KFUPM	Phys102-251	Quiz-07-1104
Physics Department	Sec:01-02-03	04-Nov-2025

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TEST CODE No.

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

Q1. Two identical charged particles ($m = 1.37$ g, $q = 0.970$ μC) are initially held 1.18 cm away from each other. They are released from rest. What is the speed of each particle, in the unit m/s, when the distance between them is doubled? $k = 8.99 \times 10^9$ Nm^2/C^2.

A) 45.7
B) 22.9
C) 32.3
D) 16.2
E) 64.7

$$\Delta K = -\Delta U$$

$$K_f - K_i = -(U_f - U_i)$$

$$2\left(\frac{1}{2}mv^2\right) - 0 = -\left(\frac{kq^2}{2d} - \frac{kq^2}{d}\right) = \frac{1}{2}\frac{kq^2}{d}$$

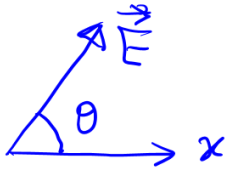
$$v = \sqrt{\frac{kq^2}{2md}} = \sqrt{\frac{8.99\times10^9}{2(1.18\times10^{-2})(1.37\times10^{-3})}}\,0.970\times10^{-6} = 16.2 \text{ m/s}$$

Q2. The electric potential over a particular region is given by $V(x,y) = 9.36 - 7.24\,x - 5.63y^2$. Determine the angle between the electric field $\vec{E}$ at point P and the positive x axis. The coordinates of the point P are $x = 1.37$ m and $y = 2.19$ m.

A) 69.8 °
B) 73.6 °
C) 88.7 °
D) 83.3 °
E) 59.6 °

$$E_x = -\frac{\partial V}{\partial x} = -(-7.24)$$

$$E_y = -\frac{\partial V}{\partial x} = -(-5.63(2y))$$



$$\theta = \tan^{-1}\left(\frac{E_y}{E_x}\right) = \tan^{-1}\left(\frac{5.63\times2\times2.19}{7.24}\right) = 73.6^\circ$$

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