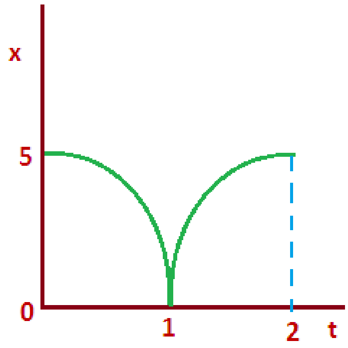
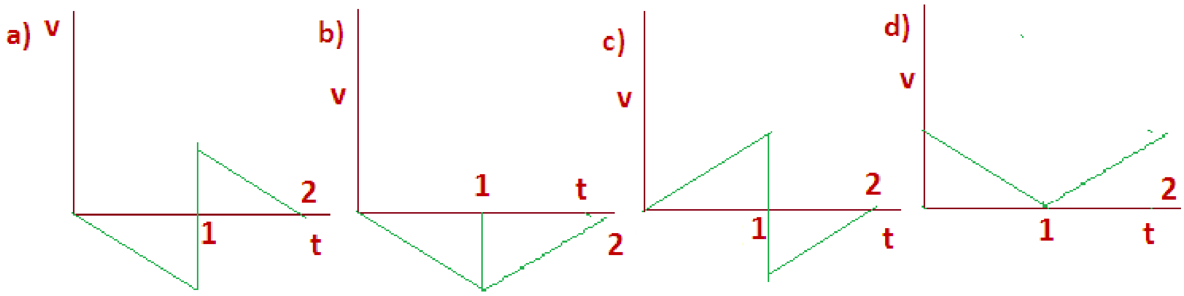
A few sample MCQs on the Syllabus of Class – XI+XII Combined in +2 Levels:

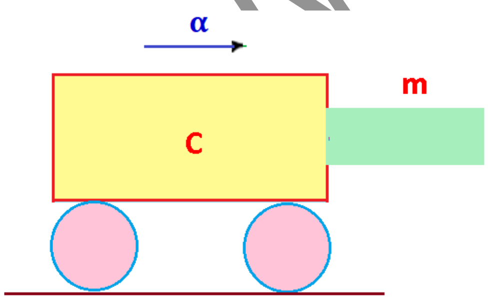
1. In an experiment four quantities a,b,c and d are measured with percentage error 1%, 2%, 3% and 4% respectively. Quantity P is calculated as follows $P = \frac{a^3b^2}{cd}$%. Error in P is (a) 14% (b) 10% (c) 7% (d) 4%

2. If $\vec{A} = 2\hat{i} + 3\hat{j}$ and $\vec{B} = \hat{i} + \hat{j}$ then find the component of the vector $\vec{A}$ along the vector $\vec{B}$ (a) $\frac{1}{\sqrt{2}}(\hat{i} + \hat{j})$ (b) $\frac{3}{\sqrt{2}}(\hat{i} + \hat{j})$ (c) $\frac{5}{2}(\hat{i} + \hat{j})$ (d) $\frac{7}{\sqrt{2}}(\hat{i} + \hat{j})$

3. The displacement-time graph of a moving particle with constant acceleration is shown in figure. The velocity-time graph is given by

