Set No. 1

Code No: R10203 / R10

I B.Tech II Semester Supplementary Examinations January / February - 2012

ENGINEERING PHYSICS - II

(Common to all branches)

Time: 3 hours **Max Marks: 75**

Answer any FIVE Questions

All Questions carry equal marks

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1.(a) Derive time independent Schrodinger wave equation for a free particle.
(b) Explain the Physical significance of wave function.
(c) Write notes on Classical Bits and Qu Bits.

[8M + 3M + 4M]

2.(a) Explain the salient features of Classical free electron theory.
(b) On the basis of classical free electron theory, derive the expressions for i) Drift velocity, ii) current density and iii) mobility.
(c) What are the drawbacks of classical free electron theory of metals.

[3M + 9M + 3M]

3.(a) Discuss the origin of energy bands in solids.
(b) Explain how the crystalline solids are classified into metals, semiconductors and insulators on the basis of band theory.

[7M + 8M]

4.(a) Explain the terms ' Magnetic polarisability', 'Magnetic Induction' and 'Susceptibility'.
(b) Show that $B = \mu_o (H + M)$.
(c) A paramagnetic material has a magnetic field of intensity of 10^4 A/m. If the susceptibility of the material at room temperature is 3.7×10^{-3}, calculate the intensity of magnetization and flux density in the material.

[6M + 5M + 4M]

5.(a) What is Superconductivity? Discuss the parameters that destruct the Superconductivity.
(b) Explain Josephson's effect of superconductivity.

[7M + 8M]

6.(a) Explain the electronic polarisability in atoms and obtain an expression for electronic polarisability in terms of the radius of the atom.
(b) Discuss the frequency dependence of various polarization processes in dielectric materials.

[9M + 6M]

7.(a) What is intrinsic semiconductor? Derive an expression for the electron concentration in an intrinsic semiconductor.
(b) Define Hall effect and mention its uses.

[9M + 6M]

8.(a) Write notes on properties and preparation of Nano Materials.
(b) What are applications of nano materials?

[10M + 5M]

Set No. 2

Code No: R10203 / R10

I B.Tech II Semester Supplementary Examinations January / February - 2012

ENGINEERING PHYSICS - II

(Common to all branches)

Time: 3 hours **Max Marks: 75**

Answer any FIVE Questions

All Questions carry equal marks

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1.(a) Show that energies of a particle in a potential box are quantized.
(b) What are the advantages of Quantum Computing over classical Computation?

[11M + 4M]

2.(a) Explain the salient features of Classical free electron theory.
(b) On the basis of classical free electron theory, derive the expressions for i) Drift velocity, ii) current density and iii) mobility.
(c) What are the drawbacks of classical free electron theory of metals?

[3M + 9M + 3M]

3.(a) Explain with theory the formation of allowed and forbidden energy bands on the basis of the Kronig-Penny model.
(b) Explain the concept of effective mass.

[10M + 5M]

4.(a) Distinguish between Dia, Para and Ferromagnetism.
(b) Explain the hysteresis loop observed in ferromagnetic materials. What are hysteresis losses?

[5M + 10M]

5.(a) Discuss the parameters that destruct the superconductivity.
(b) Write notes on flux quantisation.
(c) A superconducting ring of radius 0.02 m has a critical magnetic field of $2x10^3$ Am^{-1} at 5K. What is its critical current value?

[6M + 5M + 4M]

6.(a) Explain the electronic polarisability in atoms and obtain an expression for electronic polarisability in terms of the radius of the atom.
(b) Discuss the frequency dependence of various polarization processes in dielectric materials.

[9M + 6M]

7.(a) Explain Hall effect. Derive the expression for Hall coefficient of n-type semiconductor.
(b) Distinguish between direct and indirect band gap semiconductors

[10M + 5M]

8.(a) How are Physical, Chemical and Optical properties of nanomaterials vary with the size of the particle?
(b) Write notes on nano tubes.

