Q1) Magnetic field at point A due to both infinite long current carrying wire.

① 5A — 5m — ② 2.5A — 2.5m — A

$B_{net} = B_1 + B_2$

$B_{net} = \frac{\mu_0 5}{2\pi(7.5)} + \frac{\mu_0 2.5}{2\pi(2.5)}$

$= \frac{\mu_0}{2\pi}\left(\frac{2}{3}\right) + \frac{\mu_0}{2\pi}$

$\frac{\mu_0}{3\pi} + \frac{\mu_0}{2\pi} = \frac{2\mu_0 + 3\mu_0}{6\pi}$

$= \frac{5\mu_0}{6\pi}$ ⊗

(a) $\frac{\mu_0}{2\pi}$ ⊙ (b) $\frac{5\mu_0}{6\pi}$ ⊙ (c) $\frac{5\mu_0}{6\pi}$ ⊗ (d) $\frac{\mu_0}{2\pi}$ ⊗

$B = \frac{\mu_0 i}{2\pi d}$

20 - 28 JEE (main)

July 17 → NEET

90%

720 / 610, 650, 660

85%

basic NEET 360 → 380, 390

Che - 150/180

80 - 90%

Exam

PYQP

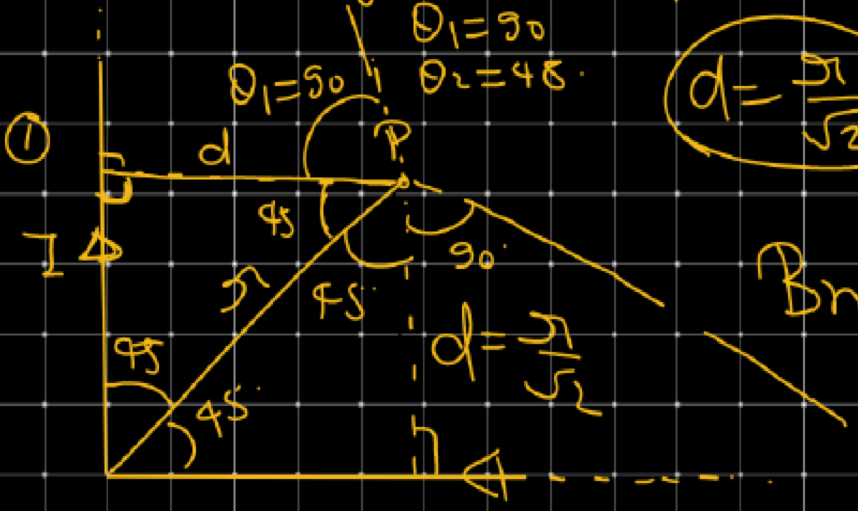
1 - Current

300+ Question

Top

Kota → test

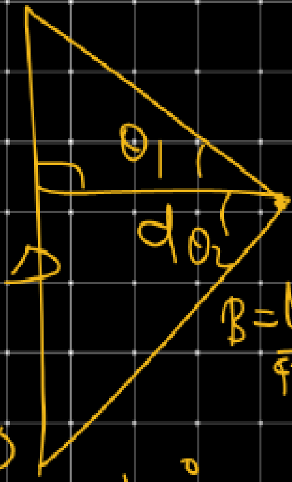
Q2) Find Magnetic field at Point P due to given wires.



