

BABA BANDA SINGH BAHADUR ENGINEERING COLLEGE
TOPIC- ELECTROSTATICS IN VACUUM AND LINEAR DIELECTRIC MEDIUM
SUBJECT-ELECTROMAGNETISM
SUBJECT CODE-BTPH103-18

1. State stokes theorem.
2. State the condition for the vector F to be solenoidal.
3. State the condition for the vector F to be irrotational.
4. Give the relationship between potential gradient and electric field.
5. What is the physical significance of $\text{div } D$?
6. What are the sources of electric field and magnetic field?
7. State Divergence Theorem.
8. State coulombs law.
9. State Gauss law for electric fields
10. Define electric flux.
11. Define electric flux density.
12. Define electric field intensity.
13. Name few applications of Gauss law in electrostatics.
14. What is electrostatic force?
15. What are dielectrics?
16. What is a capacitor?
17. Define dielectric strength.
18. What meaning would you give to the capacitance of a single conductor?
19. Why water has much greater dielectric constant than mica?
20. What is a point charge?
21. Define linear charge density.
22. Give the relation between electric field intensity (E) and electric flux density (D).
23. Write the expression for energy density in electrostatic field.
24. Write down the expression for capacitance between two parallel plates.
25. What are the significant physical differences between Poisson 's and laplace's equations.

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1. Apply Gauss law to find charge enclosed in a hollow sphere whose surface is uniformly charged.
2. Derive the expression for potential due to infinite uniformly charged line. Also find the potential due to electric dipole.
3. Derive the expression for the electrostatic energy density.
4. Derive an expression for the electric field due to a straight and infinite uniformly charged wire of length 'L' meters and with a charge density of $+\lambda$ C/m at a point P which lies along the perpendicular bisector of wire.
5. State and derive the expression for Laplace and Poisson's equations.
6. Two small identical conducting spheres have charge of -1 nC and 2 nC respectively. If they are brought in contact and then separated by 4 cm what is the force between them?
7. Derive an expression for the energy stored in the capacitor.
8. Determine the electric field at P $(-0.2, 0, -2.3)$ due to a point charge of $+5\text{ nC}$ at Q $(0.2, 0.1, -2.5)$ in air. All dimensions are in meters.
9. Derive an expression for electric field intensity at a point P due to an electric dipole hence define electric dipole moment.
10. Find the potential of a uniformly charged spherical shell of radius R at points inside and outside the shell.
11. A uniform line charge equal to 25 nC/m lies on the $x=3\text{ m}$ and $y=4\text{ m}$ in free space. Find the electric field intensity at a point $(2, 3, 15)\text{ m}$.
12. Derive an expression for energy stored and energy density in an electrostatic field.

BABA BANDA SINGH BAHADUR ENGINEERING COLLEGE
TOPIC- ELECTROSTATICS IN VACUUM AND LINEAR DIELECTRIC MEDIUM
SUBJECT-MAGNETOSTATICS
SUBJECT CODE-BTPH103-18

1. State Ampere's Circuital law and explain any two applications.
2. Obtain the boundary conditions of normal and tangential components of magnetic field at the interface of two media with different dielectrics.
3. Explain Biot Savart's law in vector form.
4. Derive the expression for Magnetic Scalar and Vector Potential.
5. Derive the expression for inductance of solenoid and toroid.
6. Derive the expression for magnetic force between two parallel conductors.
7. Derive the expression for energy stored in magnetic fields and its energy.
8. Describe the classification of magnetic materials and draw the magnetisation curve.
9. Derive the expression for Biot Savart's law using the concept of Magnetic Vector Potential.
10. What are magnetic domains? Discuss in detail.

BABA BANDA SINGH BAHADUR ENGINEERING COLLEGE
TOPIC- MAXWELL'S EQUATIONS
SUBJECT-ELECTROMAGNETISM
SUBJECT CODE-BTPH103-18

1. State Faraday's law.
2. Distinguish between displacement and conduction current.
3. Write down the Maxwell's equations in differential form.
4. Write down the Maxwell's equations in integral form.
5. What is the significance of displacement current?
6. Write the Maxwell's Equations in Free space.
7. Write the Maxwell's Equations in phasor form.
8. Explain why $\nabla \cdot \mathbf{B} = 0$?
9. Distinguish between transformer and motional e.m.f.
10. State lenz law.
11. Define pointing vector
12. Write down instantaneous, average and complex pointing vectors.
13. Deduce Maxwell's equations in integral form.
14. Derive the expression for Displacement Current .
15. Derive the Maxwell's Equations in Free space.
16. State the modified form of Ampere's circuital law. Why was it modified?
17. State and prove pointing theorem.

BABA BANDA SINGH BAHADUR ENGINEERING COLLEGE
TOPIC- ELECTROMAGNETIC WAVES
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1. If the plane wave is incident normally from medium 1 to medium 2, write the reflection and transmission coefficients.
2. What is a uniform plane wave?
3. What is the significance of skin depth?
4. Derive the electromagnetic wave equation for electric fields and magnetic fields in free space.
5. Derive the electromagnetic wave equation for electric fields and magnetic fields in conducting medium.
6. Explain the Wave propagation in Lossy medium.
7. Explain the Wave propagation in Lossless medium.
8. State and prove Poynting theorem.
9. Obtain the expression for the reflection co-efficient and transmission coefficient for a wave normally incident on the surface of the dielectric.
10. Briefly explain about the wave incident normally and obliquely to the surface of a perfect conductor.