

University/College/School Name  
 Institute Name  
 Departament Name  
 Prof. Name

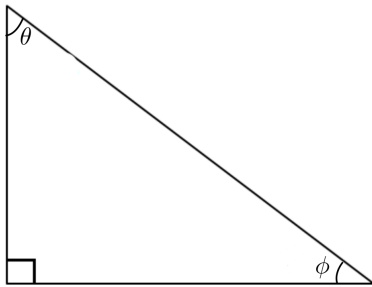
Exam/Test 1 – Physics 101 – 01 Jan 2023

**Any important message to students, if necessary**

1. Mark the true alternative.

- (a) The result of summing a vector and a scalar is a scalar.
- (b) A vector multiplied by a scalar results is a vector with different direction.
- (c) Division between vectors is defined in Mathematics.
- (d) If  $\vec{A}$  and  $\vec{B}$  are vectors, then  $\vec{A} \times \vec{B}$  is a vector perpendicular to both  $\vec{A}$  and  $\vec{B}$ .
- (e) Vectors can not be multiplied by scalars.

2. Consider the rectangle triangle of the figure below and knowing  $\theta = 15^\circ$ , determine  $\phi$  **in rad**.



- (a)1.187 (b)1.309 (c)1.123 (d)1.029 (e)1.278

3. A particle of mass 4.4 kg is subject to an external force of 18.3 N. Calculate the acceleration in  $\text{m/s}^2$  in a one-dimensional movement.

- (a)7.7 (b)14.3  
 (c)12.0 (d)4.2  
 (e)0.3

### Fórmulas e Constantes

$$I = \frac{P_s}{4\pi r^2}; \quad E = hf; \quad p = \frac{hf}{c} = \frac{h}{\lambda}$$

$$hf = K_{\max} + \Phi; \quad \Delta\lambda = \frac{h}{mc}(1 - \cos\phi)$$

$$\frac{d^2\psi}{dx^2} + \frac{8\pi^2m}{h^2}[E - U(x)]\psi = 0$$

$$T \approx e^{-2bL}, \text{ onde } b = \sqrt{\frac{8\pi^2m(U_b - E)}{h^2}}$$

$$E_n = \left( \frac{h^2}{8mL^2} \right) n^2, \text{ para } n = 1, 2, 3 \dots$$

$$\psi_n(x) = A \sin\left(\frac{n\pi}{L}x\right), \text{ para } n = 1, 2, 3 \dots$$

$$\Delta x \Delta p = h/2\pi$$

$$\epsilon_0 = 8,854 \times 10^{12} \text{ F/m}; \quad \mu_0 = 1,257 \times 10^{-6} \text{ H/m}$$

$$c = 3,0 \times 10^8 \text{ m/s}; \quad h = 6,63 \times 10^{-34} \text{ J/s} = 4,14 \times 10^{-15} \text{ eV.s}$$

$$hc = 1240 \text{ eV.nm}$$

$$\text{Eletron : } mc^2 = 511 \text{ keV}$$

### Example

For the ID number 2013579, mark as follows:

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