$d = \frac{r}{\sqrt{2}}$

$B_{net} = 2\left[\frac{\mu_0 I}{4\pi r}(1+\sqrt{2})\right]$

$= \frac{\mu_0 I}{2\pi r}(1+\sqrt{2}) \otimes$



$B = \frac{\mu_0 i}{4\pi d}[\sin\theta_1 + \sin\theta_2]$

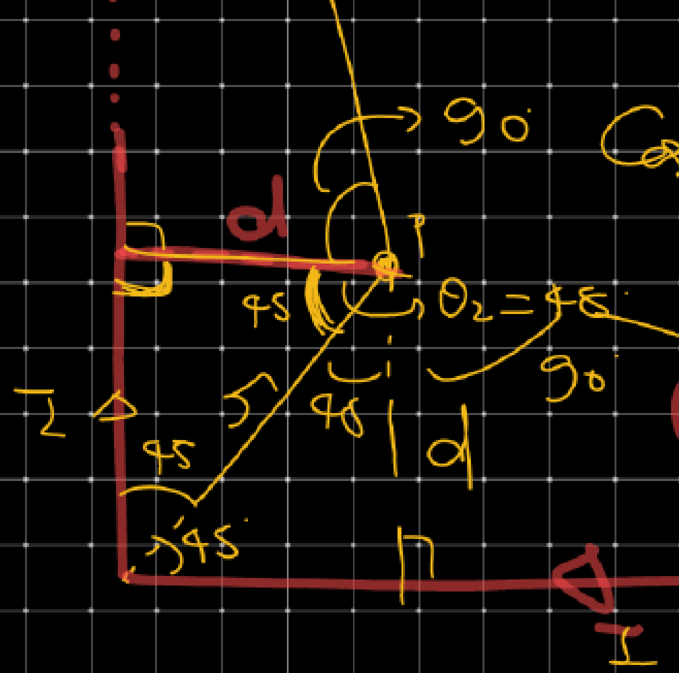
$B = \frac{\mu_0 i}{4\pi d}[\sin\theta_1 + \sin\theta_2]$

(a) $\frac{\mu_0 I}{4\pi r}(1+\sqrt{2}) \odot$

(b) $\frac{\mu_0 I}{2\pi r}(1+\sqrt{2}) \otimes$

(c) $\frac{\mu_0 I}{2\pi r}(1+\sqrt{2}) \odot$

(d) $\frac{\mu_0 I}{4\pi r}(1+\sqrt{2}) \otimes$



$$\cos 45 = \frac{d}{r}$$

$$\frac{1}{\sqrt{2}} = \frac{d}{r}$$

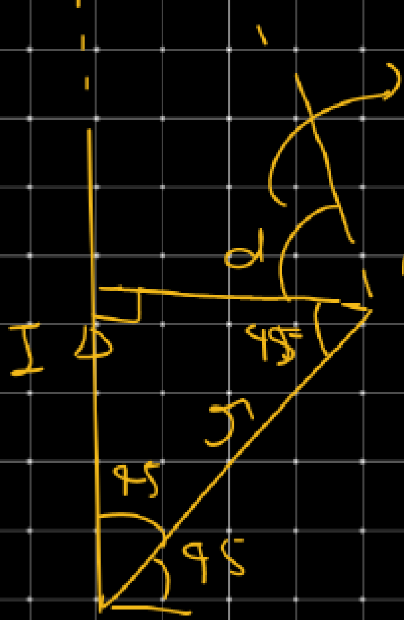
$$d = \frac{r}{\sqrt{2}}$$

$$B_P = \frac{\mu_0 I}{4\pi d}\left[\sin 90 + \sin 45\right]$$

$$B_P = \frac{\mu_0 I}{4\pi d}\left(1 + \frac{1}{\sqrt{2}}\right)$$

$$= \frac{\mu_0 I}{4\pi\left(\frac{r}{\sqrt{2}}\right)} \times \frac{(1+\sqrt{2})}{\sqrt{2}}$$

$$= \frac{\mu_0 I}{4\pi r}(1+\sqrt{2})$$



$\theta_1 = 90$
$\theta_2 = 45$

$$B = \frac{\mu_0 I}{4\pi\left(\frac{r}{\sqrt{2}}\right)}\left[\sin\theta_1 + \sin\theta_2\right]$$

