Topic : Measurements-Set-1

1 The clock on a public building has a bell that strikes each hour so that people who cannot see the clock can know what hour of the day it is.
At precisely 6 o'clock, the clock starts to strike. It strikes 6 times.
At the first strike of the bell, a man's wrist-watch is as shown in Fig. 1.1.

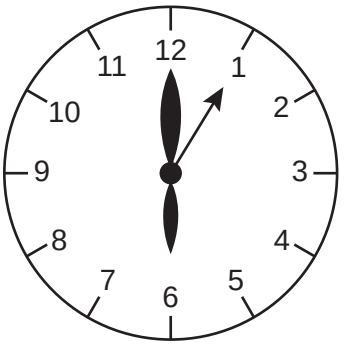


Fig. 1.1

When the bell strikes for the sixth time, the wrist-watch is as shown in Fig. 1.2.

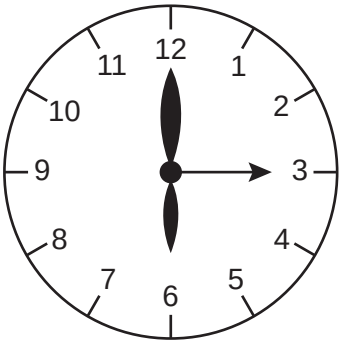


Fig. 1.2

(a) Calculate the time interval between the 1st strike and the 6th strike.

time interval = ……. s [1]

(b) Calculate the time interval between one strike and the next.

time interval = ……s [2]

(c) At precisely 11 o'clock, the clock starts to strike.
Calculate the time interval between the 1st strike and the 11th strike.

time interval = ……s [2]

MARKING SCHEME:

(a) 10

(b) division by 5 OR division by 6

2.0 OR 2 c.a.o

(c) 10 × his(b) OR 11 × his(b)

20 c.a.o

The mechanical stop-clock shown in Fig. 1.1 has

a seconds hand, which rotates once every minute
and a minutes hand, which rotates once every hour.

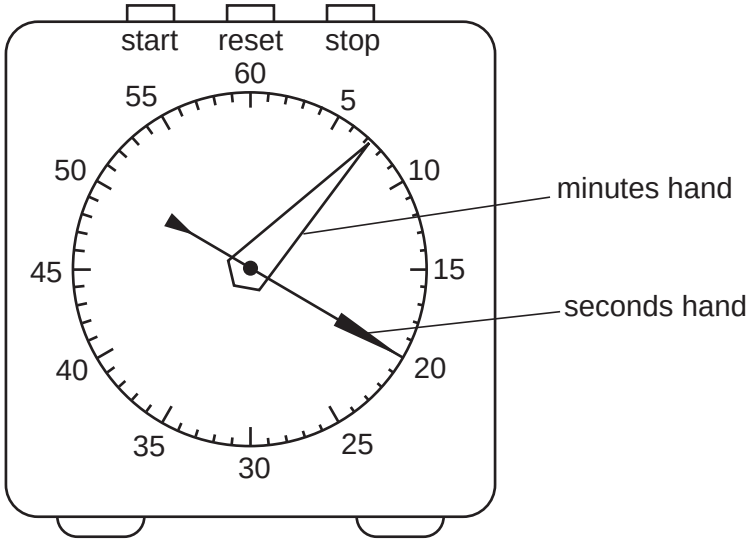


Fig. 1.1

(a) A student uses the clock to time the intervals between trains travelling along the railway past his school.

He sets the clock to zero (both hands vertical).

As train 1 passes, he starts the clock and leaves it running.

After 35 s, train 2 passes.

On the blank face of Fig. 1.2, show the positions of the two hands of the clock as train 2 passes. Make sure it is clear which hand is which. [2]

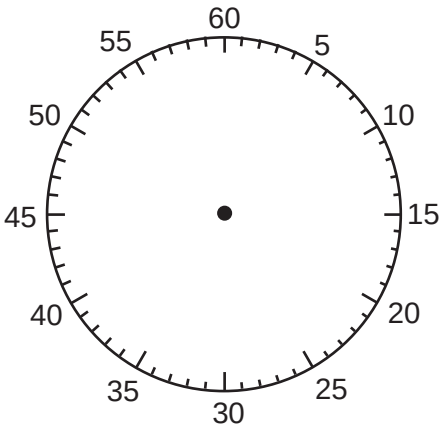


Fig. 1.2

(b) Train 3 passes the school 4 minutes and 55 s after the clock was started.