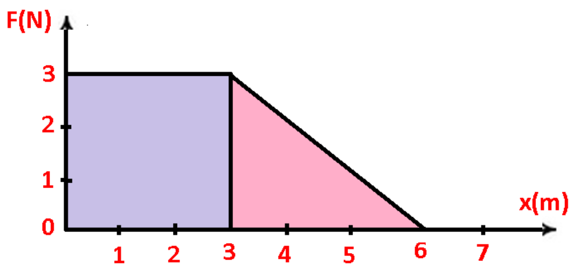




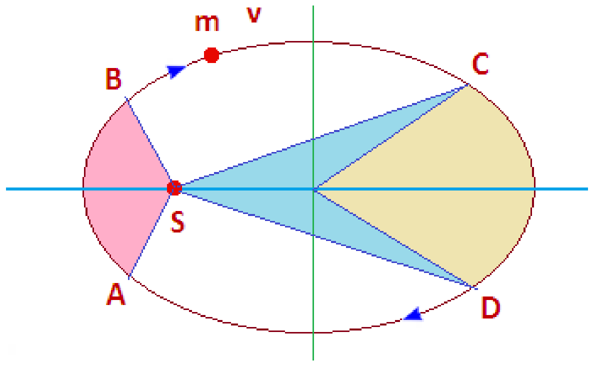


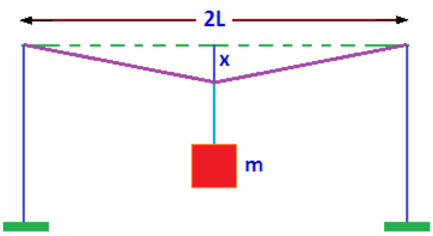
4. A block of mass m is in contact with the cart C as shown in the figure . The coefficient of static friction between the block and the cart. The acceleration α of the cart that will prevent the block from falling satisfies (a) $\alpha > \frac{mg}{\mu}$ (b) $\alpha > \frac{g}{\mu m}$ (c) $\alpha \geq \frac{g}{\mu}$ (d) $\alpha < \frac{g}{\mu}$

5. A force F acting on an object varies with distance x is in meter. The work done by the force in moving the object from $x = 0$ to $x = 6\text{m}$ (a) 4.5 J (b) 13.5 J (c) 9.0 J (d) 18.0 J



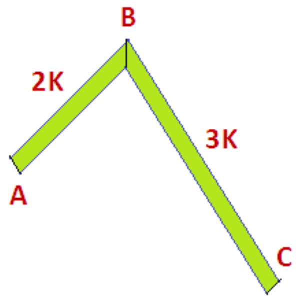
6. The figure shows elliptical orbit take of a planet m about the sun S.The shaded area SCD is twice the shaded area SAB. If t_1 isthe time for the planet to movefrom C to D and t_2 is the time to move fromA to B, then (a) $t_1 > t_2$ (b) $t_1 = 4t_2$ (c) $t_1 = 2t_2$ (d) $t_1 = t_2$



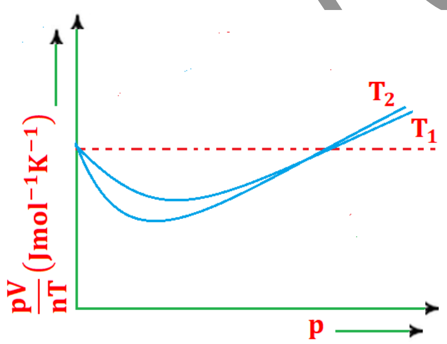


7. A mild steel wire of length $2L$ and cross-sectional area A is stretched, well within elastic limit, horizontally between two pillars as shown in figure. A mass m is suspended from the mid-point of the wire; strain in the wire is (a) $\frac{x^2}{2L^2}$ (b) $\frac{X}{L}$ (c) $\frac{x^2}{L}$ (d) $\frac{x^2}{2L}$

8. In the figure, ABC is a conducting rod whose lateral surfaces are insulated. The length of the section AB is one-half of that of BC and the respective thermal conductivities of the two sections are as given in the figure. If the ends A and C are maintained at 0°C and 70°C respectively, the temperature of junction B in the steady state is (a) $30°C$ (b) $40°C$ (c) $50°C$ (d) $60°C$

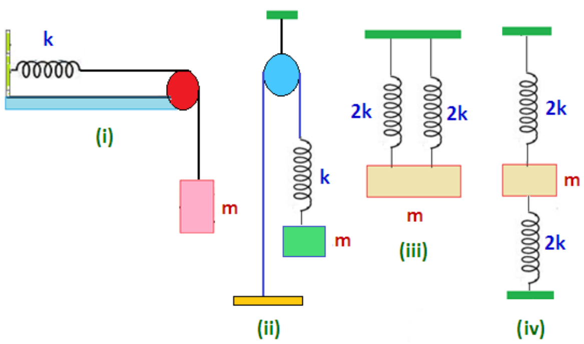


9. The figure below shows, the plot of $\frac{pV}{nT}$ versus p for oxygen gas at two different temperatures. Read the following statements concerning the above curves:



