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問1 (1) $mg \cos \theta$ (2) $mg \sin \theta$ (3) $\frac{\mu}{2} mg \cos \theta$

問2 (4) $\frac{1}{\sqrt{3}}$ (5) $\sqrt{\frac{8l}{g}}$ (6) $\sqrt{\frac{gl}{2}}$ (7) $\frac{m}{M} \sqrt{\frac{gl}{2}}$ (8) $\frac{1}{\sqrt{3}}$

問3 (9) $\sqrt{\frac{8l}{g}} + \frac{Md}{m} \sqrt{\frac{2}{gl}}$ (10) $\frac{2M-m}{4M} mgl + \frac{1}{2} Mgd$ (11) $\frac{1}{4} mgl$ (12) $\frac{1}{2} Mgd$
 (13) $\frac{M-m}{4M} mgl$

2

問1 (1) $\frac{V}{h}$ (2) $envab$ (3) $\frac{k}{e^2 n}$ (4) $\frac{e^2 BV}{kh}$ (あ) (ア) (5) $\frac{IB}{eaV'}$

問2 (イ) (ウ) (6) 0.5 (7) $\left(\frac{N_2}{N_1}\right)^2 \frac{V}{R}$ (8) $r \left(\frac{N_1}{N_2} I\right)^2$ (9) IV

3

問1 (1) $a \sin \frac{2\pi}{T} t$ (2) $\frac{x}{\lambda} T$ (3) $a \sin 2\pi \left(\frac{t}{T} - \frac{x}{\lambda}\right)$ (あ) (ウ)

(4) $\left(\frac{7}{4} - \frac{x}{\lambda}\right) T$ (5) $a \sin 2\pi \left(\frac{t}{T} + \frac{x}{\lambda}\right)$ (6) $2a$ (イ) B, D, F

問2 (7) $\sin i = n \sin r$ (8) $2d\sqrt{n^2 - \sin^2 i} = \left(m + \frac{1}{2}\right) \lambda$ (9) $2d\sqrt{n^2 - \sin^2 i} = (m + 1) \lambda$

(10) 4.3×10^2 (11) 1.4