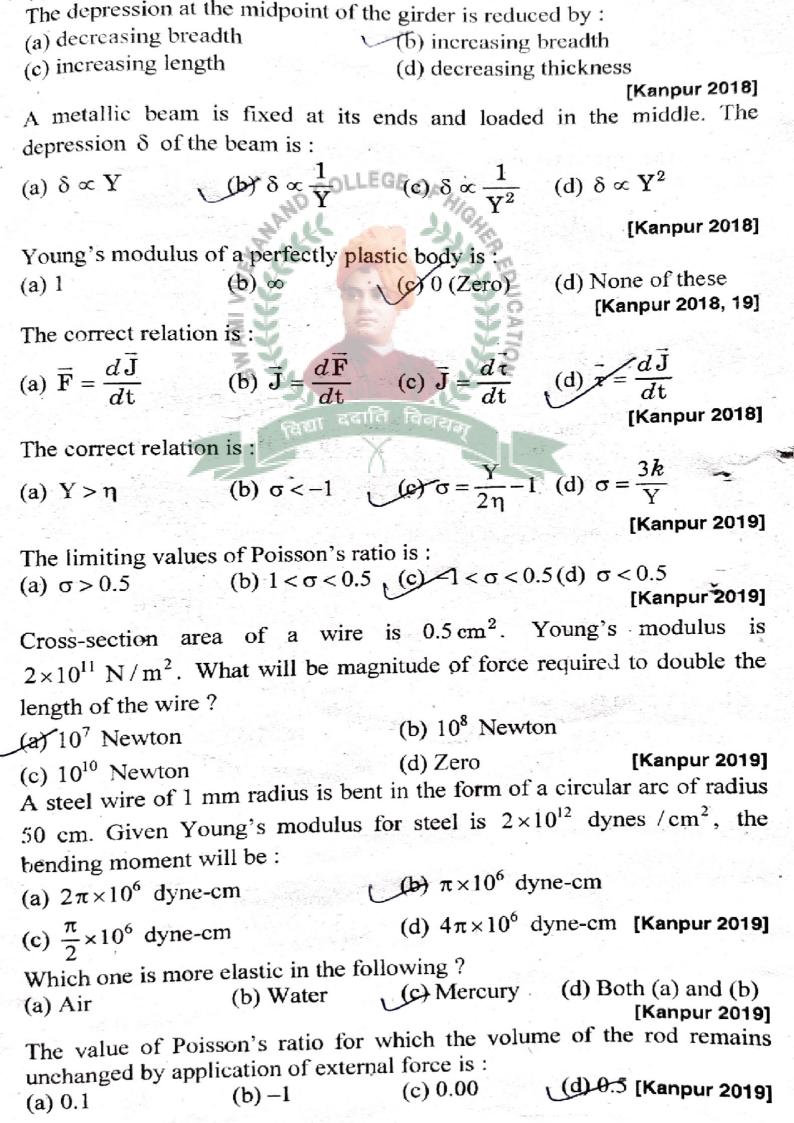
- (a) its axis of rotation (b) its size only
- (c) its shape only

