1. Describe an experiment to find the period of a pendulum.
2. An aircraft travelling at 600 km/hr accelerates steadily at 10 km/hr per second. Taking the speed of sound as 1100 km/hr at the aircraft's altitude, how long will it take to reach the 'sound barrier'?
3. When a golf ball is lowered into a measuring cylinder of water, the water level rises by 30 cm^3 when the ball is completely submerged. If the ball weighs 33g in air, find its density?
4. An engineering machine has a piston which is going up and down approximately 75 times per minute.

   Describe carefully how a stopwatch may be used to find accurately the time for one up-and-down cycle of the piston.
5. Imagine that you live beside a busy road. One of your neighbours thinks that many of the vehicles are travelling faster than the speed limit for the road.

   You decide to check this by measuring the speeds of some of the vehicles.

   a. Which two quantities will you need to measure in order to find the speed of a vehicle, and which instruments would you use to measure them?

Quantity measured	Instrument used

   b. State the equation you would use to calculate the speed of the vehicle. If you use symbols, state what your symbols mean.

   c. One lorry travels from your town to another town. The lorry reaches a top speed of 90 km/hr, but its average speed between the town is only 66 km/hr.

       i.   Why is the average speed less than the top speed?

       ii.   The journey between the towns takes 20 minutes. Calculate the distance between towns.

6. A student investigated the stretching of a spring by hanging various weights from it and measuring the corresponding extensions. The results are shown in the table below.

Weight/N	0	1	2	3	4	5
Extension/mm	0	21	40	51	82	103

a. On a copy of the grid, plot the points from these results (PLOT EXTENSION-WEIGHT GRAPH). Do not draw a line through the points yet.

b. The student appears to have made an error in recording one of the results. Which result is this?

c. Ignoring the incorrect result, draw the best straight line through the remaining pints.

d. State and explain whether this spring is obeying Hooke's law.

e. Describe how the graph might be shaped if the student continued to add several more weights to the spring.

f. The student estimates that if he hangs a 45 N load on the spring, the extension will be 920 mm.
Explain why this estimate may be unrealistic.

7. Why is it easy to float in the Dead Sea?

8. Describe an experiment to demonstrate the principle of conservation of momentum.