(I) The dotted line corresponds to the ideal gas behavior (II) $T_1 > T_2$ (III) The value of $\frac{pV}{nT}$ at the point, where the curves meet on the $Y-$axis is the same for all gases. Which of the above statements is true? (a) Only (I) (b) Both (I) and (II) (c) All of these (d) None of these

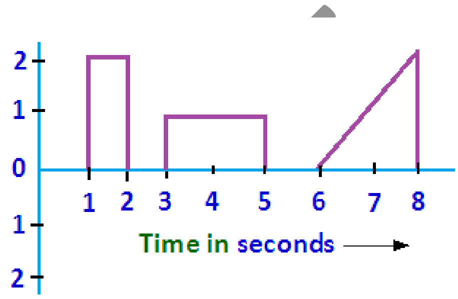
10. A block of mass m is suspended by different springs force constant shown in figure. Let time period of oscillation in these four positions beT_1, T_2, T_3 and T_4. Then, which of the following statement is correct?



(a) $T_1 = T_2 = T_4$ (b) $T_1 = T_2$ and $T_3 = T_4$ (c) $T_1 = T_2 = T_3$ (d) $T_1 = T_3$ and $T_2 = T_4$

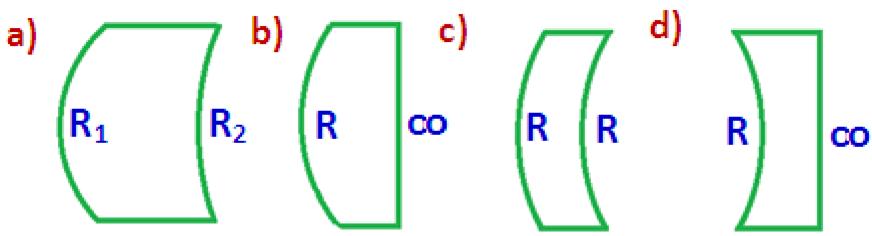
11. Point charge q moves from point P to point S along the path $PQRS$ (as shown in figure) in a uniform electric field E pointing co-parallel to the positive direction of X-axis. The coordinates of the points P, Q, R and S are $(a, b, 0), (2a, 0, 0), (a, -b, 0)$ and $(0, 0, 0)$ respectively. The work done by the field in the above process is given by the expression (a) qEa (b) $-qEa$ (c) $qEa\sqrt{2}$ (d) $qE\sqrt{(2a)^2 + b^2}$

12. A fully charged capacitor C with initial charge q_0 is connected to a coil of self inductance L at $t = 0$. The time at which the energy is stored equally between the electric field and magnetic field is (a) $\frac{\pi}{4}\sqrt{LC}$ (b) $2\pi\sqrt{LC}$ (c) $\sqrt{LC}$ (d) $\pi\sqrt{LC}$

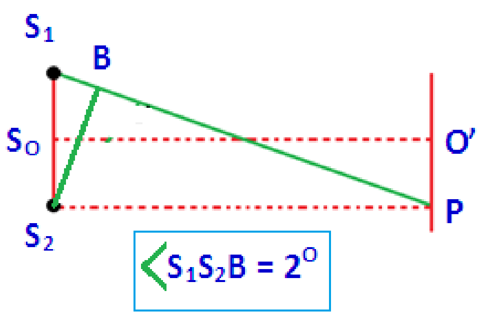


13. The plot represents the flow of current through a wire at three different times. The ratio of charges flowing through the wire at different times is (see figure) (a) 2:1:2 (b) 1:3: (c) 1:1: (d) 2:3:4

