

Mathematics

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(Chapter 10)(Vector Algebra)

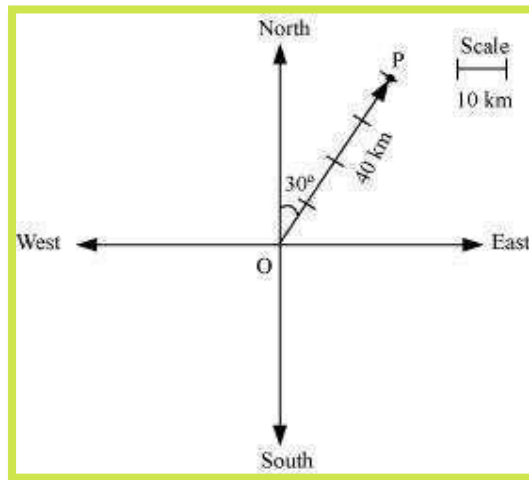
XII

Exercise 10.1

Question 1:

Represent graphically a displacement of 40 km, 30° east of north.

Answer 1:



Here, vector \vec{OP} represents the displacement of 40 km, 30° East of North.

Question 2:

Classify the following measures as scalars and vectors.

(i) 10 kg

(ii) 2 metres north-west

(iii) 40°

(iv) 40 watt

(v) 10^{-19} coulomb

(vi) 20 m/s^2

Answer 2:

(i) 10 kg is a scalar quantity because it involves only magnitude.

(ii) 2 meters north-west is a vector quantity as it involves both magnitude and direction.

(iii) 40° is a scalar quantity as it involves only magnitude.

(iv) 40 watts is a scalar quantity as it involves only magnitude.

(v) 10^{-19} coulomb is a scalar quantity as it involves only magnitude.

(vi) 20 m/s^2 is a vector quantity as it involves magnitude as well as direction.

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Question 3:

Classify the following as scalar and vector quantities.

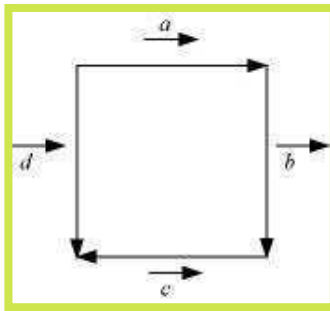
- (i) time period (ii) distance (iii) force
(iv) velocity (v) work done

Answer 3:

- (i) Time period is a scalar quantity as it involves only magnitude.
(ii) Distance is a scalar quantity as it involves only magnitude.
(iii) Force is a vector quantity as it involves both magnitude and direction.
(iv) Velocity is a vector quantity as it involves both magnitude as well as direction.
(v) Work done is a scalar quantity as it involves only magnitude.

Question 4:

In Figure, identify the following vectors.



- (i) Coinitial (ii) Equal (iii) Collinear but not equal

Answer 4:

- (i) Vectors \vec{a} and \vec{d} are coinitial because they have the same initial point.
(ii) Vectors \vec{b} and \vec{d} are equal because they have the same magnitude and direction.
(iii) Vectors \vec{a} and \vec{c} are collinear but not equal. This is because although they are parallel, their directions are not the same.

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Question 5:

Answer the following as true or false.

- (i) \vec{a} and $-\vec{a}$ are collinear.
- (ii) Two collinear vectors are always equal in magnitude.
- (iii) Two vectors having same magnitude are collinear.
- (iv) Two collinear vectors having the same magnitude are equal.

Answer 5:

(i) True.

Vectors \vec{a} and $-\vec{a}$ are parallel to the same line.

(ii) False.

Collinear vectors are those vectors that are parallel to the same line.

(iii) False.