NEET : CHAPTER WISE TEST-2

SUBJECT :- PHYSICS
CLASS :- 12th
CHAPTER :- CAPACITANCE

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NAME...
SECTION...

(SECTION-A)

1. A capacitor is charged by using a battery which is then disconnected. A dielectric slab is then slipped between the plates, which results in
(A) Reduction of charge on the plates and increase of potential difference across the plates
(B) Increase in the potential difference across the plate, reduction in stored energy, but no change in the charge on the plates
(C) Decrease in the potential difference across the plates, reduction in the stored energy, but no change in the charge on the plates
(D) None of the above

2. In a charged capacitor, the energy resides
(A) The positive charges
(B) Both the positive and negative charges
(C) The field between the plates
(D) Around the edge of the capacitor plates

3. The energy stored in a condenser of capacity C which has been raised to a potential V is given by
(A) $\frac{1}{2}CV$ (B) $\frac{1}{2}CV^2$
(C) CV (D) $\frac{1}{2VC}$

4. A condenser of capacity $50\ \mu F$ is charged to $10\ volts$. Its energy is equal to
(A) $2.5\times10^{-3}\ joule$ (B) $2.5\times10^{-4}\ joule$
(C) $5\times10^{-2}\ joule$ (D) $1.2\times10^{-8}\ joule$

5. The potential gradient at which the dielectric of a condenser just gets punctured is called
(A) Dielectric constant
(B) Dielectric strength
(C) Dielectric resistance
(D) Dielectric number

6. When air in a capacitor is replaced by a medium of dielectric constant *K*, the capacity
(A) Decreases *K* times
(B) Increases *K* times
(C) Increases K^2 times
(D) Remains constant

7. Eight small drops, each of radius r and having same charge q are combined to form a big drop. The ratio between the potentials of the bigger drop and the smaller drop is
(A) 8 : 1 (B) 4 : 1
(C) 2 : 1 (D) 1 : 8

8. A capacitor of capacity C has charge Q and stored energy is W. If the charge is increased to $2Q$, the stored energy will be
(A) $2W$ (B) $W/2$
(C) $4W$ (D) $W/4$

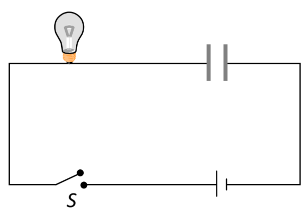
9. One plate of parallel plate capacitor is smaller than other, then charge on smaller plate will be
(A) Less than other
(B) More than other
(C) Equal to other
(D) Will depend upon the medium between them

10. Force acting upon a charged particle kept between the plates of a charged condenser is F. If one plate of the condenser is removed, then the force acting on the same particle will become
(A) 0 (B) $F/2$
(C) F (D) $2F$

11. The capacitance of a parallel plate condenser does not depend on
(A) Area of the plates
(B) Medium between the plates
(C) Distance between the plates
(D) Metal of the plates

12. A capacitor is kept connected to the battery and a dielectric slab is inserted between the plates. During this process
(A) No work is done
(B) Work is done at the cost of the energy already stored in the capacitor before the slab is inserted
(C) Work is done at the cost of the battery
(D) Work is done at the cost of both the capacitor and the battery

13. A light bulb, a capacitor and a battery are connected together as shown here, with switch S initially open. When the switch S is closed, which one of the following is true



(A) The bulb will light up for an instant when the capacitor starts charging
(B) The bulb will light up when the capacitor is fully charged
(C) The bulb will not light up at all
(D) The bulb will light up and go off at regular intervals

14. The capacity of a condenser in which a dielectric of dielectric constant 5 has been used, is C. If the dielectric is replaced by another with dielectric constant 20, the capacity will become

(A) $\frac{C}{4}$ (B) $4C$
(C) $\frac{C}{2}$ (D) $2C$

15. Two spherical conductors each of capacity C are charged to potentials V and $-V$. These are then connected by means of a fine wire. The loss of energy will be

(A) Zero (B) $\frac{1}{2}CV^2$
(C) CV^2 (D) $2CV^2$

16. An air capacitor of capacity $C = 10\mu F$ is connected to a constant voltage battery of $12\ V$. Now the space between the plates is filled with a liquid of dielectric constant 5. The charge that flows now from battery to the capacitor is

(A) $120\ \mu C$ (B) $699\ \mu C$
(C) $480\ \mu C$ (D) $24\ \mu C$

17. The energy stored in the condenser is

(A) QV (B) $\frac{1}{2}QV$
(C) $\frac{1}{2}C$ (D) $\frac{1}{2}\frac{Q}{C}$

18. A $12\,pF$ capacitor is connected to a 50*V* battery. How much electrostatic energy is stored in the capacitor

(A) $1.5\times10^{-8}\ J$ (B) $2.5\times10^{-7}\ J$
(C) $3.5\times10^{-5}\ J$ (D) $4.5\times10^{-2}\ J$

19. The capacity of a parallel plate capacitor with no dielectric substance but with a separation of 0.4 *cm* is $2\mu F$. The separation is reduced to half and it is filled with a dielectric substance of value 2.8. The final capacity of the capacitor is