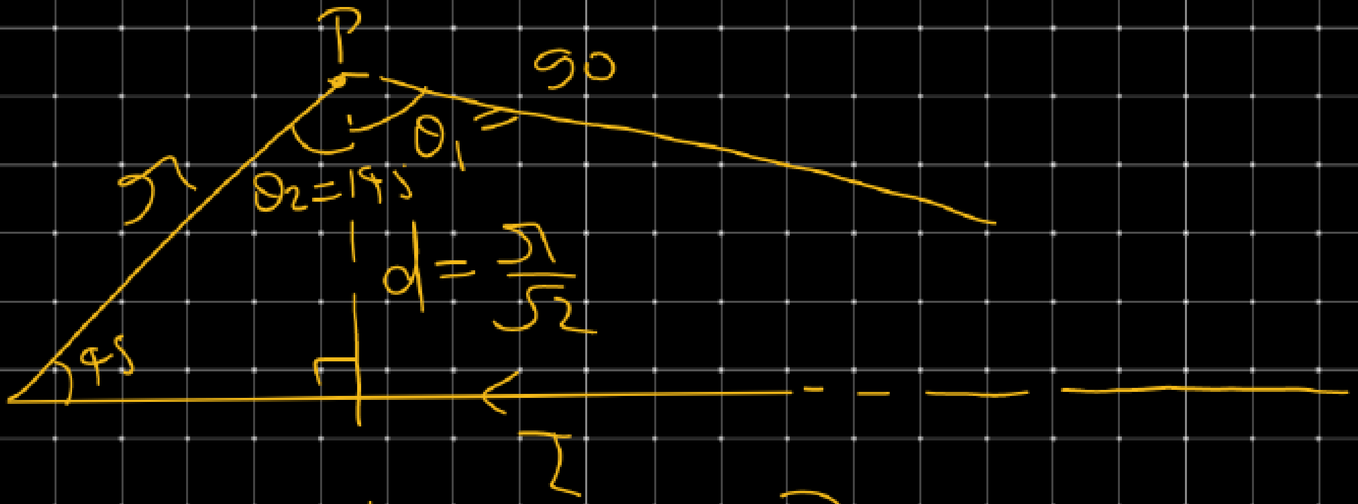
$$= \frac{\mu_0 I}{\frac{4\pi r}{\sqrt{2}}}\left(\sin 90 + \sin 45\right)$$

$$= \frac{\mu_0 I}{2\sqrt{2}\pi r}\left[1 + \frac{1}{\sqrt{2}}\right]$$

$$\frac{\mu_0 I}{2\sqrt{2}\pi r}\left(\frac{\sqrt{2}+1}{\sqrt{2}}\right)$$

$$= \frac{\mu_0 I}{4\pi r}\left(\sqrt{2}+1\right)$$

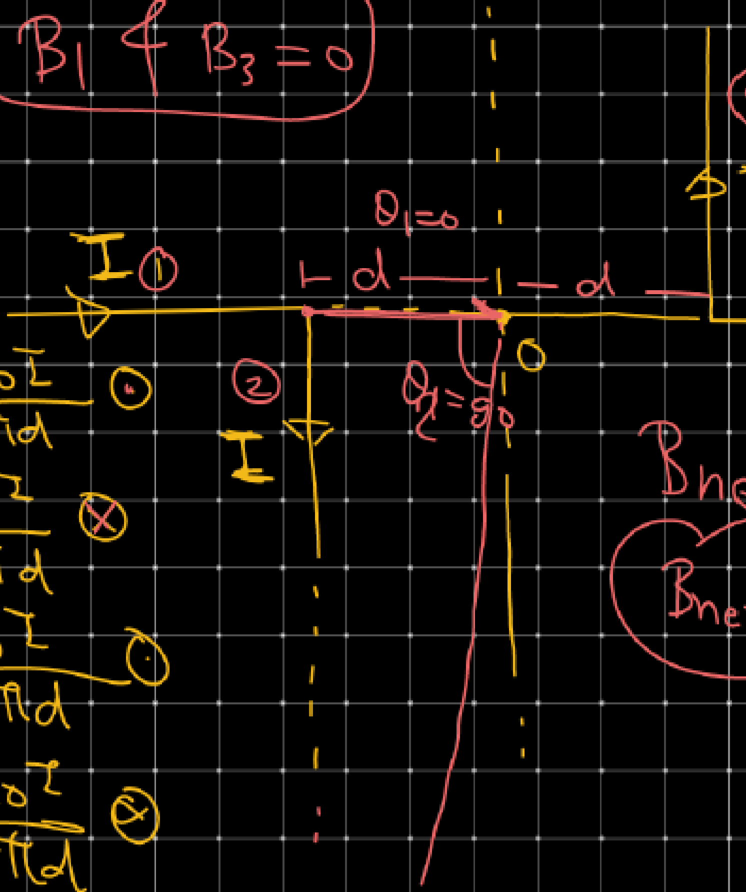
$\otimes$



$$B_p = \frac{\mu_0 I}{4\pi r}\left[1+\sqrt{2}\right]$$

Bnet at O.

