EXERCISE SOLUTIONS_8TH_PHY_TERM 1

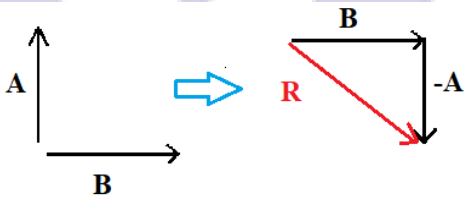
1. MEASUREMENTS, UNITS, DIMENSIONS, VECTORS

LEVEL 1

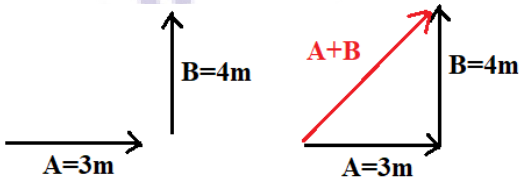
1. (d) Mass, length, temperature are base quantities
2. (d) All are units of length
3. (a) 1 m = 100 cm
4. (d) Mass is a base quantity whereas others are derived quantities
5. (c) $Density = \frac{mass}{volume}$, $SI\ unit: \frac{kg}{m^3}$
6. (c) $1g = 10^{-3}kg, 1cm^3 = 10^{-6}m^3, then \frac{1g}{cm^3} = \frac{10^3 kg}{m^3}$
7. (a) $SI\ unit\ of\ velocity: ms^{-1}, Dimensions\ of\ velocity = [M^0L^1T^{-1}]$
8. (a) $SI\ unit\ of\ acceleration: ms^{-2}, Dimensions\ of\ acceleration = [M^0L^1T^{-2}]$
9. (b) Vector quantities are defined using magnitude as well as direction.
10. (b) $1km = 1000m, 1hr = 3600s, \frac{1km}{hr} = \frac{1000}{3600}\frac{m}{s} = \frac{5}{18}\frac{m}{s}$

LEVEL 2

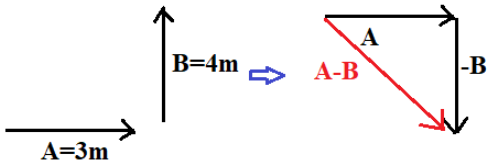
1. (c) $Dimensional\ formula\ of\ force = [M^1L^1T^{-2}]$
   $Since\ [M^aL^bT^c] = [M^1L^1T^{-2}], a = 1, b = 1, c = -2, thus\ 2a - b - c = 2 - 1 + 2 = 3$
2. (d) $1km = 10^5cm, 1hr = 3600s, 54\frac{km}{hr} = 54x\frac{10^5}{3600}\frac{cm}{s} = 1500\frac{cm}{s} = 1.5\ x\ 10^3\frac{cm}{s}$
3. (d) $1m = 10^3mm, 1m^2 = 10^6\ mm^2$
4. (b) $Dimensions\ of\ F = [M^1L^1T^{-2}], Dimensions\ of\ V^2 = [M^0L^2T^{-2}]$
   $Since, F = kV^2, thus\ k = \frac{F}{V^2} = \frac{[M^1L^1T^{-2}]}{[M^0L^2T^{-2}]} = [M^1L^{-1}T^0]$
5. (c) $By\ triangle\ law\ of\ vector\ addition, \vec{C} + \vec{A} = \vec{B}$
6. (d)



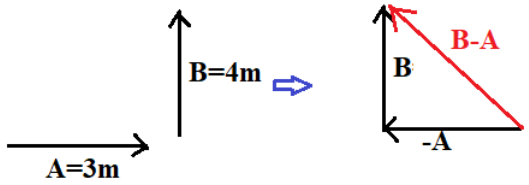
7. (b) $By\ pythagoras\ theorem, (A + B) = \sqrt{A^2 + B^2} = 5m$



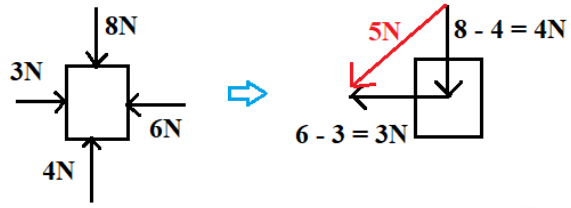
8. (c) $By\ pythagoras\ theorem, (A + B) = \sqrt{A^2 + B^2} = 5m$



9. (a) $By\ pythagoras\ theorem, (A + B) = \sqrt{A^2 + B^2} = 5m$



10. (c) $By\ pythagoras\ theorem, R = \sqrt{4^2 + 3^2} = 5m$



SUBJECTIVE QUESTIONS:

3. a) $SI\ unit\ of\ pressure\ is\ Pa(pascal)\ or\ kgm^{-1}s^{-2}$
   b) $SI\ unit\ of\ density\ is\ kgm^{-3}$
   c) $SI\ unit\ of\ work\ is\ J(joule)\ or\ kgm^2s^{-2}$

4. $From\ the\ relation\ F = G\ \frac{m_1m_2}{d^2}, G = \frac{Fd^2}{m_1m_2}$
   $SI\ unit\ of\ G\ is\ Nm^2kg^{-2}$
   $CGS\ unit\ of\ G\ is\ dyne\ cm^2g^{-2}$

5. a) $Dimensional\ formula\ of\ force\ is\ [M^1L^1T^{-2}]$
   b) $Dimensional\ formula\ of\ acceleration\ is\ [M^0L^1T^{-2}]$
   c) $Dimensional\ formula\ of\ density\ is\ [M^1L^{-3}T^0]$

7. a) $4m\ in\ the\ direction\ of\ \vec{A}$
   b) $7m\ in\ the\ direction\ of\ \vec{A}\ and\ \vec{B}$