IMAYAM ARTS AND SCIENCE COLLEGE,KANNANUR.

DEPARTMENT OF PHYSICS

II B.SC CHEMISTRY

SUB CODE:16SACPH2-ALLIED PHYSICS-II

TWO MARK QUESTIONS

UNIT-I

1.State Coulomb’s law.

The force of attraction or repulsion between two charge are

1. directly proportional to the product of the magnitudes of charges and
2. inversely proportional to the square of the distance between the charges.

2.State Gauss’s law.

The total flux linked with a closed surface is 1/ε0 times the charge enclosed by the closed surface.

**ϕ = Q/ϵ0**

3. Define Principle of a capacitor .

A capacitor works on the principle that the capacitance of a conductor increase appreciably when an earthed conductor is brought near it. Thus a capacitor has two plates separated by a distance having equal and opposite charges.

4.Define capacitance of a conductor.

The capacitance of a conductor is defined as the ratio b/w the charge and the potential.

5.Define relative permittivity.

Relative permittivity is equal to the ratio of the force b/w two charges placed in vaccum at some distance and the force b/w the same charges in the medium at the same distance apart.

6.Write down applications of capacitors.

i) Capacitors are used in virtually every area of electronics, and they perform a variety of different tasks.

ii)They are used in the ignition system of automobile engines.

iii)They are used to generate electromagnetic oscillations and in tunning radio circuits.

UNIT-II

1.Define Intensity of magnetization.

It is defined as the magnetic moment per unit volume of the material.

I=M/V

2.Define magnetic susceptibility.

It is defined as the ratio of intensity of magnetization to the magnetic field.

Xm=I/H

3.Write down the types of magnetic materials.

i)Dia magnetic materials

ii)Para magnetic materials

1. Ferro magnetic materials

4. Write down the properties of dia magnetic materials.

i)The susceptibility has a low negative value.

ii) susceptibility is independent of temperature.

iii)The relative permeability is slightly less than one.

5.Write down the properties of para magnetic materials.

i)The susceptibility has a low +ve value.

ii) susceptibility is inversely proportional to absolute temperature.

iii)The relative permeability is greater than one.

6.Magnetic induction.

The Magnetic induction is defined as the no of lines of magnetic force passing perpendicular through unit area.

7.Define Hysteresis.

The magnetic induction B lags behind the magnetizing field H in a cycle of magnetization. This is called hysteresis.

UNIT-III

1.Pauli’s exclusion principle.

The two electrons in an atom can exist in the same quantum state.In other words there can not be electrons in an atom with the same value of all the quantum numbers.

2.Moseley's law .

Moseley's law is an [empirical law](https://en.wikipedia.org/wiki/Empirical_law" \o "Empirical law) concerning the characteristic [x-rays](https://en.wikipedia.org/wiki/X-ray" \l "Physics" \o "X-ray) emitted by [atoms](https://en.wikipedia.org/wiki/Atom" \o "Atom). The law states that the square root of the frequency of the emitted x-ray is approximately proportional to the [atomic number](https://en.wikipedia.org/wiki/Atomic_number" \o "Atomic number).

3.Bragg’s law.

 When [X-rays](https://en.wikipedia.org/wiki/X-ray" \o "X-ray) are incident on an [atom](https://en.wikipedia.org/wiki/Atom" \o "Atom), they make the [electronic cloud](https://en.wikipedia.org/wiki/Electron" \o "Electron) move, as does any [electromagnetic wave](https://en.wikipedia.org/wiki/Electromagnetic_wave" \o "Electromagnetic wave). The [movement](https://en.wikipedia.org/wiki/Motion_(physics)" \o "Motion (physics)) of these [charges](https://en.wikipedia.org/wiki/Electric_charge" \o "Electric charge) re-radiates [waves](https://en.wikipedia.org/wiki/Wave" \o "Wave) with the same [frequency](https://en.wikipedia.org/wiki/Frequency" \o "Frequency), blurred slightly due to a variety of effects; this phenomenon is known as [Rayleigh scattering](https://en.wikipedia.org/wiki/Rayleigh_scattering" \o "Rayleigh scattering) (or elastic scattering). The scattered waves can themselves be scattered but this secondary scattering is assumed to be negligible.

 2*d*sin *θ=n λ*

*4.Miller indices.*

Miller indices are used to specify directions and planes. These directions and planes could be in lattices or in crystals. The number of indices will match with the dimension of the lattice or the crystal.

5.Principal quantum number (*n*).

The principal quantum number (*n*) describes the size of the orbital. Orbitals for which *n* = 2 are larger than those for which *n* = 1, for example. Because they have opposite electrical charges, electrons are attracted to the nucleus of the atom. Energy must therefore be absorbed to excite an electron from an orbital in which the electron is close to the nucleus (*n* = 1) into an orbital in which it is further from the nucleus (*n* = 2). The principal quantum number therefore indirectly describes the energy of an orbital.

