

Warm-up set 2

Question

1. [153709] Can there be an electric field at a point where there is no charge? Can a charge experience a force due to its own field? Please write a one or two sentence answer for each question.

Answer:

Yes, a charge creates an electric field at distances from the charge. Thus the field extends beyond the position of the charge itself to points where there is no charge present.

No, a charge cannot experience force due to its own field because Coulomb's law requires two charges to create equal and opposite repulsive or attractive electric force.

Question

2. [153707] An insulator is a material that...
(a) three are correct
(b) is not penetrated by electric fields
(c) none of these
(d) cannot carry an electric charge
(e) cannot feel an electrical force

Answer:

(c) None of these

Although it is more easily done with conductors, electrons can be added and removed from insulators to give them electric charge.

Even neutral insulators can feel an electric force due to polarization of the individual molecules.

Question

3. [153708] Which of the following is true of a perfect conductor ?
(a) There can be no electric charge on the surface.
(b) There cannot be an electric field inside.
(c) There cannot be any excess electric charge inside.
(d) There cannot be any electric charges inside.
(e) Two of the choices are correct

Answer:

(e) Two of the choices are correct