

B.Sc. Semester - 5 (CBCS) Examination

Oct/Nov.– 2019

ELECTRODYNAMICS AND RELATIVITY (CORE)

Time: 2:30 Hours

Marks: 70

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate marks.

Q – 1 [A] Answer the following question in detail (Any one) [07]

1. Discuss the Faraday's experiment and Faraday's law with derivation in detail.
2. Explain Poynting's theorem with differential form equation in detail.

[B] Answer the following question in brief (Any one) [04]

1. Discuss Newton's third law in electrodynamics.
2. Discuss the conservation of Linear momentum and angular momentum.

[C] Answer the following question in short (Any three) [03]

1. What is the unit of Inductance?
2. Write the Faraday's law in the integral form.
3. What is final formula of Ampere's law modified by Maxwell?
4. Poynting's vector can be regarded as
5. There is no existence of magnetic quadrupole. [True/False]

Q – 2 [A] Answer the following question in detail (Any one) [07]

1. Explain Sinusoidal waves.
2. Discuss the wave equation for E and B.

[B] Answer the following question in brief (Any one) [04]

1. Discuss Polarization.
2. Explain Energy and momentum in electromagnetic waves.

[C] Answer the following question in short (Any three) [03]

1. A stretched string support wave – motion because it follows law.
2. What is advantage of the complex notation?
3. What is transverse wave?
4. What is the wavelength of yellow light?
5. X- Ray is monochromatic radiation. [True/ False]

Q – 3 [A] Answer the following question in detail (Any one) [07]

1. Explain Retarded Potentials.
2. Discuss Lienard – Wiechert potential in detail.

[B] Answer the following question in brief (Any one) [04]

1. Derive formula for Coulomb gauge and Lorentz gauge.
2. Explain Jefimenko's equation.

[C] Answer the following question in short (Any three) [03]

1. According to Maxwell's equation $\nabla \times E = \dots\dots\dots$
2. $\square$ is known as Maxwellian operator? [True/False]
3. $\square^2 V = \dots\dots\dots$
4. What is the formula for E in generalized coulomb field?
5. The delay time $t_r \equiv \dots\dots\dots$

- Q – 4 [A] Answer the following question in detail (Any one) [07]**
1. Explain radiation from an arbitrary source.
 2. Explain mechanism responsible for the radiation reaction.
- [B] Answer the following question in brief (Any one) [04]**
1. Explain the blueness of sky and redness of sunset with proper diagram.
 2. Discuss power radiated by a point charge.
- [C] Answer the following question in short (Any three) [03]**
1. What is Radiation?
 2. What is dipole moment of oscillating electric dipole?
 3. The energy absorbed and reradiated at higher frequencies by the atmospheric dipoles is at higher frequencies.
 4. What is value of γ in Larmor formula?
 5. What is equation of Abraham – Lorentz formula?
- Q – 5 [A] Answer the following question in detail (Any one) [07]**
1. Discuss Lorentz transformations.
 2. Explain space time diagrams
- [B] Answer the following question in brief (Any one) [04]**
1. Explain Galilean transformation.
 2. Explain Relativistic dynamics
- [C] Answer the following question in short (Any three) [03]**
1. The medium of Ether is considered to be
 2. If there are different inertial frame of reference then the velocity of light to be
 3. In the special theory of relativity the velocity of light is postulated to be variable in all inertial frames of reference. [True/False]
 4. What is final formula for Lorentz contraction?
 5. In relativity if a particle has the speed exactly c then it would serve asparticle.
