HOLIDAYS HOME WORK FOR SUMMER VACATION 2019

CLASS – XII   SUBJECT: PHYSICS

SECTION - A

NOTE: - DO THE FOLLOWING QUESTIONS/NUMERICALS IN A SEPARATE NOTEBOOK

1. What is the force between two small charged spheres having charges of 2×10^{-7}C
   and 3×10^{-7}C placed 30 cm apart in air?

2. The electrostatic force on a small sphere of charge 0.4 µC due to another small sphere of charge – 0.8 µC in air is 0.2 N. (a) What is the distance between the two spheres? (b) What is the force on the second sphere due to the first?

3. (a) Explain the meaning of the statement 'electric charge of a body is quantised'.
   (b) Why can one ignore quantisation of electric charge when dealing with   macroscopic i.e., large scale charges?

4. Four point charges $q_A = 2$ µC, $q_B = -5$ µC, $q_C = 2$ µC, and $q_D = -5$ µC are
   located at the corners of a square ABCD of side 10 cm. What is the force on a
   charge of 1 µC placed at the centre of the square?

4. (a) An electrostatic field line is a continuous curve. That is, a field line cannot have
   sudden breaks. Why not?
   (b) Explain why two field lines never cross each other at any point?

5. Two point charges $q_A = 3$ µC and $q_B = -3$ µC are located 20 cm apart in vacuum.
   (a) What is the electric field at the midpoint O of the line AB joining the two
   charges?
   (b) If a negative test charge of magnitude $1.5 \times 10–9$ C is placed at this point, what
   is the force experienced by the test charge?

5. A system has two charges $q_A = 2.5 \times 10^{-7}$ C and $q_B = -2.5 \times 10^{-7}$ C
   located at points A: (0, 0, –15 cm) and B: (0,0, +15 cm), respectively. What are the total charge and electric dipole moment of the system?

6. An electric dipole with dipole moment 4×10^{-9} C m is aligned at 30° with the
   direction of a uniform electric field of magnitude 5×10^{4} NC^{-1}.
   Calculate the magnitude of the torque acting on the dipole.

7. A polythene piece rubbed with wool is found to have a negative charge of
3×10^{-7} C.
    (a) Estimate the number of electrons transferred (from which to which?)

8. Consider a uniform electric field $E = 3 \times 10^3 \, \hat{i}$ N/C.
9. (a) What is the flux of this field through a square of 10 cm on a side whose plane is parallel to the yz plane?
10. (b) What is the flux through the same square if the normal to its plane makes a 60° angle with the x-axis?
11. Careful measurement of the electric field at the surface of a black box indicates that the net outward flux through the surface of the box is 8.0 $\times 10^3$ Nm^2/C.
    (a) What is the net charge inside the box?
    (b) If the net outward flux through the surface of the box were zero, could you conclude that there were no charges inside the box? Why or Why not?
12. A point charge +10 μC is a distance 5 cm directly above the centre of a square of side 10 cm, as shown in Fig. What is the magnitude of the electric flux through the square? (*Hint:* Think of the square as one face of a cube with edge 10 cm.)

5 cm

10 cm

10 cm
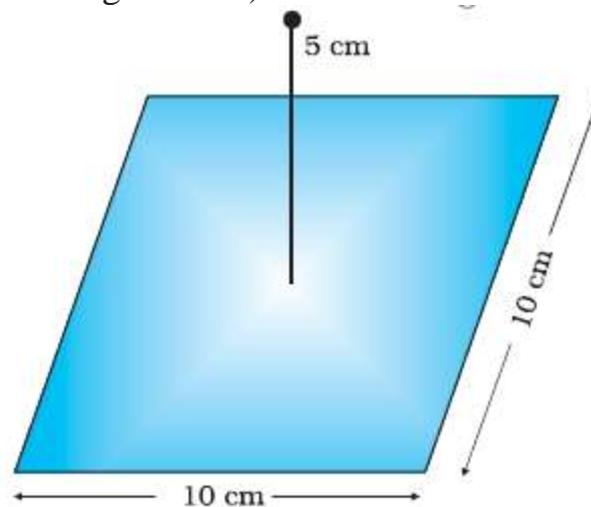
13. A point charge of 2.0 μC is at the centre of a cubic Gaussian surface 9.0 cm on edge. What is the net electric flux through the surface?
14. A point charge causes an electric flux of -1.0×10^3 Nm^2/C to pass through a spherical Gaussian surface of 10.0 cm radius centred on the charge.
    (a) If the radius of the Gaussian surface were doubled, how much flux would pass through the surface?
    (b) What is the value of the point charge?

