

一般入試前期A日程1日目

物 理

I	<p>1 mgL</p> <p>2 $L(1 - \cos\theta)$</p> <p>3 $\frac{1}{2}mgL\theta^2$</p> <p>4 力学的エネルギー保存則より $\frac{1}{2}mV^2 = \frac{1}{2}mgL\theta^2$ $\therefore V = \sqrt{gL}\theta$ \sqrt{gL} は定数</p> <p>5 ①より $3MV_A' + MV_B' = 3MV_0$ ②×Mより $M(V_A' - V_B') = -MV_0$ 両式の和より $4MV_A' = 2MV_0$ $\therefore V_A' = 0.5V_0$ $V_B' = V_A' + V_0 = 1.5V_0$</p> <p>6 $\frac{\pi}{2} \sqrt{\frac{L}{g}}$</p>	<div style="text-align: center;">(Aの運動)</div> <div style="text-align: center;">(Bの運動)</div> <p>7</p> <p>8 (衝突直前) $\frac{1}{2} \times 3MgL\theta_0^2$ (衝突直後) $\frac{1}{2} \times 3MgL\theta_1^2$</p> <p>9 $\sqrt{4\theta_0^2 - 3\theta_1^2}$ 10 $2\theta_0$</p>
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II	<p>ア 電場(電界)</p> <p>イ 電位</p> <p>1 $k \left\{ \frac{Q}{R-a} + \frac{(-Q)}{a-r} \right\}$</p> <p>2 </p> <p>3 $l = \sqrt{a^2 + r^2 - 2ar\cos\theta} = \sqrt{a^2 + \frac{a^4}{R^2} - 2a \frac{a^2}{R} \cos\theta}$ $= \sqrt{\frac{a^2}{R^2} (R^2 + a^2 - 2aR\cos\theta)} = \frac{a}{R} L$</p> <p>4 $k \frac{aRQ^2}{(R^2 - a^2)^2}$</p>	<p>ウ 等電位</p> <p>エ 静電誘導</p> <p>5 $\frac{a}{R} Q$</p>
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III	<p>波長 0.4 m</p> <p>1 振動数 0.5 Hz</p> <p>速さ 0.2 m/s</p> <p>2 正</p> <p>3 </p> <p>ア 短い</p> <p>イ 小さい</p>	<p>ウ $\frac{hc}{\lambda}$</p> <p>エ $\frac{h}{\lambda} \cos\theta$</p> <p>オ $\frac{h}{\lambda} \sin\theta$</p> <p>カ $\lambda \lambda'$</p> <p>4 散乱角θが大きくなるほど $\cos\theta$ が小さくなるため $\Delta\lambda$ は大きくなる</p> <p>5 $\theta = 180^\circ$</p> <p>6 $\lambda' = 7.7 \times 10^{-11} \text{ m}$</p>
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