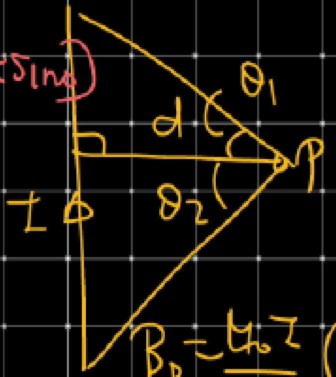
B_1 & $B_3 = 0$



$B_2 = \frac{\mu_0 i}{4\pi d}(\sin 90 + \sin 0)$

$= \frac{\mu_0 i}{4\pi d}$ ⊙

$B_4 = \frac{\mu_0 i}{4\pi d}$ ⊙



$B_P = \frac{\mu_0 I}{4\pi d}(\sin\theta_1 + \sin\theta_2)$

$B_{net} = 2 \times \frac{\mu_0 i}{4\pi d}$

$B_{net} = \frac{\mu_0 i}{2\pi d}$ ⊙

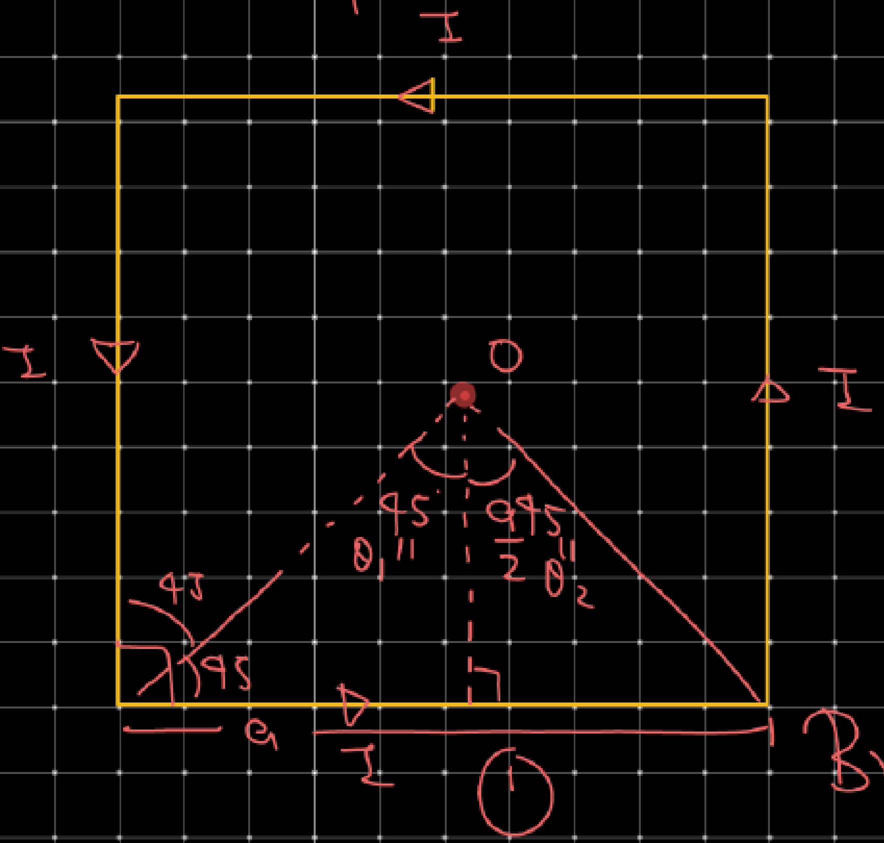
(a) $\frac{\mu_0 I}{2\pi d}$ ⊙

(b) $\frac{\mu_0 I}{2\pi d}$ ⊗

(c) $\frac{\mu_0 I}{4\pi d}$ ⊙

(d) $\frac{\mu_0 I}{4\pi d}$ ⊗

Square



$$B_1 = \frac{\mu_0 I}{4\pi\left(\frac{a}{2}\right)}\left[\sin 45^\circ + \sin 45^\circ\right]$$

$$B_1 = \frac{\mu_0 I}{2\pi a}\left[\frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}}\right]$$

$$B_1 = \frac{\mu_0 I}{2\pi a}\left[\frac{2}{\sqrt{2}}\right]$$

$$\boxed{B_1 = \frac{\mu_0 I}{\sqrt{2}\pi a}}$$

$$B_{net} = 4B_1 = \frac{4\mu_0 I}{\sqrt{2}\pi a} = \frac{2\times 2\mu_0 I}{\sqrt{2}\pi a}$$

$$\frac{2\times\sqrt{2}\times\sqrt{2}\,\mu_0 I}{\sqrt{2}\,\pi a} = \frac{2\sqrt{2}\,\mu_0 I}{\pi a}$$

