L. ADDISON.
SEM 1 2016/2017



# MATH 1115

## FUNDAMENTAL MATHEMATICS FOR THE GENERAL SCIENCES I (GROUP 1)

## ASSIGNMENT 1 SOLUTIONS

1) B
2) D
3) D

4) $(3+4i) \in \mathbb{C}$ (set of Complex Numbers)
"$i$" represents $\sqrt{-1}$
TWO APPLICATIONS OF COMPLEX NUMBERS
- Physics – Electromagnetism to represent field strength and electromagnetic strength.
  – Electronics to represent inductance and capacitance e.g. $w = C + iL$
- Electrical – Fourier transforms in understanding Engineering oscillations and frequencies
- Fluid dynamics, Quantum Mechanics, Dynamical systems, Computer graphics and so on.

5) a)(i) 15.932 (5 s.f.)
(ii) 16 (2 s.f.)
(iii) 15.9 (3 d.p.)

b)(i) 100.057 (6 s.f.)
(ii) 100 (2 s.f.)
(iii) 100.057 (3 d.p.)

c)(i) 0.000114 (3 s.f.)
0.00011 (2 s.f.)
0.000 (3 d.p.)

d)(i) 308.5998 (7 s.f.)
310 (2 s.f.)
308.600 (3 d.p.)

e) 9.5108 (5 s.f.)
9.5 (2 s.f.)
9.511 (3 d.p.)

6 a) $213.49 \equiv 2.1349 \times 10^{2}$

b) $0.045 \times 10^{-3} \equiv 4.5 \times 10^{-2} \times 10^{-3} = 4.5 \times 10^{-5}$

c) $0.36^{2} \equiv 0.36(3.6 \times 10^{-1})^{2}$

$= 3.6^{2} \times 10^{-2}$

$= 12.96 \times 10^{-2}$

$= 1.296 \times 10 \times 10^{-2}$

$= 1.296 \times 10^{-1}$

OR $0.36^{2} = 0.1296$

$= 1.296 \times 10^{-1}$

d) $0.03249 = 3.249 \times 10^{-2}$

7) $48\ km\ s^{-1} \rightarrow m\ s^{-1}$

$1\ km = 10^{3}\ m$

$\Rightarrow 48\ km = 48 \times 10^{3}\ m$

$\therefore 48\ km\ s^{-1} = 48 \times 10^{3}\ m\ s^{-1}$

$\equiv 4.8 \times 10 \times 10^{3}\ m\ s^{-1}$

$= 4.8 \times 10^{4}\ m\ s^{-1}$

8) a) 10.1 million m → μm

$1\ \mu m = 10^{-6} m \Rightarrow 1\ m = 10^{6}\ \mu m$

$10.1 \text{ million } m = 10.1 \times 10^{6} \times 10^{6}\ \mu m$

$= 10.1 \times 10^{12}\ \mu m$

$= 1.01 \times 10 \times 10^{12}\ \mu m$

$= 1.01 \times 10^{13}\ \mu m$ (Scientific Notation)

b) 100.051nm → m.

$1\ nm = 10^{-9} m$

$100.051 nm = 100.051 \times 10^{-9} m$

$= 1.00051 \times 10^{2} \times 10^{-9} m$

$= 1.00051 \times 10^{-7} m$ (Scientific Notation)

$\approx 1.00 \times 10^{-7} m$

c) $30 \times 10^{-6} km^2 \rightarrow m^2$

$1\ km = 10^{3} m$

$1 km^2 = (10^{3})^2 m^2 = 10^{6} m^2$

$30 \times 10^{-6} km^2 = 30 \times 10^{-6} \times 10^{6} m^2$

$= 30 \times 10^{0} m^2$ (Recall: $10^0 = 1$)

$= 3.0 \times 10^{1} m^2$

END