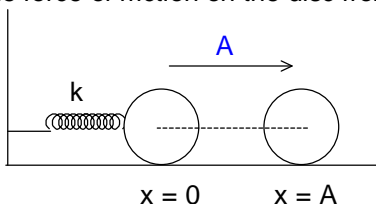


Comprehension Type

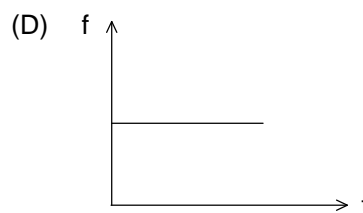
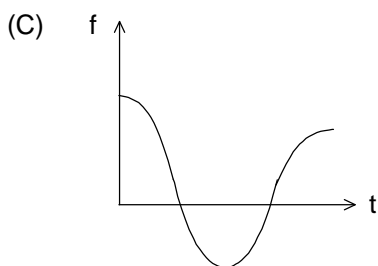
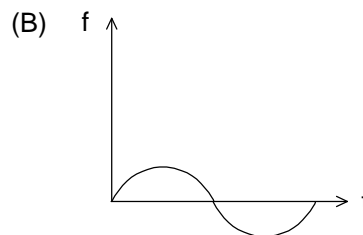
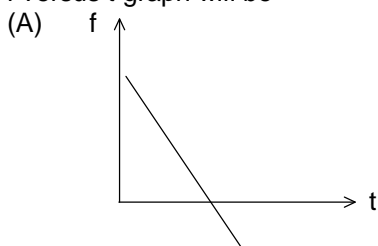
This section contains 2 paragraphs. Based upon one of paragraph 2 multiple choice questions and based on the other paragraphs 3 multiple choice questions have to be answered. Each of these questions has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct

Paragraph for Question Nos. 10 and 11

A disc of mass m and radius R is attached with a spring of force constant K at its centre as shown in figure. At $x = 0$ spring is unstretched. The disc is moved to $x = A$ and then released. There is no slipping between disc and ground. Let f be the force of friction on the disc from the ground.



10. f versus t graph will be



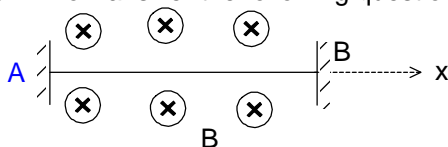
Space for Rough work

11. In the problem if $k = 10 \text{ N/m}$, $m = 2 \text{ kg}$, $R = 1 \text{ m}$ and $A = 2 \text{ m}$. Find linear speed of the disc at mean position.

(A) $\sqrt{\frac{40}{3}} \text{ m/sec}$ (B) $\sqrt{20} \text{ m/sec}$ (C) $\sqrt{\frac{10}{3}} \text{ m/sec}$ (D) $\sqrt{\frac{50}{3}} \text{ m/sec}$

Paragraph for Question Nos. 12 and 14

A standing wave $y = 2A \sin(kx) \cos(\omega t)$ set up in a wire AB fixed at both ends by two vertical wall contains a constant magnetic field B. Now answer the following questions.



12. The wire is found to vibrate in 3rd harmonic the maximum e.m.f induced is
 (A) $\frac{4AB\omega}{k}$ (B) $\frac{3AB\omega}{k}$ (C) $\frac{2AB\omega}{k}$ (D) $\frac{AB\omega}{k}$
13. In above question the time when the e.m.f becomes maximum for first time is
 (A) $\frac{2\pi}{\omega}$ (B) $\frac{\pi}{\omega}$ (C) $\frac{\pi}{2\omega}$ (D) $\frac{\pi}{4\omega}$
14. In which of following modes the e.m.f induced in AB is always zero.
 (A) Fundamental mode (B) second harmonic (C) second overtone (D) fourth overtone
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Space for Rough work