SCIM GOVERNMENT COLLEGE TANUKU W.G.Dt
DEPARTMENT OF PHYSICS
QUESTION BANK
PHYSICS PAPER –V (A)
(ELECTRICITY, MAGNETISM AND ELECTRONICS)

UNIT-I   ELECTRIC FIELD INTENSITY AND POTENTIAL, DIELECTRICS

1. Define electric field intensity and obtain an expression for electric field intensity due to uniformly charged sphere? (10M)
2. Define electric potential and obtain an expression for electric potential due to spherical shell? (10M)
3. Define the letters D, E, P and obtain the relation between them? (10M)
4. State and prove Gauss's law? (5M)
5. Obtain an expression for electric field intensity due to an infinite conducting sheet of charge? (5M)
6. Derive an expression for potential due to appoint charge? (5M)
7. Explain the boundary conditions of dielectric surface? (5M)

UNIT –II ELECTRIC AND MAGNETIC FIELDS, ELECTROMAGNETICINDUCTION

1. State Biot-Savart's law and obtain an expression for magnetic field induction due to circular   current loop? (10M)
2. State Biot-Savart's law and obtain an expression for magnetic field induction due to solenoid? (10M)
3. Define self-induction. Obtain an expression for self-induction due to long solenoid? (10M)
4. Give the theory of transformer and explain its working? (10M)
5. Derive an expression for magnetic field induction due to long straight wire?
6. State and explain Biot-Savart's law? (5M)
7. State and explain Hall Effect? (5M)
8. Explain the concept of coefficient of coupling? (5M)
9. Derive an expression for energy stored in magnetic field? (5M)
10. State and explain Faraday's law? (5M)

UNIT-III ALTERNATING CURRENTS AND ELECTROMAGNETIC WAVES

1. Construct L-C-R series resonant circuit .Obtain the equation for resonance frequency and explain with vector diagram? (10M)

2. Explain the growth and decay of currents in R-C circuit with vector diagram? (10M)

3. Derive Maxwell's electromagnetic wave equation? (10M)

4. State and explain pointing theorem and also explain Hertz experiment? (10M)

5. Obtain the relation between current and voltage in L-R circuit? (5M)

6. Obtain the expression for power in ac circuit? (5M)

7. Derive the expression for resonant frequency in L-C-R parallel circuit? (5M)

8. Write a brief note on Q-factor? (5M)

9. What arte the integral and differential forms of Maxwell's equations? (5M)

UNIT-IV   BASIC ELECTRONICS

1. What is Zener diode and explain the current –Voltage characteristics of a Zener Diode? (10M)

2. Explain the transistor configurations and obtain the relations between α, β, &Υ. (10M)

3. Explain the i-v characteristics of a p-n junction diode? (5M)

4. Explain the working of PNP transistor? (5M)

5. Explain the working of NPN transistor? (5M)

6. Explain how the transistor works as amplifier? (5M)

UNIT-V   DIGITAL ELECTRONICS

1. State and explain De Morgan's theorems? (10M)

2. Explain the construction and working of Half and Full adders? (10M)

3. How NAND and NOT are universal gates? (5M)

4. What are logic gates- explain? (5M)

5. Explain exclusive –OR gate? (5M)

Some problems

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PHYSICS PAPER –V (B)
(MODERN PHYSICS)

UNIT-I   ATOMIC AND MOLECULAR PHYSICS
1. Describe the construction and working of Stern- Gerlach experiment? (10M)
2. What is Raman Effect? Explain the experimental demonstration and theory of Raman Effect?
3. What are the draw backs of Bohr's atomic model? (5M)
4. What are coupling schemes and explain? (5M)
5. Explain different quantum numbers associated with vector atom model? (5M)
6. Explain the concept of vector atom model? (5M)
7. What are the applications of Raman Effect? (5M)
8. State and explain Raman Effect? (5M)

UNIT-II   MATTER WAVES AND UNCERTAINTY PRINCIPLE
1. Describe the construction and working of Davisson and Germer experiment? (10M)
2. State and explain Heisenberg's uncertainty principle and derive the relation between energy and time? (10M)
3. Derive an expression for the wavelength of matter waves? (5M)
4. What are the properties of matter waves? (5M)
5. Derive the relation between energy and time? (5M)

UNIT-III   QUANTUM MECHANICS
1. Develop time independent wave equation and explain the energy levels of a particle in one dimensional box? (10M)
2. What are the basic postulates of wave mechanics and derive time independent wave equation? (10M)
3. Derive time dependent wave equation? (5M)
4. What are the properties of wave function and explain the physical significance? (5M)
5. Explain the terms Eigen values and Eigen functions? (5M)

UNIT-IV   GENERAL PROPERTIES OF NUCLEUS
1. What are different nuclear models and explain? (10M)
2. What is Alpha decay and explain the Gamow's theory of Alpha decay? (10M)
3. Explain the basic properties of nucleus? (10M)
4. Explain the quadrupole moment and magnetic moment? (5M)
5. Explain the binding energy of deuteron? (5M)
6. Explain the shell model with magic numbers? (5M)
7. State and explain Geiger- Nuttal law? (5M)
8. Explain the neutrino hypothesis of beta decay? (5M)
9. State and explain Geiger's law? (5M)

UNIT-V   CRYSTAL STRUCTURE AND SUPER CONDUCTIVITY

1. What are experimental technics of x-rays by crystals and explain the crystallography by Laue method? (10M)
2. What are experimental technics of x-rays by crystals and explain the crystallography by Powder method? (10M)
3. Explain the diffraction of x-rays by crystals and explain Bragg's law? (10M)
4. What is super conductor and explain different types of super conductors? (10M)
5. Explain the concept of Miller indices? (5M)
6. State and explain Bragg's law? (5M)
7. Explain the diffraction of x-rays by crystals? (5M)
8. Explain the different types of crystals systems? (5M)
9. What are the different types of lattices and explain? (5M)
10. State and explain Meissner effect? (5M)
11. State and explain Isotope effect? (5M)
12. What are the applications of super conductors? (5M)
13. Explain the concepts of critical temperature and critical field? (5M)