Code No: R10203 **R10** **SET-1**

I B. Tech II Semester Supplementary Examinations, November - 2021
ENGINEERING PHYSICS-II
(Com. to All Branches)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions Carry **Equal** Marks
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1. a) Solve the Schrodinger wave equation for a particle confined in a one-dimensional potential box. Obtain an expression for its energy and wave function. (10M)
   b) Explain (i) Bloch's sphere (ii) Quantum gates (5M)

2. a) Explain the Fermi-Dirac distribution function of the electrons. Explain the effect of temperature on the distribution. (10M)
   b) Discuss any two drawbacks of the classical free electron theory. (5M)

3. a) Distinguish between conductors, semiconductors and insulators. (10M)
   b) Explain the concept of the effective mass of the electron. (5M)

4. a) Explain the different contributions for the formation of domains in a ferromagnetic material and show how the hysteresis curve is explained on the basis of the domain theory. (10M)
   b) What are the distinguishing features of ferromagnetism? (5M)

5. a) Explain the BCS theory of superconductivity and discuss the energy gap based on this theory. (10M)
   b) Distinguish between type I and type II superconductors. (5M)

6. a) Explain electronic polarization in atoms and obtain an expression for electronic polarizability in terms of the radius of the atom. (10M)
   b) Write short notes on piezoelectricity. (5M)

7. a) What is the Hall effect? Explain how Hall voltage is developed in a metal strip when placed in a magnetic field. (10M)
   b) Explain the differences between direct and indirect bandgap semiconductors. (5M)

8. a) Write short notes on (i) Quantum wires (ii) Quantum dots (10M)
   b) Explain various applications nanomaterials in the medical field. (5M)
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