On the blank face of Fig. 1.3, show the positions of the hands of the clock as train 3 passes. [2]

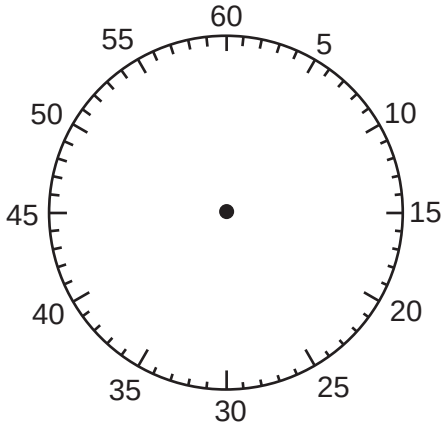


Fig. 1.3

(c) Calculate the time interval between train 2 and train 3.

time interval = ... min ..... s [1]

[Total: 5]

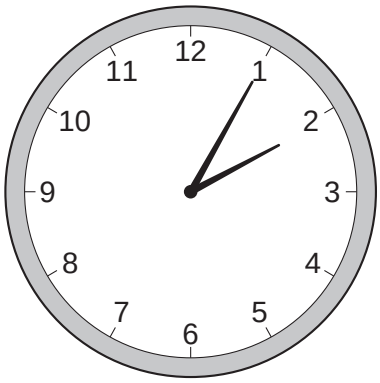
MARKING SCHEME:

(a)	seconds hand at 35 s	F	B1
	minutes hand at or just to R of 60 (up to ½ division)	C	B1
(b)	seconds hand at 55 s	F	B1
	minutes hand between 4 and 5	C	B1
(c)	4 minutes 20 s	F	B1

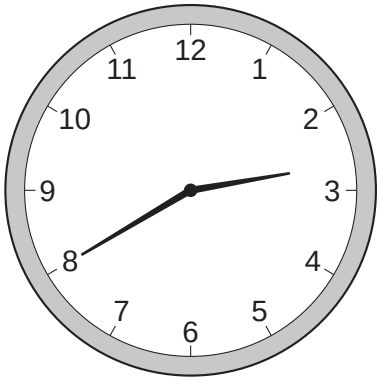
[Total: 5]

A schoolteacher is concerned about the large number of vehicles passing along the busy road next to the school. He decides to make a measurement to find the number of vehicles per minute. Using the school clock he notes the following readings.

appearance of clock at beginning of investigation



appearance of clock at end of investigation



vehicles counted travelling left to right = 472

vehicles counted travelling right to left = 228

(a) Calculate the time for which the schoolteacher was counting vehicles.

counting time = ... min [1]

(b) Calculate the total number of vehicles passing the school per minute.

vehicles per minute = ... [3]

[Total: 4]

MARKING SCHEME:

(a)	35	B1	
(b)	vehicles/time in any form, letters words or numbers	C1	
	700/35 e.c.f. **(a)**	C1	
	20 e.c.f. **(a)**	A1	[4]

A student investigates water dripping from a tap (faucet).

Fig. 1.1 shows the dripping tap and a rule next to a container collecting the drops of water.

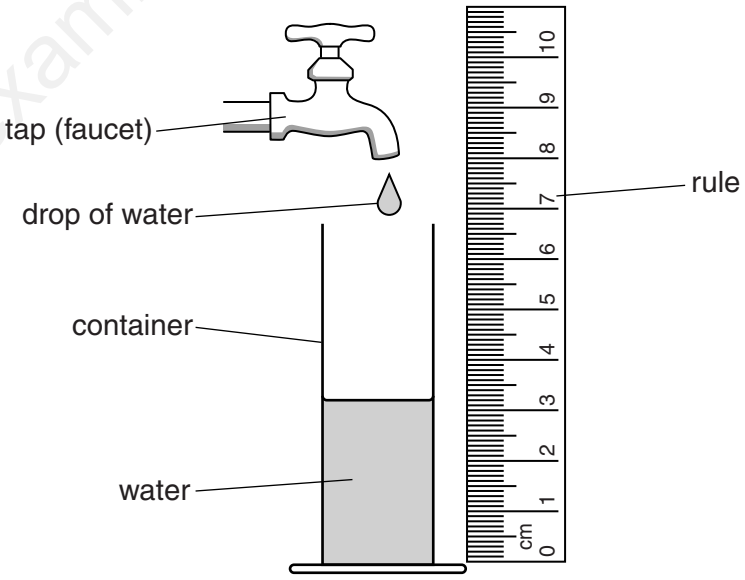


Fig. 1.1

(a) Name the quantity that the student is measuring with the rule.

