**Lecture 2: Maths for Physics 2**

**Part 1: Prefixes and Units**

1. v = f λ = 75 x 1012 x 4.0 x 10-6 = 3.0 x 108  m s-1

2. v = f λ = 0.25 x 106 x 5.6 x 10-6 = 1400 m s-1

3. λ = v/f = 330 / 3.0 x 109 = 1.1 x 10-7 m

4. f = v/ λ = 300 x 106 / 0.050 x 10-3 = 6.0 x 1012  Hz = 6.0 THz

5. f = v/ λ = 300 x 106 / 6.0 x 10-2 = 5.0 x 109 Hz = 5.0 GHz

**Part 2: Converting length, area and volume**

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| 6 m2 | = | 60 000 cm2 |  | 750 mm2 | = | 0.00075 m2 |
| 0.002 m2 | = | 2000 mm2 |  | 5 x 10-4 cm3 | = | 5.0 x10-10 m3 |
| 24 000 cm2 | = | 2.4 m2 |  | 8.3 x 10-6 m3 | = | 8300 mm3 |
| 46 000 000 mm3 | = | 0.046 m3 |  | 3.5 x 102 m2 | = | 3.5 x 106  cm2 |
| 0.56 m3 | = | 560 000 cm3 |  | 152000 mm2 | = | 0.152 m2 |

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| 31 x 108 m2 | = | 3100 km2 |
| 59 cm2 | = | 5900 mm2 |
| 24 dm3 | = | 24000 cm3 |
| 4 500 mm2 | = | 45 cm2 |
| 5 x 10-4 km3 | = | 500 000 m3 |

A 2.0 m long solid copper cylinder has a cross-sectional area of 3.0 x102 mm2. What is its volume in cm3?

h= 2.0 m = 2.0 x 102 cm csa = 3.0 cm2

V = cross-section area x height = 2.0 x 102 x 3.0= 600

Volume = 600 cm3

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| 5 N cm-2 | = | 50 000 N m-2 |
| 1150 kg m-3 | = | (1150 x103 / (102)3) = 1.15 g cm-3 |
| 3.0 m s-1 | = | ( 3.0 x10-3) x (60x60) =10.8 km h-1 |
| 65 kN cm-2 | = | 650 N mm-2 |
| 7.86 g cm-3 | = | 7860 kg m-3 |