[EURPH-103A]
B.Tech. Degree Examination

I SEMESTER
( Supplementary )

ENGINEERING PHYSICS-I
(B.Tech. regular for the admitted batches 2012–13 to 2014-15 only)  
(AE effective from the admitted batch 2013–14)  
(Common for B.Tech. regular all branches & Aeronautical Engg.)

Time: 3 Hours  Max.Marks: 60

Instructions: Each Unit carries 12 marks.
Answer all units choosing one question from each unit.
All parts of the unit must be answered in one place only.
Figures in the right hand margin indicate marks allotted.

UNIT-I

1.  a) State and prove Carnot’s theorem  
    b) Explain reversible and irreversible processes. Illustrate with examples

OR

2.  a) Derive the expressions for work done during 
    i) Isothermal process  ii) Adiabatic process
    b) What is Thermodynamics? State the first, second and third laws of thermodynamics and discuss their significance

UNIT-II

3.  a) Obtain the expression for energy stored in a capacitor and inductor
    b) Explain the working of a tuning LCR circuit for an AC input

OR

4.  a) State and explain Poynting theorem
    b) Write a note on Displacement current
UNIT-III
5. a) Obtain the relevant mathematical expressions for Electronic Polarizability in terms of the radius of the atom
   b) The dielectric constant of He gas at NTP is 1.0000684. Calculate the electronic polarizability of He atoms, if the gas contains $2.7 \times 10^{25}$ atm/m$^3$

OR
6. a) Discuss the frequency dependence of various polarization processes in dielectric materials
   b) Explain spontaneous polarization in BaTiO$_3$ and mention applications of ferroelectric materials

UNIT-IV
7. a) Distinguish between soft and hard Magnetic materials and mention their applications
   b) Explain the Weiss theory of Ferromagnetism

OR
8. a) Distinguish between dia, para and ferromagnetic materials
   b) Explain domain theory of ferromagnetic materials
   c) Write a note on magnetic bubbles

UNIT-V
9. a) Describe the BCS theory of Superconductivity
   b) Distinguish between type-I and type-II superconductors

OR
10. a) What is Piezoelectric effect? With necessary circuit diagram explain the production of Ultrasonics using piezoelectric crystals
    b) Describe how ultrasonics are used in non-destructive testing of material

[1,2,3,4,5,6,7,8,9,10] I S/117]