[9M + 6M]

Set No. 3

Code No: R10203 / R10

I B.Tech II Semester Supplementary Examinations January / February - 2012

ENGINEERING PHYSICS - II

(Common to all branches)

Time: 3 hours **Max Marks: 75**

Answer any FIVE Questions

All Questions carry equal marks

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1.(a) Derive time independent Schrodinger wave equation for a free particle.
(b) Explain the Physical significance of wave function.
(c) Write notes on Classical Bits and Qu Bits.

[8M + 3M + 4M]

2.(a) Explain Fermi-Dirac distribution for electrons in a metal. Discuss its variation with temperature.
(b) Explain the terms 'Mean free path', 'Relaxation time' and 'Drift velocity' of an electron in a metal.
(c) Discuss the origin of electrical resistance in metals.

[6M + 6M + 3M]

3.(a) State and explain Bloch theorem.
(b) Explain with theory the formation of allowed and forbidden energy bands on the basis of the Kronig-Penny model.

[5M + 10M]

4.(a) Explain the terms ' Magnetic polarisability', 'Magnetic Induction' and 'Susceptibility'.
(b) Show that $B = \mu_o (H + M)$.
(c) A paramagnetic material has a magnetic field of intensity of 10^4 A/m. If the susceptibility of the material at room temperature is 3.7×10^{-3}, calculate the intensity of magnetization and flux density in the material.

[6M + 5M + 4M]

5.(a) What is Superconductivity? What are the properties of Superconductors?
(b) Explain BCS theory of superconductivity.

[7M + 8M]

6.(a) Derive an expression for internal field in dielectrics.
(b) Derive Clausius-Mosotti equation.

[9M + 6M]

7.(a) What is intrinsic semiconductor? Derive an expression for the electron concentration in an intrinsic semiconductor.
(b) Define Hall effect and mention its uses.

[9M + 6M]

8.(a) How are Physical, Chemical and Optical properties of nanomaterials vary with the size of the particle?
(b) Write notes on nano tubes.

[9M + 6M]

Set No. 4

Code No: R10203 / R10

I B.Tech II Semester Supplementary Examinations January / February - 2012

ENGINEERING PHYSICS - II

(Common to all branches)

Time: 3 hours **Max Marks: 75**

Answer any FIVE Questions

All Questions carry equal marks

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1.(a) Show that energies of a particle in a potential box are quantized.
(b) What are the advantages of Quantum Computing over classical Computation?

[11M + 4M]

2.(a) Explain Fermi-Dirac distribution for electrons in a metal. Discuss its variation with temperature.
(b) Explain the terms 'Mean free path', 'Relaxation time' and 'Drift velocity' of an electron in a metal.
(c) Discuss the origin of electrical resistance in metals.

[6M + 6M + 3M]

3.(a) Discuss the origin of energy bands in solids.
(b) Explain how the crystalline solids are classified into metals, semiconductors and insulators on the basis of band theory.

[7M + 8M]

4.(a) Distinguish between Dia, Para and Ferromagnetism.
(b) Explain the hysteresis loop observed in ferromagnetic materials. What are hysteresis losses?

[5M + 10M]

5.(a) Discuss the parameters that destruct the superconductivity.
(b) Explain BCS theory of superconductivity.
(c) A superconducting ring of radius 0.02 m has a critical magnetic field of $2x10^3$ Am^{-1} at 5K. What is its critical current value?

[6M + 5M + 4M]

6.(a) Derive an expression for internal field in dielectrics.
(b) Derive Clausius-Mosotti equation.

[9M + 6M]

7.(a) Explain Hall effect. Derive the expression for Hall coefficient of n-type semiconductor.
(b) Distinguish between direct and indirect band gap semiconductors

[10M + 5M]

8.(a) Write notes on properties and preparation of Nano Materials.
(b) What are applications of nano materials?

[10M + 5M]