(A) $11.2\mu F$ (B) $15.6\mu F$
(C) $19.2\mu F$ (D) $22.4\mu F$

20. The capacity of the conductor does not depend upon

(A) Charge
(B) Voltage
(C) Nature of the material
(D) All of these

21. The capacity of a parallel plate condenser is $10\,\mu F$, when the distance between its plates is 8 *cm*. If the distance between the plates is reduced to 4 *cm*, then the capacity of this parallel plate condenser will be

(A) $5\,\mu F$ (B) $10\,\mu F$
(C) $20\,\mu F$ (D) $40\,\mu F$

22. The mean electric energy density between the plates of a charged capacitor is (here q = charge on the capacitor and A = area of the capacitor plate)

(A) $\frac{q^2}{2\varepsilon_0 A^2}$
(B) $\frac{q}{2\varepsilon_0 A^2}$
(C) $\frac{q^2}{2\varepsilon_0 A}$
(D) None of the above

23. A charge of $40\,\mu C$ is given to a capacitor having capacitance $C = 10\,\mu F$. The stored energy in ergs is

(A) 80×10^{-6} (B) 800
(C) 80 (D) 8000

24. If the distance between parallel plates of a capacitor is halved and dielectric constant is doubled then the capacitance

(A) Decreases two times
(B) Increases two times
(C) Increases four times
(D) Remain the same

25. The energy required to charge a capacitor of $5\,\mu F$ by connecting a *d.c.* source of 20 *kV* is

(A) 10 *kJ* (B) 5 *kJ*
(C) 2 *kJ* (D) 1 *kJ*

26. If there are *n* capacitors in parallel connected to *V volt* source, then the energy stored is equal to

(A) *CV* (B) $\frac{1}{2}nCV^2$
(C) CV^2 (D) $\frac{1}{2n}CV^2$

27. The unit of electric permittivity is

(A) *Volt/m*^{2} (B) *Joule/coulomb*
(C) *Farad/m* (D) *Henry/m*

28. If eight identical drops are joined to form a bigger drop, the potential on bigger as compared to that on smaller drop will be

(A) Double (B) Four times
(C) Eight times (D) One time

29. A 40 μF capacitor in a defibrillator is charged to 3000 *V*. The energy stored in the capacitor is sent through the patient during a pulse of duration 2*ms*. The power delivered to the patient is
(A) 45 *kW* (B) 90 *kW*
(C) 180 *kW* (D) 360 *kW*

30. The energy stored in a condenser is in the form of
(A) Kinetic energy
(B) Potential energy
(C) Elastic energy
(D) Magnetic energy

31. When a dielectric material is introduced between the plates of a charges condenser, then electric field between the plates
(A) Remain constant
(B) Decreases
(C) Increases
(D) First increases then decreases

32. Two metallic spheres of radii $1\,cm$ and $2\,cm$ are given charges $10^{-2}\,C$ and $5\times 10^{-2}\,C$ respectively. If they are connected by a conducting wire, the final charge on the smaller sphere is
(A) $3\times 10^{-2}\,C$ (B) $1\times 10^{-2}\,C$
(C) $4\times 10^{-2}\,C$ (D) $2\times 10^{-2}\,C$

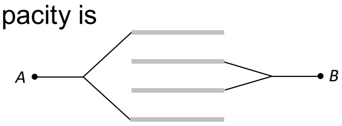
33. When a lamp is connected in series with capacitor, then
(A) Lamp will not glow
(B) Lamp will burst out
(C) Lamp will glow normally
(D) None of these

34. Two identical capacitors are joined in parallel, charged to a potential *V* and then separated and then connected in series *i.e.* the positive plate of one is connected to negative of the other
(A) The charges on the free plates connected together are destroyed
(B) The charges on the free plates are enhanced
(C) The energy stored in the system increases
(D) The potential difference in the free plates becomes $2V$

35. A parallel plate capacitor is made by stacking n equally spaced plates connected alternately. If the capacitance between any two plates is C then the resultant capacitance is
(A) C (B) nC
(C) $(n-1)C$ (D) $(n+1)C$

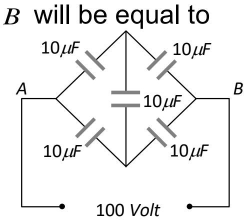
(SECTION-B)

36. Four plates of equal area A are separated by equal distances d and are arranged as shown in the figure. The equivalent capacity is



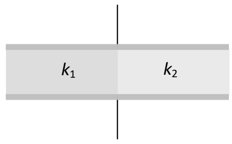
(A) $\frac{2\varepsilon_0 A}{d}$ (B) $\frac{3\varepsilon_0 A}{d}$
(C) $\frac{3\varepsilon_0 A}{d}$ (D) $\frac{\varepsilon_0 A}{d}$

37. Five capacitors of $10\,\mu F$ capacity each are connected to a *d.c.* potential of $100\,volts$ as shown in the adjoining figure. The equivalent capacitance between the points A and B will be equal to



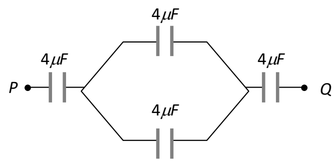
(A) $40\,\mu F$ (B) $20\,\mu F$
(C) $30\,\mu F$ (D) $10\,\mu F$

