

# KEY TO EX: 16-18

## UNIT II: ANSWERS

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16. (a) # of milligrams =  $0.25 \text{ Mg} \times \frac{1 \times 10^6 \text{ g}}{1 \text{ Mg}} \times \frac{1 \text{ mg}}{1 \times 10^{-3} \text{ g}} = 2.5 \times 10^8 \text{ mg}$

(b) # of centiseconds =  $10 \text{ } \mu\text{s} \times \frac{10^{-6} \text{ s}}{1 \text{ } \mu\text{s}} \times \frac{1 \text{ cs}}{10^{-2} \text{ s}} = 1 \times 10^{-3} \text{ cs}$

(c) # of millimetres =  $(5.8 \text{ cm}) \times \frac{10^{-2} \text{ m}}{1 \text{ cm}} \times \frac{1 \text{ mm}}{10^{-3} \text{ m}} = 158 \text{ mm}$   $1.58 \times 10^2 \text{ mm}$

(d) # of kilograms =  $250 \text{ mg} \times \frac{10^{-3} \text{ g}}{1 \text{ mg}} \times \frac{1 \text{ kg}}{10^3 \text{ g}} = 2.5 \times 10^{-4} \text{ kg}$

(e) # of decilitres =  $0.5 \text{ kL} \times \frac{10^3 \text{ L}}{1 \text{ kL}} \times \frac{1 \text{ dL}}{10^{-1} \text{ L}} = 5 \times 10^3 \text{ dL}$

17. (a) # of milliseconds =  $3 \text{ s} \times \frac{1 \text{ ms}}{1 \times 10^{-3} \text{ s}} = 3 \times 10^3 \text{ ms}$

(b) # of litres =  $50.0 \text{ mL} \times \frac{10^{-3} \text{ L}}{1 \text{ mL}} = 5.00 \times 10^{-2} \text{ L}$

(c) # of microlitres =  $2 \text{ L} \times \frac{1 \text{ } \mu\text{L}}{10^{-6} \text{ L}} = 2 \times 10^6 \text{ } \mu\text{L}$

(d) # of grams =  $25 \text{ kg} \times \frac{10^3 \text{ g}}{1 \text{ kg}} = 2.5 \times 10^4 \text{ g}$

(e) # of metres =  $3 \text{ Mm} \times \frac{10^6 \text{ m}}{1 \text{ Mm}} = 3 \times 10^6 \text{ m}$

(f) # of decilitres =  $2 \text{ L} \times \frac{1 \text{ dL}}{10^{-1} \text{ L}} = 2 \times 10^1 \text{ dL}$

\* (g) # of milliseconds =  $7 \text{ } \mu\text{s} \times \frac{1 \times 10^{-6} \text{ s}}{1 \text{ } \mu\text{s}} \times \frac{1 \text{ ms}}{1 \times 10^{-3} \text{ s}} = 7 \times 10^{-3} \text{ ms}$

(h) # of milligrams =  $51 \text{ kg} \times \frac{10^3 \text{ g}}{1 \text{ kg}} \times \frac{1 \text{ mg}}{10^{-3} \text{ g}} = 5.1 \times 10^7 \text{ mg}$

(i) # of kilolitres =  $3125 \text{ } \mu\text{L} \times \frac{10^{-6} \text{ L}}{1 \text{ } \mu\text{L}} \times \frac{1 \text{ kL}}{10^3 \text{ L}} = 3.125 \times 10^{-6} \text{ kL}$

(j) # of centigrams =  $1.7 \text{ } \mu\text{g} \times \frac{10^{-6} \text{ g}}{1 \text{ } \mu\text{g}} \times \frac{1 \text{ cg}}{10^{-2} \text{ g}} = 1.7 \times 10^{-4} \text{ cg}$

(k) # of seconds =  $1 \text{ yr} \times \frac{365 \text{ d}}{1 \text{ y}} \times \frac{24 \text{ h}}{1 \text{ d}} \times \frac{60 \text{ min}}{1 \text{ h}} \times \frac{60 \text{ s}}{1 \text{ min}} = 3.15 \times 10^7 \text{ s}$

\* (l) # of  $\frac{\text{grams}}{\text{litre}} = \frac{1 \text{ mg}}{\text{dL}} \times \frac{10^{-3} \text{ g}}{1 \text{ mg}} \times \frac{1 \text{ dL}}{10^{-1} \text{ L}} = 1 \times 10^{-2} \frac{\text{g}}{\text{L}}$

\* (m) # of  $\frac{\text{kilometres}}{\text{second}} = \frac{1 \text{ cm}}{\text{ } \mu\text{s}} \times \frac{10^{-2} \text{ m}}{1 \text{ cm}} \times \frac{1 \text{ km}}{10^3 \text{ m}} \times \frac{1 \text{ } \mu\text{s}}{10^{-6} \text{ s}} = 1 \times 10^1 \frac{\text{km}}{\text{s}}$

(n) # of  $\frac{\text{decigrams}}{\text{litre}} = \frac{1 \text{ cg}}{\text{mL}} \times \frac{10^{-2} \text{ g}}{1 \text{ cg}} \times \frac{1 \text{ dg}}{10^{-1} \text{ g}} \times \frac{1 \text{ mL}}{10^{-3} \text{ L}} = 1 \times 10^2 \frac{\text{dg}}{\text{L}}$

(o) # of  $\frac{\text{mg}}{\text{s}} = \frac{5 \text{ cg}}{\text{ds}} \times \frac{10^{-2} \text{ g}}{\text{cg}} \times \frac{1 \text{ mg}}{10^{-3} \text{ g}} \times \frac{\text{ds}}{10^{-1} \text{ s}} = 5 \times 10^2 \frac{\text{mg}}{\text{s}}$

$3.1536 \times 10^7 \text{ s}$

18. (a) # of metres =  $8.3 \text{ min} \times \frac{60 \text{ s}}{1 \text{ min}} \times \frac{3.00 \times 10^8 \text{ m}}{1 \text{ s}} = 1.5 \times 10^{11} \text{ m}$

(b) # of seconds =  $3.8 \times 10^5 \text{ km} \times \frac{10^3 \text{ m}}{1 \text{ km}} \times \frac{1 \text{ s}}{3.00 \times 10^8 \text{ m}} = 1.3 \text{ s}$

(c) # of minutes =  $7.83 \times 10^7 \text{ km} \times \frac{10^3 \text{ m}}{1 \text{ km}} \times \frac{1 \text{ s}}{3.00 \times 10^8 \text{ m}} \times \frac{1 \text{ min}}{60 \text{ s}} = 4.35 \text{ min}$