UNIT-IV

1.Define nuclear size.

Rutherford work on the scattering of alpha particles showed that the mean radius of an atomic nucleus of the order of 10-14  to 10-15  m while that the atom is 10-10 .This is known as nuclear size.

2. Define nuclear mass.

The mass of the nucleus is the sum of the masses of neutron and proton.

Nuclear mass=Zmp+Zmn

3.Define mass defect.

The difference of the nuclear masses is real nuclear mass is known as mass defect.

4.Define nuclear spin.

Electrons &protons have a spin of ½.Thus nuclei with an even number of protons &electrons should have integral spins.This is known as nuclear spin.

5.Define Lepton .

These are light weight elementary particle. The leptons are stable expect muons.They interest weakly with other particle.The members of lepton are electron and positron ,muons-neutrions.

UNIT-V

1.AND Gate.

The AND gate is a [digital logic gate](https://www.elprocus.com/different-types-of-digital-logic-circuits/" \t "_blank) with ‘n’ i/ps one o/p, which perform logical conjunction based on the combinations of its inputs.The output of this gate is true only when all the inputs are true. When one or more inputs of the AND gate’s i/ps are false, then only the output of the AND gate is false.

2. NOR Gate.

The NOR gate is a digital logic gate with n inputs and one output, that performs the operation of the OR gate followed by the NOT gate. NOR gate is designed by combining the OR and NOT gate. When any one of the i/ps of the NOR gate is true, then the output of the NOR gate will be false.

3.Demorgan’s first law.

The complement of sum is equals the product of the complements.

4.Convert decimal to binary number.

1010 / 2 = 505 with 0 remainder   
505 / 2 = 252 with 1 remainder  
252 / 2 = 126 with 0 remainder  
126 / 2 = 63 with 0 remainder  
63 / 2 = 31 with 1 remainder  
31 / 2 = 15 with 1 remainder  
15 / 2 = 7 with 1 remainder  
7 / 2 = 3 with 1 remainder  
3 / 2 = 1 with 1 remainder  
1 / 2 = 0 with 1 remainder

Ans:

101010 = 11111100102

5. Demorgan’s second law.

The complement of product is equals the sum of the complements.

5 MARK QUESTIONS

UNIT-I

1.Explain the principle of a capacitor.

2.Derive an expression for the energy stored in a condenser.

3.Write short note on capacitors in series.

4. Write short note on capacitors in parallel.

5.Explain applications of capacitors.

UNIT-II

1. Discuss about types of magnetic materials.

2. Discuss about properties of para magnetic materials.

3. Discuss about properties of ferro magnetic materials.

4.Explain magnetic energy per unit volume.

5. Discuss about uses of ferro magnetic materials.

UNIT-III

1. Write short note on (a)spatial quantization (b)electron spin

2.State and explain Pauli’s exclusion principle.

3. Discuss characteristic of x-rays.

4.Describe Moseley law.

5.Explain Bragg’s law.

6. Distinguish between continuous and characteristic of x-rays spectra.

UNIT-IV

1.Describe the salient features of liquid drop model.

2.Compare a liquid drop with the nucleus.

3.Write note on (a)Nuclear charge (b)Nuclear spin

4.Explain classification of elementary particles.

5.Discuss about types of nuclear reactions .

UNIT-V

1.Convert the following binary to decimal (a)11011 (b)10110.11

2.Distinguish between an AND and OR gate.

3.Explain half adder with the help of truth table.

4.Write note on full subtractor.

5.What are NOR and NAND gate.

6. Convert the following binary to octal (a)1001 (b)11011.1100101

TEN MARKS QUESTIONS

1.Show that there is always loss of energy due to sharing of charges.

2.State and explain Coulomb’s law in electrostatics.

3.Derive an expression for the cylindrical capacitor.

4. Derive an expression for the spherical capacitor.

5. Explain B-H curve.

6.Explain quantum numbers in vector atom model.

7.Relation between magnetic susceptibility and magnetic permeability.

8.Describe the x-ray diffraction powder photograph method.

9. Describe the x-ray diffraction Laue’s method.

10.Give an account of sommerfield relativistic atom model.

11.Discuss the theory of cyclotron.

12.Describe the working of betatron.

13. Describe the working of shell model.

14.Explain synchro-cyclotron.

15.State and prove De-Margan’s theorem.

16.Discuss about half and full adders and draw its logic symbol.

17. Discuss about half and full subtractors and draw its logic symbol.

18.Prove basic laws of Boolean algebra.

19. Convert the following binary to hexa decimal numbers

(a)11010111 (b)1011011100 (c)1100111111

20. Convert the following hexa decimal to decimal

(a)17B (b)8C.371 (c)3F.246