15. A conducting sphere of radius 10 cm has an unknown charge. If the electric field
    20 cm from the centre of the sphere is 1.5×10^3 N/C and points radially inward,
    what is the net charge on the sphere?

16. A uniformly charged conducting sphere of 2.4 m diameter has a surface charge density of 80.0 µC/m2.
    (a) Find the charge on the sphere. (b) What is the total electric flux leaving the surface of the sphere?

17. An infinite line charge produces a field of 9×10^4 N/C at a distance of 2 cm. Calculate the linear charge density.

18. Two large, thin metal plates are parallel and close to each other. On their inner faces, the plates have surface charge densities of opposite signs and of magnitude
    17.0×10^{-22} C/m^2. What is E: (a) in the outer region of the first plate,
    (b) in the outer region of the second plate, and (c) between the plates?

19. A parallel plate capacitor with air between the plates has a capacitance of 8 pF
    (1pF = 10^{-12} F). What will be the capacitance if the distance between the plates is
    reduced by half, and the space between them is filled with a substance of dielectric
    constant 6?

20. Three capacitors each of capacitance 9 pF are connected in series.
    (a) What is the total capacitance of the combination?
    (b) What is the potential difference across each capacitor if the combination is
    connected to a 120 V supply?

21. Three capacitors of capacitances 2 pF, 3 pF and 4 pF are connected in parallel.
    (a) What is the total capacitance of the combination?
    (b) Determine the charge on each capacitor if the combination is connected to a
    100 V supply.

22. In a parallel plate capacitor with air between the plates, each plate has an area of
    6×10^{-3} m^2 and the distance between the plates is 3 mm.
    Calculate the capacitance of the capacitor. If this capacitor is connected to a 100 V
    supply, what is the charge on each plate of the capacitor?

23. A 12pF capacitor is connected to a 50V battery. How much electrostatic energy is
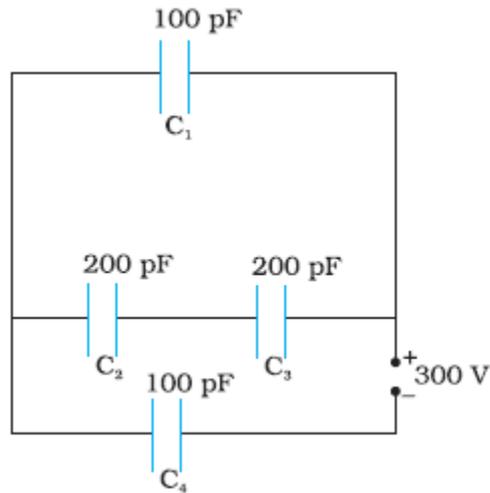
stored in the capacitor?

24. A 600pF capacitor is charged by a 200V supply. It is then disconnected from the
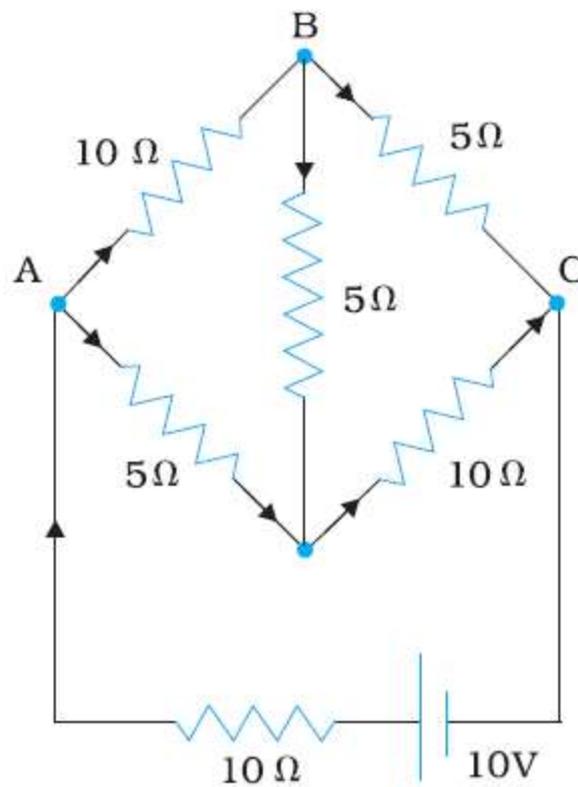supply and is connected to another uncharged 600 pF capacitor. How much
electrostatic energy is lost in the process?