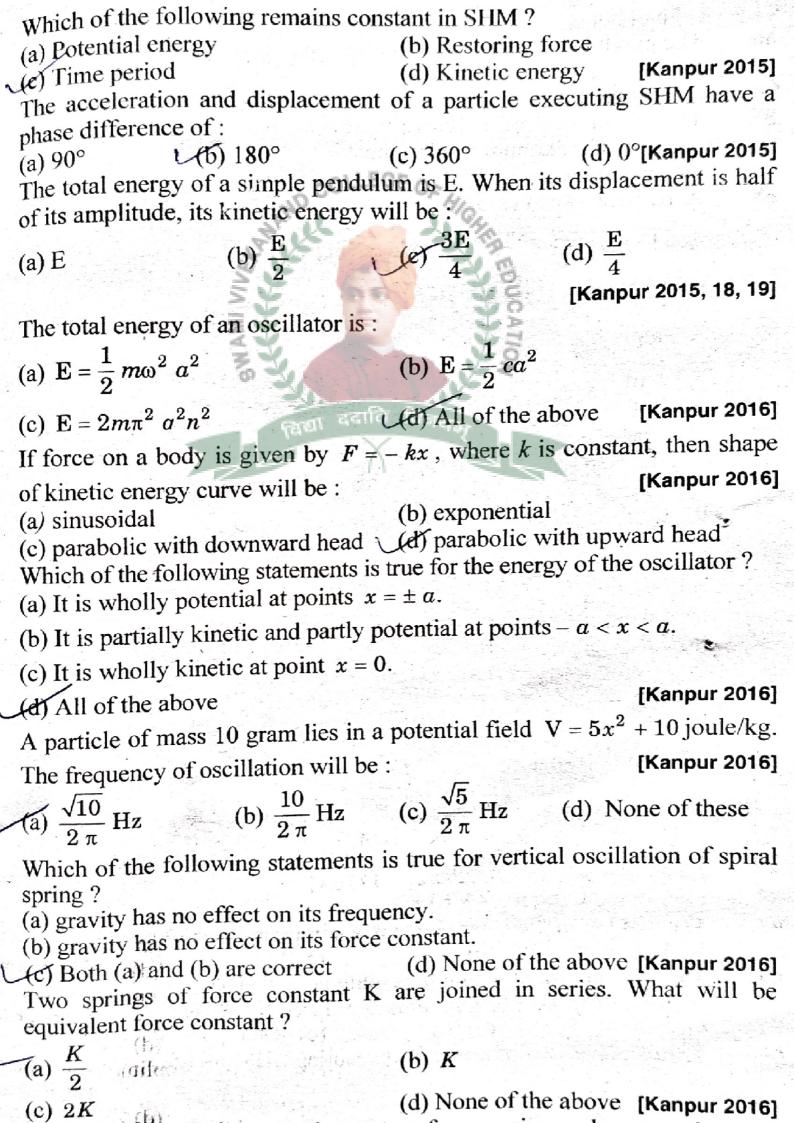
 (d) All of the above [Kanpur 2015]

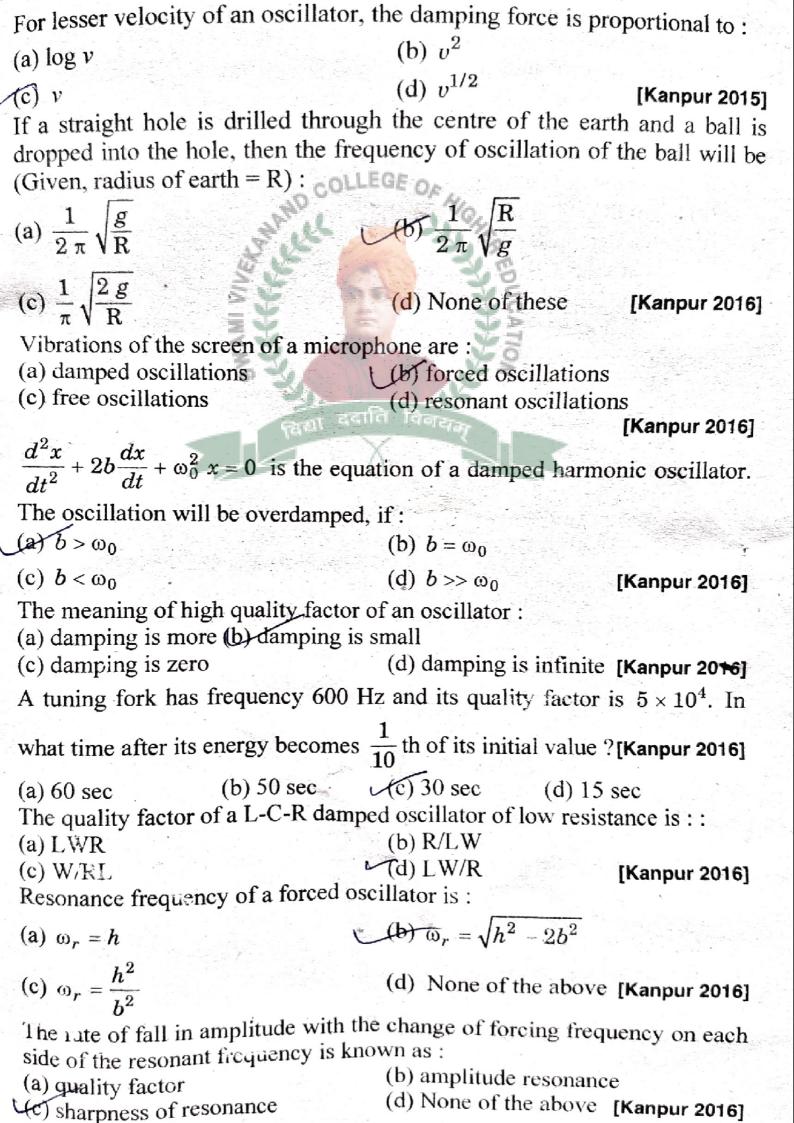
The moment of inertia of a disc of mass M and radius R about an axis perpendicular to its plane and passing through its centre is:

