

9th Class Physics - Chapter 1

Exercise - Short Response Questions

1. How Physics plays an important role in our life?

Answer: Physics helps us understand natural phenomena and the laws governing matter and energy. Its principles are used in technology, communication, transport, medicine and many other aspects of daily life.

2. Estimate your age in minutes and seconds.

Answer: If your age is x years, then approximately:

Age in minutes = $x \times 365 \times 24 \times 60 = x \times 525,600$ minutes.

Age in seconds = $x \times 365 \times 24 \times 60 \times 60 = x \times 31,536,000$ seconds.

3. What base quantities are involved in these derived physical quantities: force, pressure, power and charge?

Answer: Force: mass, length and time.

Pressure: mass, length and time.

Power: mass, length and time.

Charge: electric current and time.

4. Show that prefix micro is thousand times smaller than prefix milli.

Answer: milli = 10^{-3} and micro = 10^{-6} .

$10^{-3} / 10^{-6} = 10^3 = 1000$.

Therefore, micro is 1000 times smaller than milli.

5. Justify that displacement is a vector quantity while energy is a scalar quantity.

Answer: Displacement has both magnitude and direction, so it is a vector quantity. Energy has magnitude only and no direction, so it is a scalar quantity.

6. Screw gauge can give more precise length than vernier calipers. Briefly explain why?

Answer: A screw gauge has a smaller least count, typically 0.01 mm, than a vernier caliper, typically 0.1 mm. Therefore, a screw gauge can measure smaller lengths more precisely.

7. Differentiate between stop watch and digital stop watch.

Answer: A stopwatch measures time intervals using a mechanical mechanism and an analogue scale. A digital stopwatch measures time electronically and displays the time directly in digits; it generally provides finer resolution and easier reading.

8. How measuring cylinder is used to measure volume of an irregular shaped stone?

Answer: Pour water into a measuring cylinder and note the initial volume V_1 . Completely immerse the stone and note the new volume V_2 . The volume of the stone is:

Volume of stone = $V_2 - V_1$.

9. What precaution should be kept in mind while taking measurement using measuring cylinder?

Answer: Keep the measuring cylinder upright on a horizontal surface and read the liquid level at eye level to avoid parallax error. For water, take the reading from the bottom of the meniscus.

10. Why do we need to consider significant digits in measurements?

Answer: Significant digits indicate the precision of a measurement. They prevent us from reporting more precision in a calculated result than is justified by the measured data.

11. How random error can be reduced?

Answer: Random error can be reduced by taking several repeated measurements and using their arithmetic mean as the best estimate.

12. Differentiate between precision and accuracy.

Answer: Precision is the closeness of repeated measurements to one another. Accuracy is the closeness of a measured value to the true or accepted value.