KEY

Physics 12 – REVIEW Name: KEY

Note that it is **always** necessary to show all the steps that reflect your reasoning.

Convert the following to m/s:

1. 50 km/h

$$\frac{50\,km}{1\,h} \times \frac{1000\,m}{1\,km} \times \frac{1\,h}{3600\,s} = \frac{50000}{3600}\frac{m}{s} = 13.\overline{8}\ m/s \doteq \underline{14\ m/s}$$

2. 360 km/h

$$\frac{360\,km}{h} \times \frac{1000\,m}{1\,km} \times \frac{1\,h}{3600\,s} = 100\ m/s = \underline{1.00 \times 10^2\ m/s}$$

3. 85 m/min

$$\frac{85\,m}{min} \times \frac{1\,min}{60\,s} = \frac{85}{60}\ m/s \doteq \underline{1.4\ m/min}$$

4. 200 km/s

$$\frac{200\,km}{1\,s} \times \frac{1000\,m}{1\,km} = 200\,000\ m/s = \underline{2.00 \times 10^5\ m/s}$$

Convert the following to km/h:

5. 0.8 m/s

$$\frac{0.8\,m}{s} \times \frac{1\,km}{1000\,m} \times \frac{3600\,s}{1\,h} = 2.88\ km/h \doteq \underline{3\ km/h}$$

6. 256 m/s

$$\frac{256\,m}{s} \times \frac{1\,km}{1000\,m} \times \frac{3600\,s}{1\,h} = 921.6\ km/h = \underline{9.22 \times 10^2\ km/h}$$

7. 0.04 m/s

$$\frac{0.04\,m}{s} \times \frac{1\,km}{1\,000\,m} \times \frac{3600\,s}{1\,h} = 0.144\ km/h \doteq \underline{1.4 \times 10^{-1}\ km/h}$$

8. 25 km/s

$$\frac{25\,km}{s} \times \frac{3600\,s}{1\,h} = 90000\ km/h = \underline{9.0 \times 10^4\ km/s}$$

$i = 0 = 1 =$ initial

$f = " " = 2 =$ final

KINEMATICS FORMULAE:

Given $v = v_0 + at$ isolate for a) time

$$t = \frac{v_f - v_i}{a}$$

$$v_f = v_i + at$$

b) acceleration

$$a = \frac{v_f - v_i}{t}$$

Given $\overline{v} = \frac{v+v_0}{2}$ isolate for a) initial velocity

$$v_i = 2 \cdot v_{avg} - v_f$$

$$v_{avg} = \frac{V_f + V_i}{2}$$

b) final velocity

$$v_f = 2 \cdot v_{avg} - v_i$$

Given $v^2 = v_0^2 + 2ad$ isolate for a) initial velocity

$$v_i = \pm\sqrt{v_f^2 - 2ad}$$

$$v_f^2 = v_i^2 + 2ad$$

b) acceleration

$$a = \frac{v_f^2 - v_i^2}{2d}$$

c) displacement

$$d = \frac{v_f^2 - v_i^2}{2a}$$

Given $d = v_0 t + \frac{1}{2}at^2$ isolate for a) time when the object is initially at rest $\rightarrow v_i = 0\ m/s$

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

$$d = v_i t + \frac{1}{2}at^2$$

b) acceleration

$$a = \frac{d - v_i t}{\frac{1}{2}t^2} = \frac{2(d - v_i t)}{t^2}$$