

PH3205 APPLIED PHYSICS

IMPORTANT QUESTIONS AND QUESTION BANK

UNIT-I ELECTRICAL PROPERTIES OF MATERIALS

2-Marks

1. What is meant by a free electron?
2. Define drift velocity of electron?
3. Define mobility of electron?
4. Define electrical conductivity?
5. Define thermal conductivity?
6. Success of classical free electron theory?
7. What are the Density of energy states?
8. Define Electron effective mass?
9. Define concept of hole?
10. Define Tunneling process?

Part-B

1. What are the drawbacks are classical free electron theory? (or) state the demerits of classical free electron theory?
2. Distinguish between electrical conductivity and thermal conductivity?
3. Explain in details about the Wiedemann-Franz law?
4. Explain the quantum free electron theory?
5. Explain the density of energy state and its their classification?
6. . Explain the details with quantum interference devices?
7. Explain the advantages and disadvantages of Quantum free electron theory?
8. Write a neat sketch with the working and applications of Tunneling process?
9. Explain about the Density of energy states? And give their applications?
10. Explain the different types of Energy bands in solids?
11. Discuss and derive the functions of Electron effective mass?
12. Explain in details about in concept of hole?
13. Determine the process of an degenerate states in various stages?
14. Explain the details of Fermi-Dirac statistics?

UNIT-II SEMICONDUCTOR AND TRANSPORT PHYSICS

2-Marks

1. What are the elemental semiconductors?
2. Give important elemental semiconductors?

3. What are the properties of semiconductors?
4. Mention any two advantages of semiconducting materials?
5. What are the compound semiconductors?
6. What is semiconductors?
7. What id n-type semiconductors?
8. What is p-type semiconductors?
9. Define hall effect and hall voltage?
10. Mention the application of hall effects??

Part-B

1. Describe the conductivity of conductors, semiconductors, and insulator with the help of energy bands diagram?
2. Describe the details in intrinsic semiconductors and extrinsic semiconductors?
3. Discuss the formation and operation of N type and P type semiconductors?
4. Give some important compound of semiconductors? And differentiate between the elemental semiconductors and compound semiconductors?
5. What is meant by intrinsic and extrinsic semiconductors?
6. Compare p-type and n-type semiconductors?
7. Define impurity range exhaustion range and intrinsic range in n-type semiconductors?
8. Explain the variation of carrier concentration with temperature?
9. Explain in details about transport semiconductors?
10. Write a short note on; (i) n-type semiconductor (ii) p-type semiconductor
11. Explain the details of hall effects and it their application?
12. Explain in details about ohmic contacts?
13. Write a detail of Schottky diode? And explain the working principle?
14. Draw and explain the energy band diagram?

UNIT-III DIELECTRICS AND FERROELECTRICS

2-Marks

1. What is the different between dielectric and ferroelectric?
2. Define Di-electric material?
3. Define ferro-electric materials?
4. What are the main characteristics of ferroelectric materials?

5. What is Di-electric material?
6. What are the ferroelectric material explain?
7. What is Di-electric particle?
8. What are the uses of ferroelectric materials?
9. What are the classification of classification of ferroelectric crystals?
10. Define KDP?

Part-B

1. What is dielectric material? Mention the uses of dielectric materials?
2. Define the following terms (i) Dielectric Polarization, (ii) Polarisability, (iii) Dielectric Constant, (iv) Spontaneous polarization, (v) Electric susceptibility?
3. Briefly discuss the polarization phenomenon in dielectric materials?
4. What is relative dielectric constant? Derive the expression for the dielectric susceptibility. Briefly describe with the help of atomic model the dependence of relative dielectric constant (ϵ_r) on the electronic polarizability (α_e)?
5. What do you mean by orientational polarization? Discuss the temperature dependence of orientational polarization?
6. Write down the expressions of following parameters under static and a.c. field application of dielectric materials (a) Internal electric field (b) Electric dipole (P) (c) Relative dielectric constant?
7. Explain the details about classification of ferroelectric crystals?
8. Write a explain in neat working of the BaTiO₃ and KDP and also write with an applications?
9. Explain about the details in Piezo, pyro and ferroelectric properties of crystals?
10. Determine the classification of the elementary ideas on dipole relaxation?
11. What should be the nature of relative dielectric constant (ϵ_r) under A.C. field? How it is related with the dielectric loss in the system?
12. Write down the equivalent circuit of a loss-dielectric capacitor?
13. What do you mean by complex dielectric constant of material?
14. Short note: (a) dielectric strength, (b) dielectric loss, (c) Ferroelectricity, (d) Piezoelectricity
15. Estimate the internal electric field strength with in the atoms of dielectric material, placed under external static electric field?

UNIT-IV MAGNETISM AND SUPERCONDUCTIVITY

2-Marks

1. What are the properties of superconductivity?
2. What is the magnetic behaviour of super conductivity?
3. How does magnetic field affected superconductivity?
4. Define Superconductivity?

5. What are the general properties of Superconductors?
6. What is the classification of magnetic material?
7. Define diamagnetism?
8. Define para magnetism?
9. What is critical current density?
10. Define BCS theory of superconductivity?

Part-B

1. Explain about Superconductivity? And what is Critical or transition temperature?
2. Explain the General properties of Superconductors?
3. Explain the function of The Meissner effect and their applications?
4. Write and explain about the Type I and type II superconductors. Or types of superconductors?
5. Discuss the Differences between type I and Type II superconductor?
6. Explain about the BCS theory?
7. Write a short note on diamagnetism, para magnetism, ferromagnetism, anti ferromagnetism and ferrimagnetism?
8. Explain about the details in Domain theory?
9. Discuss the details about Critical parameters of superconductivity?
10. Explain about the function of Elements of high temperature superconductivity?
11. Determine the details in soft and hard magnetic materials?
12. Explain about the Zero resistance and the Meissner effect?
13. Explain about the details in critical current density?
14. Explain the details about Atomic magnetic moment?

UNIT-V OPTICAL PROPERTIES OF MATERIALS

2-Marks

1. Mention any three advantages of led electronic supply?
2. Mention any four advantages of fiber optic?
3. Mention some any fiber optic source?
4. What is meant by injection luminescence? Give its examples?
5. Define solar cell?
6. State the application of optical fiber?
7. Define optical absorption emission?
8. Define the basic principle of optic materials?
9. Define light emitting diode?

10. Define Plasmonics?

Part-B

1. Give their application of optical process in semiconductors?
2. Write the classification of optical materials?
3. Explain the optical process in semiconductors?
4. Write a process and construction, working principle of optoelectronic devices? And give their applications?
5. Differentiate the linear optical materials and non-linear optical materials?
6. Write a neat explain with the modulator and switching devices and its their examples?
7. What is meant by LED give it's the explain their principles?
8. Explain the optical process in organic semiconductors device and its examples are given?
9. Explain about the light detectors and solar cells give the application and their limitations?
10. Write a short note on; (i) light emitting diode (ii) laser diode
11. Write an explanation at optical process in quantum walls?
12. Explain about the details of optical absorption and emission?
13. Explain the details of light detectors?
14. Write the explanation of plasmonics in details and give its their applications?

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Notes

Syllabus

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