ALLAMA IQBAL OPEN UNIVERSITY, ISLAMABAD
(Department of Physics)

Course: Physics (3404)   **Semester: Autumn, 2013**
Level: BCS   **Total Marks: 100**
                                                          Pass Marks: 40

ASSIGNMENT No. 1
(Units: 1–3)

Note: Attempt all questions. All questions carry equal marks.

Q. 1   What is Coulomb's Law? Also give its experimental verification in detail.   **(20)**

Q. 2   What is Gauss's law and what do you know about its following applications.   **(20)**
   i)   Gauss's law in Cylindrical symmetry
   ii)   Gauss's law in Planar symmetry
   iii)   Gauss's law in Spherical symmetry.

Q. 3   What is electric potential? Discuss electric potential as electric dipole. Also discuss electric potential due to charge distributions.   **(20)**

Q. 4   What are capacitors and dielectrics? Explain the capacity of parallel plate capacitors.   **(20)**

Q. 5   Discuss the behaviour of Gauss's law in dielectrics. What is electric susceptibility? Calculate the energy density of electrostatic field.   **(20)**

ASSIGNMENT No. 2
(Units: 4–7)

Note: Attempt all questions. All questions carry equal marks.

Q. 1   a)   What is Biot Savart's Law?
            b)   Discuss Equation of Continuity.
            c)   Calculate the field due to a straight and circular current.   **(20)**

Q. 2 a) Sate and explain Ampere's Law. What is Ampere's Circuital Theorem?
     b) Calculate field due to a solenoid and a toroid. **(20)**

Q. 3 Discuss the following: **(20)**
     i)   Thermo electrically seedback
     ii) Pelter's and Thomson's Effect
     iii) Photovoltaic Effect
     iv) Piezoelectric Effect

Q. 4 Derive Faraday's law of electromagnetic induction and its differential form. Also discuss mutual induction. **(20)**

Q. 5 Discuss the following: **(20)**
     i)   Magnetization Vector
     ii) Magnetic Energy Density
     iii) Diamagnetism
     iv) Para Magnetism
     v)   Ferromagnetism

Physics (3404)   Credit Hours: 4 (4 + 0)

Recommended Book:
Fundamentals of Physics by Halliday, Resnick, Walker

Course Outlines:
Unit–1 Coulomb Law and Electric Field
     Coulombs law, Coulomb's Law and its Experimental Verification, Electric Field and Potential Field Lines

Unit–2 Gausses Law
     Gauss's Law, Electric Potential, Flux of Electric Field, Gauss's Law and its Application, Electric Potential as Line Integral Potential Due to Charge Distribution, Potential and Potential and Field Due to a Dipole

Unit–3 Capacitors, Electric Energy and Properties of Insulators
     Capacitors and Dielectrics, Capacitor and Dielectrics, Capacity of a Spherical and Parallel Plate Capacitor, Polarization of Matter, Gauss's Law in Dielectrics, Electric Susceptibility and Dielectric Constant, Energy Density of Electrostatic Field.

Unit–4 Current and Magnetic Field
     Current and Magnetic Field, Electric Current, 'Ohm's Law, Equation of Continuity, Field Due to a Current Interaction of Magnetic Field with Current,

Magnetic Induction Vector, Biot Savart Law, Field Due to a Straight and Circular Current.

Unit–5 Source of Magnetic Field

Ampere's Law, Ampere's Circuital Theorem, Field Due to a Solenoid and a Toroid, Thermo Electrically Seebeck, Pelter and Thomson's Effect, Total E.M.F in Thermocouple, Photo Voltaic Effect Pieolectric Effect.

Unit–6 Faraday's Law

Faraday's Law, Faraday's Law of Electromagnetic Induction and its Differential Form, Self Induction, Self Inductance of a Toroidal Solenoid, Mutual Induction, Mutual Inductance of a Toroidal Solenoid

Unit–7 Magnetic Field in Matter

Magnetic Fields in Matter-1, Magnetization Vector, the Magnetic Intensity Vector H, Magnetic Energy Density, Dia, Para and Ferromagnetism Flagnetic, Hysteresls

Unit–8 Electromagnetic Oscillations and Ac Circuits

LC Oscillation, Series RLC Circuit, A.C Sources Connected to a Resister, Capacitors, Inductor, Series RLC Circuit Derived by an ac Source, Power For RLC Circuits Derived by an AC Source

Unit–9 Maxwell Equation and Electromagnetic Waves

Maxwell's Equations, Maxwell's Wave Equations and its Plane Wave Solution in Free Space, Relation between the Propagation Vector and Wavelength Electric and Magnetic Vectors in a Plane Wave Polynting Vector.

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