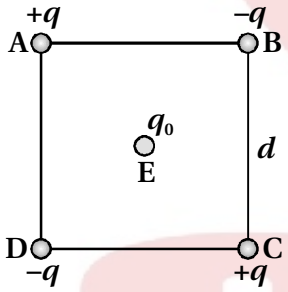
OPEN STUDENT FOUNDATION
Physics (Class 12)
PRACTICE SHEET DAY 2

CHAPTER 02 | Date : 19/02/24

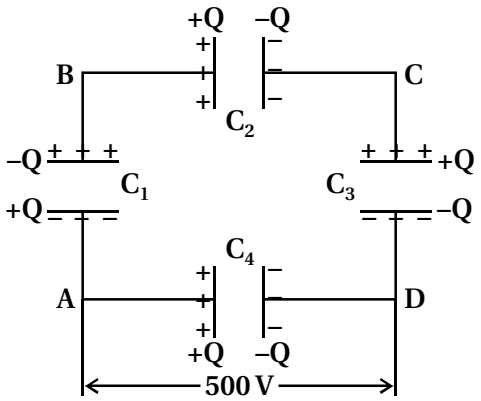
Section A

● **Write the answer of the following questions. [Each carries 1 Mark]** **[10]**

1. Derive expression for the capacitance of the parallel plate capacitor.
2. Obtain the equation of energy stored in capacitor, $W = \frac{Q^2}{2C}$.
3. A 600 pF capacitor is charged by a 200 V supply. It is then disconnected from the supply and is connected to another uncharged 600 pF capacitor. How much electrostatic energy is lost in the process ? ($\Delta U = 4.5 \times 10^{-6}$ J $- 2.25 \times 10^{-6}$ J $= 2.25 \times 10^{-6}$ J)
4. Two charges 3×10^{-8} C and -2×10^{-8} C are located 15 cm apart. At what point on the line joining the two charges is the electric potential zero ? Take the potential at infinity to be zero.
5. A slab of material of dielectrical constant K has the same area as the plates of a parallel-plate capacitor but has a thickness $\left(\frac{3}{4}\right)d$, where d is the separation of the plates. How is the capacitance changed when the slab is inserted between the plates ?
6. Obtain the equation of electric potential energy of a dipole from equation of potential energy of a system of two electric charges.
7. Four charges are arranged at the corners of a square ABCD of side d as shown in figure.
   (a) Find the work required to put together this arrangement.
   (b) A charge q_0 is brought to the centre E of the square the four charges being held fixed at its corners. How much extra work is needed to do this ?



8. Derive the formula for the electric potential due to an electric dipole at a point from it.
9. Two charges 3×10^{-8} C and -2×10^{-8} C are located 15 cm apart. At what point on the line joining the two charges is the electric potential zero ? Take the potential at infinity to be zero.
10. A network of four 10 μF capacitors is connected to a 500 V supply, as shown in figure. Determine (a) the equivalent capacitance of the network and (b) the charge on each capacitor. (Note, the charge on a capacitor is the charge on the plate with higher potential, equal and opposite to the charge on the plate with lower potential).


+Q
–Q
B
C
C2
–Q
C1
C3
+Q
+Q
–Q
C4
A
D
+Q
–Q
500 V

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Section [A] : 1 Marks Questions					
No	Ans	Chap	Sec	Que	Universal_QueId
1.	-	Chap 2	S8	1	QP23P11B1211_P1C2S8Q1
2.	-	Chap 2	S8	2	QP23P11B1211_P1C2S8Q2
3.	-	Chap 2	S8	3	QP23P11B1211_P1C2S8Q3
4.	-	Chap 2	S8	4	QP23P11B1211_P1C2S8Q4
5.	-	Chap 2	S9	18	QP23P11B1211_P1C2S9Q18
6.	-	Chap 2	S9	17	QP23P11B1211_P1C2S9Q17
7.	-	Chap 2	S10	21	QP23P11B1211_P1C2S10Q21
8.	-	Chap 2	S10	20	QP23P11B1211_P1C2S10Q20
9.	-	Chap 2	S10	17	QP23P11B1211_P1C2S10Q17
10.	-	Chap 2	S9	20	QP23P11B1211_P1C2S9Q20

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➠ Try Yourself

2. Obtain the equation of energy stored in capacitor, $W = \frac{Q^2}{2C}$.

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➠ Try Yourself

4. Two charges 3×10^{-8} C and -2×10^{-8} C are located 15 cm apart. At what point on the line joining the two charges is the electric potential zero ? Take the potential at infinity to be zero.

➠ $x = 9$ cm or $x = 45$ cm

5. A slab of material of dielectrical constant K has the same area as the plates of a parallel-plate capacitor but has a thickness $\left(\frac{3}{4}\right)d$, where d is the separation of the plates. How is the capacitance changed when the slab is inserted between the plates ?

➠ Try Yourself

6. Obtain the equation of electric potential energy of a dipole from equation of potential energy of a system of two electric charges.

➠ Try Yourself

7. Four charges are arranged at the corners of a square ABCD of side d as shown in figure.
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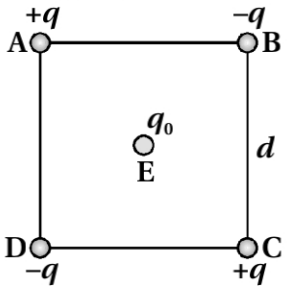

➠ Try Yourself

8. Derive the formula for the electric potential due to an electric dipole at a point from it.

➠ Try Yourself

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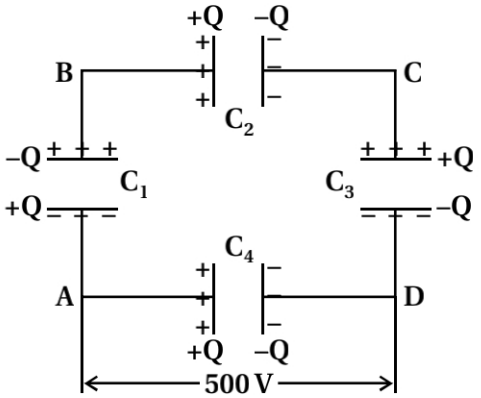

➠ Try Yourself