

SUBJECT : PHYSICS

TOPIC: CHARGE

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1. A soap bubble is given a negative charge, then its radius
- (a) Decreases
 - (b) Increases
 - (c) Remains unchanged
 - (d) Nothing can be predicted as information is insufficient
2. A body can be negatively charged by
- (a) Giving excess of electrons to it
 - (b) Removing some electrons from it
 - (c) Giving some protons to it
 - (d) Removing some neutrons from it
3. The minimum charge on an object is
- (a) 1 coulomb
 - (b) 1 stat coulomb
 - (c) 1.6×10^{-19} coulomb
 - (d) 3.2×10^{-19} coulomb
4. An isolated solid metallic sphere is given +Q charge. The charge will be distributed on the sphere
- (a) Uniformly but only on surface
 - (b) Only on surface but non-uniformly
 - (c) Uniformly inside the volume
 - (d) Non-uniformly inside the volume
5. There are two metallic spheres of same radii but one is solid and the other is hollow, then
- (a) Solid sphere can be given more charge
 - (b) Hollow sphere can be given more charge
 - (c) They can be charged equally (maximum)
 - (d) None of the above
6. In general, metallic ropes are suspended on the carriers which take inflammable material. The reason is
- (a) Their speed is controlled
 - (b) To keep the centre of gravity of the carrier nearer to the earth
 - (c) To keep the body of the carrier in contact with the earth
 - (d) Nothing should be placed under the carrier
7. When 10^{14} electrons are removed from a neutral metal sphere, the charge on the sphere becomes
- (a) $16 \mu C$
 - (b) $-16 \mu C$
 - (c) $32 \mu C$
 - (d) $-32 \mu C$
8. A conductor has 14.4×10^{-19} coulombs positive charge. The conductor has
(Charge on electron = 1.6×10^{-19} coulombs)
- (a) 9 electrons in excess
 - (b) 27 electrons in short
 - (c) 27 electrons in excess
 - (d) 9 electrons in short
9. Number of electrons in one coulomb of charge will be
- (a) 5.46×10^{29}
 - (b) 6.25×10^{18}
 - (c) 1.6×10^{19}
 - (d) 9×10^{11}
10. A glass rod rubbed with silk is used to charge a gold leaf electroscope and the leaves are observed to diverge. The electroscope thus charged is exposed to X-rays for a short period. Then
- (a) The divergence of leaves will not be affected
 - (b) The leaves will diverge further
 - (c) The leaves will collapse
 - (d) The leaves will melt
11. One metallic sphere A is given positive charge whereas another identical metallic sphere B of exactly same mass as of A is given equal amount of negative charge. Then
- (a) Mass of A and mass of B still remain equal
 - (b) Mass of A increases
 - (c) Mass of B decreases
 - (d) Mass of B increases
12. When 10^{19} electrons are removed from a neutral metal plate, the electric charge on it is
- (a) $-1.6 C$
 - (b) $+1.6 C$
 - (c) $10^{+19} C$
 - (d) $10^{-19} C$
13. Charge on α -particle is
- (a) $4.8 \times 10^{-19} C$
 - (b) $1.6 \times 10^{-19} C$
 - (c) $3.2 \times 10^{-19} C$
 - (d) $6.4 \times 10^{-19} C$
14. When a glass rod is rubbed with silk, it
- (a) Gains electrons from silk
 - (b) Gives electrons to silk

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(c) Gains protons from silk (d) Gives protons to silk

15. A charge of Q coulomb is placed on a solid piece of metal of irregular shape. The charge will distribute itself

- (a) Uniformly in the metal object
- (b) Uniformly on the surface of the object
- (c) Such that the potential energy of the system is minimised
- (d) Such that the total heat loss is minimised

16. Five balls numbered 1 to 5 are suspended using separate threads. Pairs (1, 2), (2, 4) and (4, 1) show electrostatic attraction, while pair (2, 3) and (4, 5) show repulsion. Therefore ball 1 must be

- (a) Positively charged (b) Negatively charged
- (c) Neutral (d) Made of metal

17. Two identical conductors of copper and aluminium are placed in an identical electric fields. The magnitude of induced charge in the aluminium will be

- (a) Zero (b) Greater than in copper
- (c) Equal to that in copper (d) Less than in copper

18. When a body is earth connected, electrons from the earth flow into the body. This means the body is.....

- (a) Unchanged (b) Charged positively
- (c) Charged negatively (d) An insulator

19. The number of electrons in 1.6 C charge will be

- (a) 10^{19} (b) 10^{20}
- (c) 1.1×10^{19} (d) 1.1×10^2

20. Four metal conductors having different shapes

- 1. A sphere 2. Cylindrical
- 3. Pear 3. Lightning conductor

are mounted on insulating stands and charged. The one which is best suited to retain the charges for a longer time is

- (a) 1 (b) 2
- (c) 3 (d) 4

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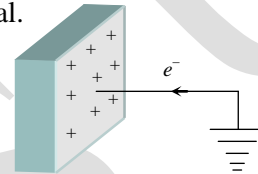
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Solution

1. (b) Due to mutual repulsion of charges distributed on the surface of bubble.
2. (a) Excess of electron gives the negative charge on body.
3. (c) All other charges are its integral multiple.
4. (a) The charge given to a sphere will be distributed uniformly over the surface.
5. (c) Because in case of metallic sphere either solid or hollow, the charge will reside on the surface of the sphere. Since both spheres have same surface area, so they can hold equal maximum charge.
6. (c) For providing path to charge induced on the surface of the carriers which take inflammable material.
7. (a) $Q = ne = 10^{14} \times 1.6 \times 10^{-19} \Rightarrow Q = 1.6 \times 10^{-5} C = 16 \mu C$
Electrons are removed, so charge will be positive.
8. (d) Positive charge shows the deficiency of electrons.
Number of electrons $= \frac{14.4 \times 10^{-19}}{1.6 \times 10^{-19}} = 9$
9. (b) $n = \frac{Q}{e} = \frac{1}{1.6 \times 10^{-19}} = 6.25 \times 10^{18}$
10. (b) Charge on glass rod is positive, so charge on gold leaves will also be positive. Due to X-rays, more electrons from leaves will be emitted, so leaves become more positive and diverge further.
11. (d) Negative charge means excess of electron which increases the mass of sphere B.
12. (b) By using $Q = ne \Rightarrow Q = 10^{19} \times 1.6 \times 10^{-19} = +1.6 C$.
13. (c) By using $Q = ne \Rightarrow Q = +2e = +3.2 \times 10^{-19} C$
14. (b) On rubbing glass rod with silk, excess electron transferred from glass to silk. So glass rod becomes positive and silk becomes negative.

15. (c) Potential energy depends upon the charge at peaks of irregularities. Since every event in the universe leads to the minimisation of energy.
16. (c) Let us consider 1 ball has any type of charge. 1 and 2 must have different charges, 2 and 4 must have different charges *i.e.* 1 and 4 must have same charges but electrostatics attraction is also present in (1, 4) which is impossible.
17. (c) Since both are metals so equal amount of charge will induce on them.

18. (b) When a positively charged body connected to earth, electrons flow from earth to body and body becomes neutral.



19. (a) $n = \frac{q}{e} = \frac{1.6}{1.6 \times 10^{-19}} = 10^{19}$

20. (a) In case of spherical metal conductor the charge quickly spreads uniformly over the entire surface because of which charges stay for longer time on the spherical surface. While in case of non-spherical surface, the charge concentration is different at different points due to which the charges do not stay on the surface for longer time.