

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 $16 \times \frac{1}{2} = 8$ (1 Mark)
8	The volume is conserved (1 Mark). The height change in the wider piston $A_1x_1 = A_2x_2 \Rightarrow x_2 = 10 \text{ cm}$, (0.5Mark for formula, 0.5 for result)
9	Distance travelled by the sound wave $= d + (d - vt) = v_{\text{sound}} t$. (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 $t = 0.1 \text{ s}$ gives $v = 50 \text{ ms}^{-1}$. (0.5 Marks)
10	The use of conversion formula $\frac{x}{100} = \frac{x-32}{180}$ (0.5 Marks) Getting the right answer $x = -40 \text{ C}$ 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 Ax^2 (0.5 Marks) (as the perimeter increases by a factor of x).
12	As we have an equilateral triangle $PA = \sqrt{O'A^2 - O'P^2} = 4 \text{ cm}$ (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) $r_F \times n_F = r_R \times n_R \Rightarrow n_F = 20$ 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) <u>No penalty if the students pick particular values for the mass of cold water and the specific heat of water.</u>
15	$E = 6V, \quad I = 30 \text{ mA} \therefore r = \frac{E}{I} = 200 \Omega$ Application of Ohm's law gets 0.5 Mark . The correct answer gets the remaining 0.5 Mark