..... [1]

(b) The student uses a digital stopwatch to measure the time between the drops of water. She repeats her measurement.

Fig. 1.2 shows the reading on the stopwatch for all her measurements.

time = ... s

time = ... s

time = ... s

Fig. 1.2

(i) On the line below each stopwatch, record the time, in seconds, measured by the student. [1]

(ii) Calculate the average time between drops of water. Show your working.

average time between drops = ... s [2]

(c) The student collects drops of water for 15.5 minutes.

Calculate how many drops leave the tap in 15.5 minutes. Use your answer to part **b(ii)**.

number of drops = ... [3]

[Total: 7]

MARKING SCHEME:

(a)	height (of water / liquid)	**B1**
(b)(i)	3.10 (s) and 3.04 (s) and 3.16 (s)	**B1**
(b)(ii)	correct sum (9.3) correct average (3.1)	**C1** **A1**
(c)	15.5 × 60 or 930 930 ÷ 3.1 300 (drops)	**C1** **C1** **A1**
		Total: 7

2 A wheel is rotating at approximately 2 revolutions per second.

Describe how you would use a stopwatch to measure as accurately as possible the time for one revolution of the wheel. Make sure you include all the relevant information.

.....

.....

.....

.....

..... [5]

MARKING SCHEME:

reference mark on wheel
datum line (could be “top” or “bottom”)
***start timing/stopwatch as mark passes datum line**

time a number of rotations (accept 1 here)
time at least 20 rotations
***stop stopwatch**
divide time by number of rotations
repeat
make sure stopwatch at zero

A worker on the production line in a factory is making brackets. An inspector times the worker whilst he makes 5 brackets. To start, the stopwatch is set to zero.

After 5 brackets have been made, the stopwatch is as shown in Fig. 1.1.

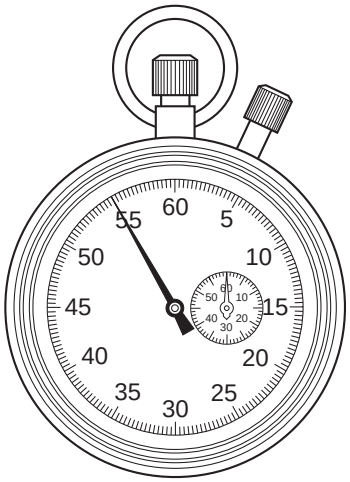


Fig. 1.1

(a) State the reading on the stopwatch.

reading = ... s [1]

(b) Calculate the time taken to make 1 bracket.

time taken = ... s [2]

(c) The worker has a target of making 300 brackets per hour.

Does the worker meet his target? Tick one box and show the working which led you to your answer.

Does the worker meet his target? Yes ☐

No ☐ [4]

MARKING SCHEME:

(a)	55 (s)				B1
(b)	55/5 ecf				C1
	11 (s) ecf				A1
(c)	EITHER	OR	OR	OR	
	300/hour	1 takes 11s	5 takes 55s	1hour for 300	B1
	= 5/min	300 take 3300s	300 take 60x55s	3600/300s for 1	B1
	takes less than 1 min for 5	less than 1hr for 300	less than 1hr for 300	1 takes less time than this	B1
	YES/NO ticked according to his working				B1 7

A boy is fishing in a river. Nearby, a ferry-boat is taking passengers backwards and forwards across the river.

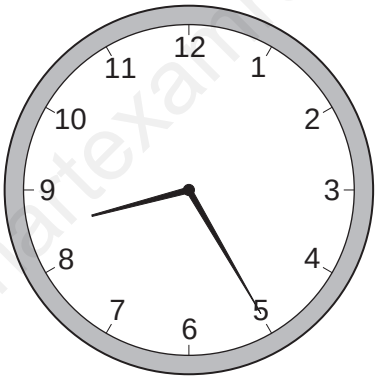


Fig. 1.1

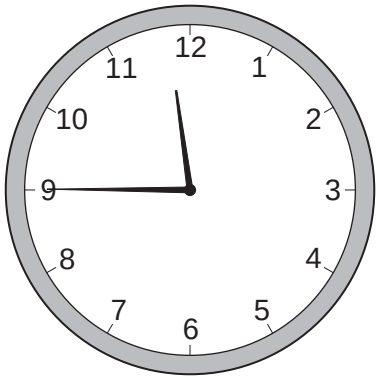


Fig. 1.2

When he starts fishing one morning, the boy's wristwatch is as shown in Fig. 1.1.
When he finishes his morning's fishing, the wristwatch is as shown in Fig. 1.2.