38. A parallel plate capacitor with air as medium between the plates has a capacitance of $10\,\mu F$. The area of capacitor is divided into two equal halves and filled with two media as shown in the figure having dielectric constant $k_1 = 2$ and $k_2 = 4$. The capacitance of the system will now be



(A) $10\,\mu F$ (B) $20\,\mu F$
(C) $30\,\mu F$ (D) $40\,\mu F$

39. Four condensers each of capacity $4\,\mu F$ are connected as shown in figure. $V_P - V_Q = 15\,volts$. The energy stored in the system is



(A) $2400\,ergs$ (B) $1800\,ergs$
(C) $3600\,ergs$ (D) $5400\,ergs$

40. Three capacitors of capacity $C_1, C_2\, C_3$ are connected in series. Their total capacity will be
(A) $C_1 + C_2 + C_3$ (B) $1/(C_1 + C_2 + C_3)$
(C) $(C_1^{-1} + C_2^{-1} + C_3^{-1})^{-1}$ (D) None of these

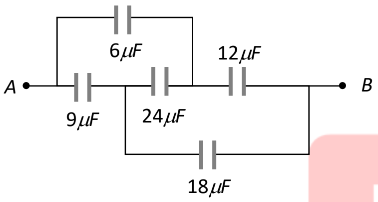
41. Two capacitors of equal capacity are first connected in parallel and then in series. The ratio of the total capacities in the two cases will be

(A) 2 : 1 (B) 1 : 2
(C) 4 : 1 (D) 1 : 4

42. Two capacitors connected in parallel having the capacities C_1 and C_2 are given 'q' charge, which is distributed among them. The ratio of the charge on C_1 and C_2 will be

(A) $\frac{C_1}{C_2}$ (B) $\frac{C_2}{C_1}$
(C) C_1C_2 (D) $\frac{1}{C_1C_2}$

43. In the connections shown in the adjoining figure, the equivalent capacity between A and B will be



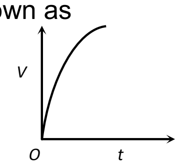
(A) $10.8\,\mu F$ (B) $69\,\mu F$
(C) $15\,\mu F$ (D) $10\,\mu F$

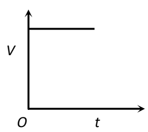
44. Assertion : If three capacitors of capacitance $C_1 < C_2 < C_3$ are connected in parallel then their equivalent capacitance $C_p > C_s$

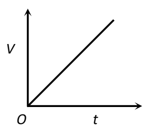
Reason : $\frac{1}{C_p} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3}$

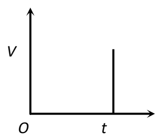
(A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
(B) If both assertion and reason are true but reason is not the correct explanation of the assertion.
(C) If assertion is true but reason is false.
(D) If the assertion and reason both are false.

45. During charging a capacitor variation of potential V of the capacitor with time t is shown as

(A)


(B)


(C)


(D)


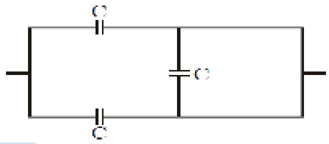
46. In the circuit shown in figure. C_1=C, C_2=2C, C_3=3C, C_4=4C.

Column I
(A) Maximum potential difference
(B) Minimum potential difference
(C) Maximum potential energy
(D) Minimum potential energy

Column II
(P) across C_1
(Q) across C_2
(R) across C_3
(S) across C_4

(A) A → P ; B → R,S ; C → P ;D → R
(B) A → Q ; B → Q,S ; C → P ;D → R
(C) A → P,R ; B → S ; C → Q ;D → R,S
(D) A → S ; B → P,S ; C → P ;D → R

47. The equivalent capacitance of the combination shown in the figure is :



(A) 3C (B) 2C
(C) C/2 (D) 3C/2

48. A parallel plate capacitor of capacitance 20 μF is being charged by a voltage source whose potential is changing at the rate of 3 V/s. The conduction current through the connecting wires, and the displacement current through the plates of the capacitor, would be, respectively.

(A) Zero, 60 μA (B) 60 μA, 60 μA
(C) 60 μA, zero (D) Zero, zero

49. A parallel plate air capacitor has capacity C, distance of separation between plates is d and potential difference V is applied between the plates. Force of attraction between the plates of the parallel plate air capacitor is

(A) $\frac{C^2V^2}{2d}$ (B) $\frac{CV^2}{2d}$
(C) $\frac{CV^2}{d}$ (D) $\frac{C^2V^2}{2d^2}$

50. In a parallel plate capacitor, the distance between the plates is d and potential difference across plates us V. Energy stored per unit volume between the plates of capacitor is

(A) $\frac{Q^2}{2V^2}$ (B) $\frac{1}{2}\frac{\varepsilon_0 V^2}{d^2}$
(C) $\frac{1}{2}\frac{V^2}{\varepsilon_0 d^2}$ (D) $\frac{1}{2}\varepsilon_0\frac{V^2}{d}$