

QB365 Question Bank Software

11 physics case study questions Units And Measurements for -2024

11th Standard

Physics

SECTION - A

2 x 4 = 8

1) The dimensional method is a very convenient way of finding the dependence of physical quantity on other physical quantities of a given system. This method has its own limitations. In a complicated situation, it is often not easy to guess the factors on which a Physical quantity will depend. Secondly, this method gives no information about the dimensionless proportionality constant. Thirdly this method is used only if a Physical quantity depends on the product of other physical quantities. Fourthly this method will not work if a physical quantity depends on another quantity being a trigonometric or exponential function. Finally this method does not give complete information in cases where a Physical quantity depends on more than three quantities in problems in mechanics.

- (i) What are Physical quantity? Write their types.
- (ii) What are dimensional formula of a physical quantity?
- (iii) Which principle does the method of dimensional analysis use?
- (iv) What is principle of homogeneity?
- (v) Write two limitations of dimensional analysis.
- (vi) Write one use of dimensional analysis.

Answer : (i) Physical quantities are those in terms of which any physical Phenomena is studied. These are of two types; fundamental and derived.

(ii) Expression of a physical quantity in terms of powers of fundamental physical quantity is known as dimensional formula

(iii) Method of dimensional analysis uses the principle of homogeneity.

(iv) According to this the dimensions of both sides of a physical equation must be identical.

(v) (i) It gives no information about the dimensionless constant which has to be determined by experiment or by mathematical derivation.

(ii) This method will not work if a quantity depends on another quantity which is a trigonometric function.

(vi) Conversion of units from one system to another.

2) To measure distance or length between two points, various methods are adopted which are categorised as direct and indirect methods. Direct methods are used to measure shorter but accessible distances while indirect methods are used for inaccessible distance. Large distances, such as the distance of a planet or star from earth can be measured by the Parallax method. Parallax is the change in position of an object with respect to fixed background when object is seen from two different positions. Parallax method is used for measuring distances of stars which are less than 100 light years away.

(i) Name the instruments that are used to measure distance of the order 10^{-5} m.

(ii) Define the terms 'basis' and parallactic angle used in Parallax method for measuring distance.

(iii) What is the measure of basis in measuring distance of a nearby star by Parallax method?

(iv) Why Parallax method is used for measuring distances of nearby stars only?

(v) What is meant by angular diameter of moon?

Answer : (i) A screw gauge and a spherometer are used to measure distances upto 10^{-5} m.

(ii) Basis - is the distance between two different point of observation while the parallactic angle is the angle between two line of sight against fixed background.

(iii) Since diameter of earth's orbit around the sun is the basis, therefore measure of basis is 2 AU.

(iv) It is because as the distance of star increases, the Parallax angle decreases that can not be measured accurately. Parallax method is limited to measurement of distance upto 100 light years.

(v) Angular diameter of moon is the angle subtended at a point on earth by two diametrically opposite ends of the moon. Its value is 0.5° .