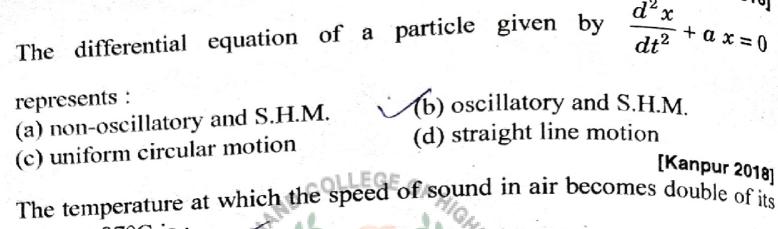
(a)
$$\frac{1}{4}MR^2$$
 (b) MR^2

 $(d) \frac{1}{2} MR^2$ [Kanpur 2015]









(b) 927°C (c) 54°C (d) 1200°C value at 27°C is:

(a) 108°C

[Kanpur 2018] The speed of longitudinal wave travelling in a gas of pressure P and

density d is:

(a)
$$v = \sqrt{\frac{\gamma P}{d}}$$

(b)
$$v = \sqrt{\frac{P}{d}}$$
 (c) $v = \sqrt{\frac{P}{\gamma d}}$ (d) $v = \gamma \sqrt{\frac{P}{d}}$

[Kanpur 2018]

If E is mean energy and τ is relaxation time, the power dissipation of a damped harmonic oscillator is:

(a) Et

(b) $\mathbf{E}\tau^2$ (c) \mathbf{E}/τ^2 (d) \mathbf{E}/τ

[Kanpur 2018]

The quality factor of an oscillatory system is:

(a)
$$Q = 2 \pi \frac{\text{Energy stored}}{\text{Energy loss per period}}$$

(b)
$$Q = 2 \pi \frac{\text{Energy loss per period}}{\text{Energy stored}}$$

(c)
$$Q = \frac{1}{2 \pi} \frac{\text{Energy stored}}{\text{Energy loss per period}}$$

(d)
$$Q = \frac{1}{2 \pi} \frac{\text{Energy loss per period}}{\text{Energy stored}}$$

[Kanpur ²⁰¹⁸]

The expression for intensity of a wave is:

(a) $2\pi^2 n^2 A^2 e$

(b) $2\pi^2 n^2 A^2 e^2$

(c) $2\pi^2 n^2 A^2 e^2 v$

 $(d) 2\pi^2 n^2 A^2 ev$

[Kanpur 2018]

At resonance the phase of displacement and velocity with respect to driving force:

(a) lags behind, zero

(b) leads ahead, zero

(d) zero, lags behind

[Kanpur ^{2018]}

(a) Tags behind, leads ahead

