

Bankim Sardar College
Internal Examination 2020

Semester 2

Subject : Physics(G)

Paper: CCG2

Full Marks: 90

Group A

Answer all questions

10x1=10

- 1.(a)What does gradient operator operate on?
- (b) State the Gauss' divergence theorem.
- (c) Define electric field of a point charge.
- (d) What is electric polarisation?
- (e))State Gauss's theorem of electrostatics.
- (f) State Biot Savart's law.
- (g) What is magnetic vector potential?
- (h) What are ferromagnetic materials?
- (i) State Faraday's law of electromagnetic induction.
- (j) What is Lenz's law?

Group B

Answer all questions

3x10=30

2(a)What is a Carey Foster bridge? Write the formula for determining an unknown low resistance by the bridge explaining the symbols.

(b)Given resistance per unit length of the bridge wire (ρ) 0.02 ohm/cm and known resistances 1,1.1,1.2 ohms find the values of the null points.

(c)With the above data and unknown resistance =2.5 ohm find the values of the null points.

Group C

Answer all questions

10x2=20

3(a) What do you mean by surface and volume charge density?

(b) What is \vec{A} called if $\vec{\nabla} \cdot \vec{A} = 0$.

(c) What do you mean by line integral of a vector.

(d) What is an electric dipole?

(e) What do you mean by electric flux?

(f) Is electric field conservative? Give reasons.

- (g) What is Ampere's circuital law?
- (h) What is Lorentz force?
- (i) What do you mean by magnetisation?
- (j) Write the expression for Poynting vector.

Answer any six questions

6x5=30

4. Calculate the gradient of the scalar function $\varphi = 2x^2y^2 + zx$.
5. Find the electric potential due to a dipole.
6. Find the electric field due to a uniformly charged sphere at an external point using Gauss' law.
7. Find a relation between permittivity and susceptibility of a medium.
8. Find the magnetic field due to a straight conductor carrying current using Biot Savart's law.
9. Find the magnetic field due to a straight conductor carrying current using Ampere's circuital law.
10. Find the expression for self inductance of a coil.
11. State Maxwell's relation of electrodynamics in vacuum.