(a) For how many minutes was the boy fishing?

number of minutes = ... [3]

(b) It takes the ferry-boat 20 minutes to load up passengers, take them across the river, load up with passengers at the other side, and return, to start all over again.
Calculate how many journeys, across the river and back, the ferry made whilst the boy was fishing.

number of journeys = ... [2]

[Total: 5]

MARKING SCHEME:

(a)	attempt at subtraction		C1	
	3 hrs 20 mins		C1	
	200 mins		A1	
(b)	200/20 OR 200/10	e.c.f. from **(a)**	C1	
	10 OR 20	e.c.f.	A1	[5]

Drops of water from a cracked gutter fall past the window of an IGCSE Physics student's room, as shown in Fig. 1.1.

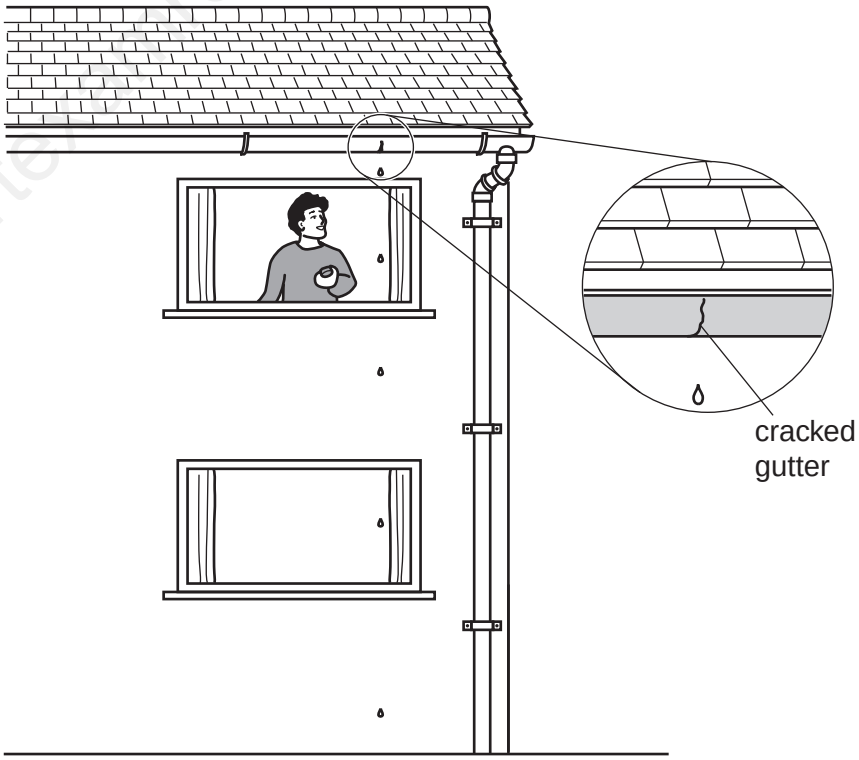


Fig. 1.1

The student uses a digital stopwatch to find the time between one drop and the next.

To do this he

sets the stopwatch to zero,

then, starts the stopwatch as a drop comes into view at the top of the window,

then, stops the stopwatch 40 drops later.

The appearance of the stopwatch after 40 drops is shown in Fig. 1.2.

Fig. 1.2

(a) State the reading on the stopwatch. reading = ... s [1]

(b) Calculate the time interval between one drop and the next.

time = ... s [2]

(c) Explain why it is better to time 40 intervals than to time just 1 interval.

.....

..... [1]

(d) Using Fig. 1.1, estimate the time for a drop to fall from the top of the upper window to the ground.

time = ... s [3]

MARKING SCHEME:

(a)	13.6 (s)	B1
(b)	13.6/40 e.c.f.	C1
	0.34 (s) e.c.f.	A1
(c)	more accurate OR errors less significant OR time for 1 interval too small	B1
(d)	4 intervals OR 4 and a bit intervals OR 5 intervals	C1
	4 × his **(b)** OR (4 and a bit) × his **(b)** 5 × his **(b)**	C1
	1.36 – 1.5 (s) e.c.f.	A1