



JURONG PIONEER JUNIOR COLLEGE
9478 H2 PHYSICS/8867 H1 PHYSICS

QUANTITIES AND MEASUREMENT ASSIGNMENT SOLUTIONS

Qn.	Solution	Mark Allocation
1	$F = \frac{\mu_o I_1 I_2 L}{2\pi d} \Rightarrow \mu_o = \frac{F(2\pi d)}{I_1 I_2 L}$ $\text{Units of } \mu_o = \frac{(\text{kg m s}^{-2})(\text{m})}{(\text{A})(\text{A})(\text{m})} = \text{kg m s}^{-2} \text{A}^{-2}$	[2] Deduct 1 mark for each incorrect units of I_1, I_2, F, d and L, up to max. of 2 marks. [1] for correct units of μ_o
2	SI base units of $P = \text{kg m}^2 \text{s}^{-3}$ Base units of $kF^w L^x \rho^y = (\text{kg m s}^{-2})^w (\text{m})^x (\text{kg m}^{-3})^y$ $= \text{kg}^{w+y} \text{m}^{w+x-3y} \text{s}^{-2w}$ Comparing indices of similar units on both sides of the equation, $w = 1.5,$ $x = -1,$ $y = -0.5$	[2] Deduct 1 mark for each incorrect units of P, F, L and ρ, up to max. of 2 marks. [1] for correct comparing of indices. [1] for correct answer.
3(a)	Component of resultant force along OX $= 4.0 \cos 30^\circ - 5.0 \cos 60^\circ$ $= 0.9641$ $\approx 0.96 \text{ N}$	[1] for resolving forces correctly into their components
3(b)	Component of resultant force along OY $= 4.0 \sin 30^\circ + 5.0 \sin 60^\circ - 3.0$ $= 3.330$ $\approx 3.3 \text{ N}$ Resultant force $= \sqrt{(0.9641)^2 + (3.330)^2}$ $= 3.4668$ $\approx 3.5 \text{ N}$ $\tan \theta = \frac{3.330}{0.9641}$ $\theta = 73.9^\circ \approx 74^\circ$ Therefore, the resultant force is 3.5 N at an angle of 74° above the x-axis.	[1] for resolving forces correctly into their components [1] for correct calculation of resultant force [1] for correct calculation of direction