25. Obtain the equivalent capacitance of the network in Fig. For a 300 V supply,
determine the charge and voltage across each capacitor.

26. Determine the current in each branch of the network shown in Fig.

SECTION – B

PREPARE NOTES ON THE FOLLOWING TOPICS FROM CHAPTER NO.11 "ATOMS"

NOTE: - THIS SECTION MUST BE DONE IN YOUR CLASSWORK NOTEBOOK

- ❖ Alpha particals scattering experiment.

- ❖ Distance of closest approach: Estimation of Nuclear Size.

- ❖ Impact parameter.

- ❖ Rutherford's Model of an atom and its limitations.

- ❖ Bohr's Quantisation Condition.

- ❖ Postulates of Bohr's theory of Hydrogen atom.

- ❖ Spectral Series of Hydrogen atom.

- ❖ Energy level diagram for hydrogen atom.

- ❖ Limitations of Bohr's theory.

- ❖ Excitation and Ionisation potential.

- ❖ Atleast 10 numericals based on Frequency, Wave Number and Ionisation potential.

Q1. Solve 10 questions based on output finding (Python).

Q2. Solve 10 questions based on error finding (Python).

Q3.Write 10 python programs using function (Method).

Q4. Write 5 python programs of each of the following:
    (i)   List
    (ii)   String
    (iii)   Tuples
    (iv)   Dictionaries
    (v)
Q5. Project: Design an application using python programming.

CLASS – XII   **SUBJECT: CHEMISTRY**

Chemistry additional questions

1. A solution of glucose in water is labeled as 10% w/w, what would be the molarity and mole fraction of each component in the solutions? If the density of the solution is 1.2g/ml, then what shell molarity of the solution?

2. How many mL of 0.1 M HCl are required to react with 1g mixture of Na_2CO_3 containing equimolar amount of both?

3. An anti-freeze solution is prepared from 222.6g of ethyl-glycol and 200g of water, calculate the molarity of solutions, if density of the solutions is 1.072g/ml, than what be the molarity of the solution?

4. A solution is obtained by mixing 300g of 25% solution and 400g of 40% solution by mass. calculate the mass percentage of the resulting solution

5. What role does the molecular interaction play in solution of alcohol and water

6. What is meant by positive and negative deviation from raoult's law and how is the sign of $_{max}$H related to negative and positive deviation of raoult's law

7. An aqueous solution of 2% non-volatile solute exerts a pressure of 1.004 bar at the normal boiling point of the solvent .what is the molar mass of the solute

8. Hepten and octane from an ideal solution.at 373k, the vapour pressure of the liquid components are 105.2 kPa and 46.8 kPa respectively. What will be the vapour pressure of a mixture of 26.0g of heptane and 35g of octane

9. A 50% solution [by mass] of cane sugar in water has freezing point of 271k.Calculate the freezing point of 5% glucose in water if freezing point of pure water is 273.15k

10. If the density of some lake water is 1.25g/ml and contain 92g of Na^+ ions per kg of water, calculate the molarity of Na^+ ions in the lake.

11. The depression in freezing point of water observed for the same

CLASS-XII (2019-20)   BIOLOGY

1. Draw and practice following diagrams from NCERT Book in your assignment notebook.
   Figure
   2.3,2.5,2.7,2.8,2.13,2.14,2.15(a),3.1,3.2,3.3,3.5,3.6,3.7,3.8,3.9,3.10,3.11 and 3.12
2. Choose one topic for investigatory project collect information on it/ perform it and present it in soft copy.
3. Make a booklet /dictionary on the definitions of important terms from NCERT Book in homework notebook.
4. Do the given assignment and NCERT exercise on chapter 2,3and 4 excluding diagram based questions .