14. Which one of the following spherical lenses does not exhibit dispersion? The radii of curvature of the surfaces of the lenses are as given in the diagrams:



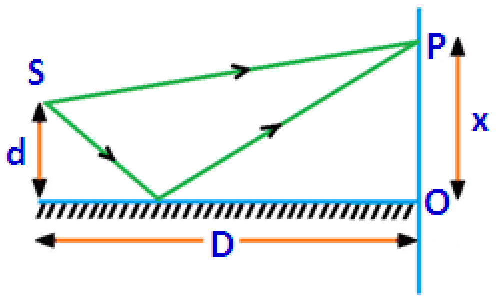
15. A short linear object of length L lies on the axis of a spherical lens of focal length f at a distance u from the lens. It's image has an axial length L' equal to (a) $L[\frac{f}{u-f}]^{1/2}$ (b) $L[\frac{(u+f)}{f}]^{1/2}$ (c) $L[\frac{f}{u-f}]^2$ (d) $L[\frac{f}{u+f}]^2$



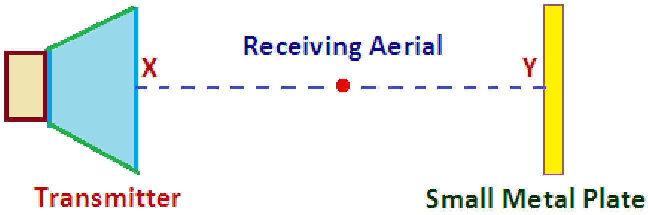
16. In the given figure, O' is the position of first bright ring towards right from OP is the position of 5th bright fringe on the other side of O with respect to O'. If wavelength ofused light is 6000Å,

then value of S_1B will be (a) 2.4×10^{-4} m(b) 2.4×10^{-2} m(c) 2.4×10^{-3} m(d) 2.4×10^{-6} m

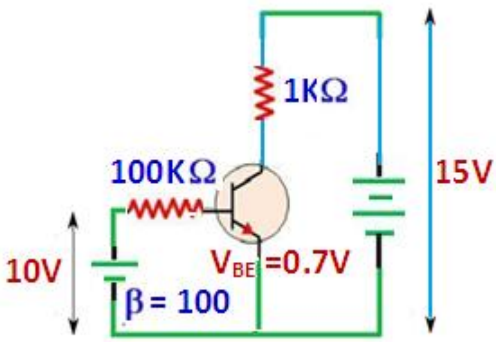
17. A narrow slit S transmitting light of wavelength λ isplaced a distance d above a large plane mirror asshown. The light coming directly from the slit and thatafter reflection interferes at P on the screen placed at a distance D from the slit. What will bex, for which first maxima occurs? (a) $\frac{4d}{\lambda D}$(b) $\frac{\lambda D}{4d}$(c)$\frac{2d}{D}$(d) $\frac{D}{2d}$



18. A transmitter of 3×10^{-2} m electromagnetic waves and a small plate are set up as shown. A receiving aerial is connected to a stable amplifier and a meter. (The speed of electromagnetic radiation is3.0×10^{8} ms^{-1}). Which of the following is then true? (1) When the receiving aerial is moved along the line XY, a maximum response is noted every 1.5×10^{-2} m (2) The frequency of wave is 10^{10} Hz (3) When the receiving aerial is placed at a suitable point behind the plate but on the line XY produced a response can again be note because diffraction occurs at the edges of the plate (a) if 1, 2, 3 are correct (b) if 1, 2 only correct (c) if 2, 3 only correct (d) if 1 only correct



19. A capacitor is being charged by an external source. Kirchhoff's first rule is applicable at each plate if 'current' means (a) displacement current (b) majority current (c) conduction current (d) both conduction and displacement current



20. A transistor CE circuit is shown in the figure (i) The base current I_B in mA is (a) 0.093 (b) 0.05 (c) 10 (d) 0.5 (ii) Collector current I_C in mA is (a) 15 (b) 9.3 (c) 100 (d) 1000