Mark Scheme for Chittagong Group A

Ques no	Answer and Marks
1	(iv) (1 Mark)
2	(iv) (1 Mark)
3	(iv) (1 Mark)
4	(iii) (1 Mark)
5	(i) (1 Mark)
6	Ans: 7:45 , Hour Correct -7(0.5 marks), Minute Correct-45(0.5 marks) . Total 1 Mark
7	The width seen is cos(60)=1/2 times the original width (1 Mark) Thus the goal scored is 16 x ½ = 8 (1 Mark)
8	The volume is conserved (1 Mark). The height change in the wider piston $A_1x_1 = A_2x_2 \Rightarrow x_2 = 10\ cm$, (0.5Mark for formula, 0.5 for result)
9	Distance travelled by the sound wave $= d + (d - vt) = v_{sound}\ t$. (Setting up the distance travelled by sound as seen by the source which is on the LHS worth **1 Mark** . The equation **set up correctly** deserves a maximum of **1.5 Mark**) Putting $t = 0.1\ s$ gives $v = \mathbf{50\ ms^{-1}}$. **(0.5 Marks)**
10	The use of conversion formula $\frac{x}{100} = \frac{x-32}{180}$ (0.5 Marks) Getting the right answer $x = -40$ C or -40 F (0.5 Marks)
11	Area is proportional to the radius and hence perimeter squared (1.5 Marks) Thus the new area will be $\boldsymbol{Ax^2}$ (0.5 Marks) (as the perimeter increases by a factor of $\boldsymbol{x}$).
12	As we have an equilateral triangle $PA = \sqrt{O'A^2 - O'P^2} = 4\ cm$ (1 Mark) No partial marks here.
13	The distances covered by both the wheels are the same. So the number of turns will be inversely proportional to their circumference, i.e. the radius. (0. 7 Marks) $r_F \times n_F = r_R \times n_R \Rightarrow n_F = \mathbf{20}$ If the answer is obtained correctly then full marks (1 Mark)
14	Let the initial temperature be of the hot water be T and the specific heat of water be c and the mass of the hot water is m. The heat given off by the hot water will be mc(T-20). (0.5 Marks) The heat absorbed by the cold water 4mc(20-10)= 40 mc. (0.5 Marks) Equating T-20= 40 (0.5Marks) Answer : T = 60C (0.5 marks) **No penalty if the students pick particular values for the mass of cold water and the specific heat of water.**
15	$E = 6V, \quad I = 30\ mA \ \ \therefore r = \frac{E}{I} = 200\ \Omega$ Application of Ohm's law gets **0.5 Mark.** The correct answer gets the remaining **0.5 Mark**