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Question Paper Code : X 10949

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020 AND APRIL/MAY 2021

Second Semester

Computer and Communication Engineering

PH 8253 – PHYSICS FOR ELECTRONICS ENGINEERING

(Common to Biomedical Engineering/Electrical and Electronics Engineering/ Electronics and Communication Engineering/Electronics and Instrumentation Engineering/Electronics and Telecommunication Engineering/Instrumentation and control Engineering/Medical Electronics)

(Regulations 2017)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions.

PART – A **(10×2=20 Marks)**

1. Define Fermi level and Fermi energy with its importance.
2. What is a periodic potential ?
3. Define donors and acceptors.
4. The Hall Co-efficient of a specimen of doped silicon is found to be 3.66×10^{-4} m^{-3}/C. The resistivity of specimen is 8.93×10^{-3} Ω m. Find the mobility and density of charge carriers.
5. Define the term retentivity and coercivity and its units.
6. What is meant by high-k-dielectrics ?
7. What are optical materials ? Give its types.
8. Specify the types of photo detector.
9. Recall the term Bloch oscillations.
10. Define Coulomb blockade effect.

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PART – B **(5×16=80 Marks)**

11. a) Derive an expression for the density of states and based on that calculate the carrier concentration in metals.

(OR)

b) Derive an expression for both electrical conductivity and thermal conductivity of electrons in metal. Hence deduce Wiedemann – Franz Law.

12. a) Derive the intrinsic carrier concentration for intrinsic semiconductor.

(OR)

b) Describe the principle, theory and V-I characteristics of Tunnel diode.

13. a) Explain about the origin of ferromagnetism and exchange interaction in ferromagnetic materials.

(OR)

b) Derive an expression for internal field in a cubic structure. Deduce the Clausius-Mosotti relation.

14. a) Describe the principle, construction and working of a solar cell.

(OR)

b) Explain the working and principle of a Quantum dot laser.

15. a) Discuss density of states in quantum well, quantum wire and quantum dot.

(OR)

b) Describe the carbon nano tubes with their properties and applications.

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