

1. The dielectric constant of metals is _____
(a) one (b) zero (c) infinity (d) greater than one

2. A parallel plate capacitor is charged and the charging battery is disconnected. Then a dielectric slab is introduced between the plates. The quantity that remains unchanged is _____

(a) potential (b) capacity (c) energy (d) charge

3. If a unit charge is taken from one point to another point over an equipotential surface, then _____

(a) work is done on the charge
(b) work is done by the charge
(c) work done on the charge is constant
(d) no work is done

4. In practice, earth is chosen as a place of zero electric potential because it is _____

(a) non conducting (b) has a very large radius
(c) keeps on gaining and losing equal number of charges
(d) has almost a constant potential, which is treated as a reference zero potential

5. The main function of a capacitor is to _____

(a) block the flow of current
(b) help the flow of current
(c) dissipate heat (d) store the energy

6. The separation between the plates of a charged parallel plate capacitor is doubled by keeping the charge constant. In this case _____

(a) potential difference is halved
(b) the capacitance is doubled
(c) the p.d. between the plates is doubled
(d) the capacitance is halved but the energy of the capacitor is not changed

7. Two charges q_1 and q_2 are kept at a certain distance in air. If a metal plate is placed between them, the force between them _____

(a) decreases (b) increases
(c) does not change (d) will be zero

15. The resistance of a discharge tube is

(a) non-ohmic (b) ohmic (c) zero
(d) both (b) and (c)

16. An electron moving with a velocity of 15 ms^{-1} enters a uniform magnetic field of 0.2 T , along a direction parallel to the field. What would be its trajectory in this field?

(a) Elliptical (b) Straight path (c) Helical (d) Circular

17. Which of the following will experience a maximum force, when projected with the same velocity perpendicular to the magnetic field (a) α -particle, (b) β -particle?
(c) α -particle and β -particle? (d) none of the above

18. When an arc of a circle of radius R subtends an angle of $\pi/4$ at the center, and carries a current I , the magnetic field B at the center is

(a) $\frac{\mu_0 I}{16R}$ (b) $\frac{\mu_0 I}{R}$ (c) $\frac{\mu_0 I}{6R}$ (d) $\frac{\mu_0 I}{16R}$

19. A horizontal overhead power line carries a current of 100 A in east to west direction. What is the magnitude and direction of the magnetic field due to the current, 2 m below the line?

(a) $1 \times 10^{-5} \text{ T}$ and the direction of the magnetic field is toward south.
(b) $1 \times 10^{-5} \text{ T}$ and the direction of the magnetic field is toward north.
(c) $1 \times 10^{-5} \text{ T}$ and the direction of the magnetic field is toward east.
(d) $1 \times 10^{-5} \text{ T}$ and the direction of the magnetic field is toward west

20. What is the magnetic field inside a metallic pipe?

(a) Unity (b) infinity (c) two (d) zero

21. What do you mean by quantisation of charge. Calculate the charge carried by 12.5×10^{18} electrons;

22. State and explain Coulomb's law. OR

Two electric lines never intersect each other.

8. 8 equally charged drops are combined to form a big drop. If the potential on each drop is 10 V, then the potential of the big drop will be _____

- (a) 40 V (b) 30 V (c) 25 V (d) 20 V

9. The internal resistance of a cell

- a) always acts in the cell in open circuit
b) acts only in closed circuit and it reduces the EMF
c) acts only in the closed circuit and it reduces the current
d) None of these

10. The Curve representing Ohm's law is a

- a) Linear b) Cosine Function c) Parabola d) Hyperbola

11. A potentiometer is an accurate and versatile device to make electrical measurements of E.M.F because the method involves

- a) potential gradients
b) a condition of no current flow through the galvanometer
c) a combination of cells, galvanometer and resistances
d) cells

12. In a potentiometer, for a wire of uniform cross-section and a constant current, the fall of potential across any portion of wire is
(A) is inversely proportional to the length of that portion of wire.

(B) is directly proportional to the length of that portion of wire.

(C) does not depend on the length of that portion of wire.

(D) Is zero

13. The Resistance of the conductor is

- a) inversely proportional to the length
b) directly proportional to the square of the radius
c) inversely proportional to the square of radius
d) directly proportional to the square root of the length

14. In potentiometer experiment, null point is obtained at a particular point for a cell on potentiometer wire x cm long. If the length of potentiometer wire is increased without changing the cell, the balancing length will (driving source is not changed)

- a) Increases b) Decreases
c) Becomes zero d) Not change

23. A charge is placed at the centre of line joining two equal charges Q. Show that the system of charges will be in equilibrium if $q = -Q/4$.

24. **Two wires of equal length, one of copper and other is manganin have same resistance. Which wire is thicker and why?**

25. **What is drift velocity. Derive an expression for it.**

OR

Deduce the relation between current and drift velocity of electron

26. A picked a resistor with bands of colours : brown, green, orange, while B chose a resistor with bands of black, green, red. Who picked the resistor higher value?

27. No force is exerted by a stationary charge when placed in magnetic field. Why?

28. What is a solenoid? Derive an expression for magnetic field due to a current carrying solenoid. **OR**

Derive an expression for torque acting on current carrying loop placed in uniform magnetic field.

29. What are magnetic elements of earth. Explain.

30. Define electric capacity. Derive an expression for the capacitance of a parallel plate capacitor in which a dielectric medium of dielectric constant K fills the space between the plates.

31. a) What is the cause of resistance in conductors? On what factors resistance of a conductors depends. ?.

b) How many electrons pass through a lamp in one second if current is 1 A ?

OR

State and Prove Wheatstone bridge principle

32. What are diamagnetic materials. Explain electron theory of diamagnetism,

33. Discuss the motion of charged particle in a uniform magnetic field with initial velocity perpendicular to magnetic field.

