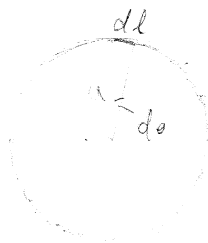


H27

問2

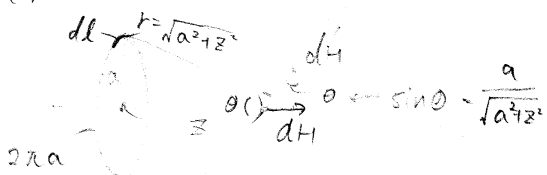
(1) ビオ・サバール法の法則より

$$\begin{aligned}
 H &= \int \frac{I}{4\pi a^2} dl \\
 &= \int_0^{2\pi} \frac{I}{4\pi a^2} a d\theta \\
 &= \frac{I}{2a}
 \end{aligned}$$



Z軸 正の方向

(2)



$$dH = \frac{I}{4\pi r^2} dl = \frac{I}{4\pi (a^2 + z^2)} dl$$

$$dH_z = dH \sin \theta$$

$$= \frac{aI}{4\pi (a^2 + z^2)^{3/2}} dl$$

$$H_z = \int_0^{2\pi a} \frac{aI}{4\pi (a^2 + z^2)^{3/2}} dl$$

$$= \frac{a^2}{2(a^2 + z^2)^{3/2}} I$$

Z軸 正の方向