KFUPM Physics Department	Phys102-251 Sec:01-02-03	Quiz-10-1209 09-Dec-2025

NAME _____

STUDENT No. _____

SECTION No. _____

STUDENT NUMBER

SECTION NUMBER

TEST CODE No.

1 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	26 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	51 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	76 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	101 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
2 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	27 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	52 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	77 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	102 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
3 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	28 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	53 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	78 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	103 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

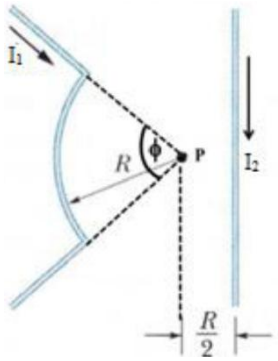
Q1. The figure shows two wires each carrying a current in the direction indicated in the figure. Wire 1, which consists of a circular arc of radius R and two radial lengths, carries a current I_1= 7.41 A. Wire 2 is long and straight; carries a current I_2= 3.22 A and is at a distance R/2 from the center of the arc. For what value of arc angle ϕ the net magnetic field B at point P due to the two currents is zero?

A) 110 °
B) 99.6 °
C) 80.7 °
D) 61.7 °
E) 41.8 °

$B_{arc} = B_{in}$

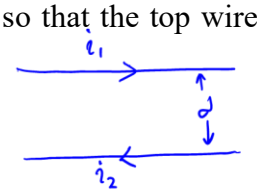
$\frac{\mu_0 i_1 \phi}{4\pi R} = \frac{\mu_0 i_2}{2\pi \frac{R}{2}}$

$\phi = 4\frac{i_2}{i_1} = 4\frac{3.22}{7.41} \times \frac{180}{\pi} = 99.6°$



Q2. A wire with a weight per unit length of 0.0632 N/m is suspended directly above a second parallel wire. The top wire carries a current of 81.5 A, and the bottom wire carries a current of 70.6 A. Find the separation between the wires, in the unit mm, so that the top wire will be held in place by magnetic repulsion.

A) 11.8
B) 22.8
C) 15.3
D) 18.2
E) 6.01



$\frac{F}{\ell} = \frac{\mu_0 i_1 i_2}{2\pi d}$

$d = \frac{\mu_0 i_1 i_2}{2\pi(\frac{F}{\ell})} = \frac{4\pi \times 10^{-7}(81.5)(70.6)}{2\pi(0.0632)} = 18.2\ mm$

23 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	48 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	73 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	98 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	123 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
24 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	49 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	74 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	99 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	124 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
25 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	50 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	75 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	100 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	125 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