**SAINIK SCHOOL GOPALGANJ**

**SUB: PHYSICS**

**CLASS - XII**

**SUMMER VACATION ASSIGNMENT**

**CHAPTER – 2**

1. If two conducting spheres are separately charged and then brought in contact

(a) The total energy of the two spheres is conserved

(b) The total charge on the two spheres is conserved

(c) Both the total energy and charge are conserved

(d) The final potential is always the mean of the original potentials of the two spheres

1. Two insulated charged spheres of radii  and respectively and having an equal charge  are connected by a copper wire, then they are separated

(a) Both the spheres will have the same charge 

(b) Charge on the  sphere will be greater than that on the  sphere

(c) Charge on the  sphere will be greater than that on the  sphere

(d) Charge on each of the sphere will be 

1. Eight drops of mercury of equal radii possessing equal charges combine to form a big drop. Then the capacitance of bigger drop compared to each individual small drop is

(a) 8 times (b) 4 times

(c) 2 times (d) 32 times

1. A condenser of capacity is charged to . Its energy is equal to

(a)  (b) 

(c)  (d) 

1. 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

1. A parallel plate condenser has a capacitance  in air and when immersed in an oil. The dielectric constant  of the oil is

(a) 0.45 (b)0.55

(c) 1.10 (d) 2.20

1. Separation between the plates of a parallel plate capacitor is and the area of each plate is . When a slab of material of dielectric constantand thickness  is introduced between the plates, its capacitance becomes

(a)  (b) 

(c)  (d) 

1. The capacity of parallel plate condenser depends on

(a) The type of metal used

(b) The thickness of plates

(c) The potential applied across the plates

(d) The separation between the plates

1. The energy of a charged capacitor resides in

(a) The electric field only

(b) The magnetic field only

(c) Both the electric and magnetic field

(d) Neither in electric nor magnetic field

1. No current flows between two charged bodies connected together when they have the same

(a) Capacitance or  ratio (b) Charge

(c) Resistance (d) Potential or ratio

1. The capacity of a parallel plate condenser is . Its capacity when the separation between the plates is halved will be

(a)  (b) 

(c)  (d) 

(c)  (d) 

1. The equivalent capacitance in the circuit between *A* and *B* will be

(a)  (b)(c)

*A*

*B*

1*μF*

1*μF*

1*μF*

(d) 

1. Three capacitors of  and  are joined in series and the combination is charged by means of a 24 *volt* battery. The potential difference between the plates of the  capacitor is

(a) 4 *volt* (b) 6 *volt*

(c) 8 *volt* (d) 10 *volt*

1. Two capacitors of capacitances  and  are charged to a potential of 12 *V* each. They are now connected to each other, with the positive plate of each joined to the negative plate of the other. The potential difference across each will be

(a)6 *volt* (b)4 *volt*

(c) 3 *volt* (d) Zero

1. Two identical capacitors, have the same capacitance *C*. One of them is charged to potential  and the other to . The negative ends of the capacitors are connected together. When the positive ends are also connected, the decrease in energy of the combined system is

(a)  (b) 

(c)  (d) 

1. A capacitor of 10*μF* charged up to 250 *volts* is connected in parallel with another capacitor of 5*μF* charged up to 100 *volts*. The common potential is

(a) 500 *V* (b) 400 *V*

(c) 300 *V* (d) 200 *V*

1. Two capacitors of 1*μF* and 2*μF* are connected in series, the resultant capacitance will be

(a)  (b) 

(c)  (d) 

1. The charge on any one of the  capacitors and  capacitor will be given respectively (in ) as

2*μF*

2*μF*

1*μF*

2*V*

(a) 1, 2 (b)2, 1 (c) 1, 1 (d)2, 2

1. When two identical capacitors are in series have 3*μF* capacitance and when parallel 12*μF*. What is the capacitance of each

(a)  (b) 

(c)  (d) 

1. In the circuit as shown in the figure the effective capacitance between *A* and *B* is

4*μF*

4*μF*

2*μF*

4*μF*

2*μF*

*B*

*A*

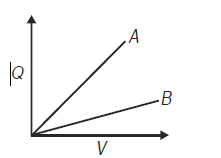
(a) 

(b) 

(c) 

(d) 

1. The figure shows the Q (charge) versus V (potential) graph for a combination of two capacitors.Identify the graph representing the parallel combination.



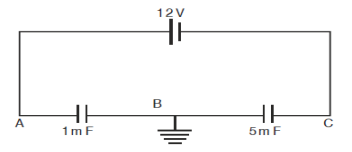
1. Two conducting spheres of radii r1 & r2 are at same potential. What is the ratio of charges on the spheres?
2. Why must electrostatic field at the surface of charged conductor be normal to the surface at every point? Give reason.
3. A capacitor is made of a flat plate of area A and second plate having a stair like structure as shown in figure below. If width of each stair is A/3 and height is d. Find the capacitance of the arrangement.



1. Two point charges 6 μC and 2 μC are separated by 3 cm in free space. Calculate the work done

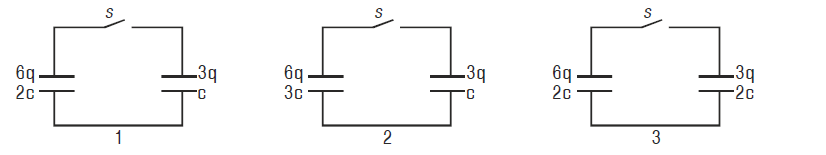
in separating them to infinity.

1. A parallel plate capacitor is charged to potential V by a source of emf. After removing the source, the separation between the plates is doubled. How will the following change
2. electric field change on each plate
3. potential difference
4. Capacitance of the capacitor. Justify your answer
5. Find the potential at A and C in the following circuit :



1. Figure shows three circuits, each consisting of a switch and two capacitors initially charged as

Indicated . After the switch has been closed, in which circuit (if any) will the charges on the left hand capacitor (i) increase (ii) decrease (iii) remain same?



1. Derive an expression for capacitance of parallel plate capacitor with dielectric slab of thickness t (t<d) between the plates separated by distance d. If the dielectric slab is introduced with the battery connected, then how do the following quantities change (i) charge (ii) potential (iii) capacitance (iv) energy?
2. a) What is meant by dielectric polarization? Why does the electric field inside a dielectric decrease when it is placed in an external field?

b) Find equivalent capacitance between A and B in the combination given below :each capacitor is of 2μF.