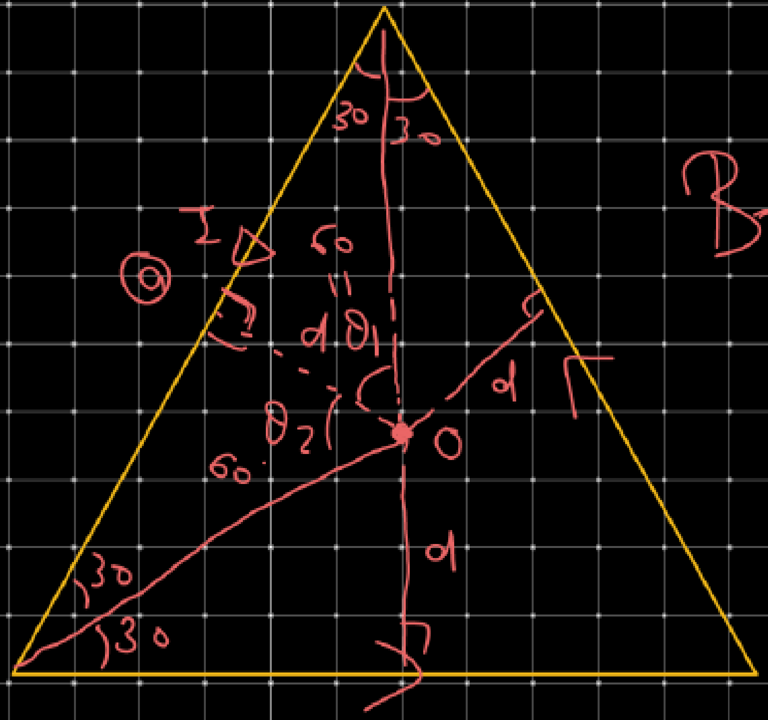
Q-) revise

Formula

12:30 hr

JIIT

NEET



45

$\theta_1 = 60°$

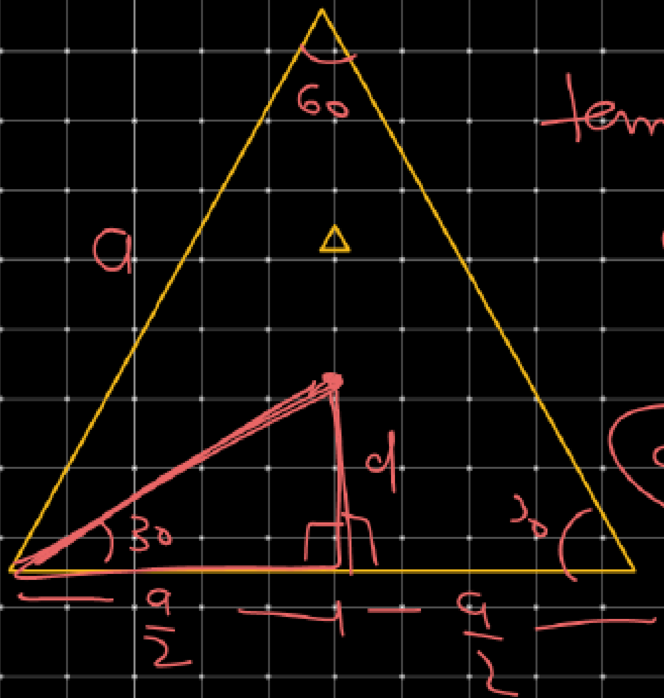
$\theta_2 = 60°$

$$B_{net} = 3\left[\frac{\mu_0 i}{4\pi d}\left(\sin 60 + \sin 60\right)\right]$$

$$= 3\left(\frac{\mu_0 I}{4\pi d} \times 2 \times \frac{\sqrt{3}}{2}\right)$$

$$= \frac{3\mu_0 I}{4\pi \frac{a}{2\sqrt{3}}} \times \sqrt{3} = \frac{3\mu_0 I\, 2\sqrt{3} \times \sqrt{3}}{2\pi a}$$

$$B_{net} = \frac{9\mu_0 I}{2\pi a}$$



$$\tan 30^\circ = \frac{d}{a/2}$$

$$d = \frac{a}{2}\tan 30^\circ$$

$$= \frac{a}{2} \times \frac{1}{\sqrt{3}}$$

$$d = \frac{a}{2\sqrt{3}}$$