

(FOR THE CANDIDATES ADMITTED

SUBJECT CODE **22 UPS.405**

DURING THE ACADEMIC YEAR 2022-23 ONLY)

REG.NO.

N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI

END-OF-SEMESTER EXAMINATIONS : MAY – 2024

B.Sc. – PHYSICS

MAXIMUM MARKS: 50

IV SEMESTER

TIME : 3 HOURS

PART – III

ELECTRICITY AND MAGNETISM

SECTION – A (10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS.

(K1)

1. The SI unit of Electric Field is-----.
(a) Newton (b) Newton/Weber (c) Newton/Coulomb (d) Newton/Meter
2. ----- is not a Polar Molecule..
(a) H₂O (b) N₂O (c) HCL (d) H₂
3. The expression for the Lorentz force is F = -----.
(a) $q[E - (v \times B)]$ (b) $q[E + (v \times B)]$ (c) $[E - (v \times B)]$ (d) $[E + (v \times B)]$
4. 1 Henry = -----.
(a) 1 Weber/Ampere (b) 1 Weber (c) 1 weber/ Volt (d) 1 Volt/Ampere
5. The unit of Refractive Index is-----.
(a) Meter (b) Meter/Second (c) Second/Meter (d) no unit

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES.

(K2)

6. Define: Equipotential Surface.
7. What is called a Capacitor?
8. What is Toroid?
9. When does an LC circuit become an ideal LC circuit?
10. List any two types of Currents.

SECTION – B (5 X 3 = 15 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.

(K3)

11. (a) Derive Laplace's Equation.

(OR)

- (b) Obtain an expression for the electric Potential energy.

(CONTD 2)

12. (a) Get an expression for the Capacitance of a Parallel Plate Capacitor.
(OR)
- (b) Define and explain (i) Electric Polarization Vector and
(ii) Electric Displacement Vector.
13. (a) Discuss the Magnetic Field along the axis of a circular coil..
(OR)
- (b) Explain the Torque on a current carrying coil in Uniform magnetic field.
14. (a) State and explain the Faraday's laws of Electromagnetic Induction.
(OR)
- (b) Discuss the Growth and Decay of current in an RL circuit.
15. (a) Explain the propagation of EM waves in free space.
(OR)
- (b) State and explain Poynting Theorem.

SECTION – C**(5 X 5 = 25 MARKS)****ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.****(K4 (Or) K5)**

16. (a) Derive expressions for the Potential and Field due to Uniformly Charged Sphere.
(OR)
- (b) Get expressions for the Potential and Field due to a Quadrupole.
17. (a) (i) Discuss the Guard Ring Capacitor.
(ii) Obtain an expression for the Energy stored in a Capacitor.
(OR)
- (b) Explain the Capacitance of a Parallel Plate Capacitor Partially and Completely filled with Dielectric.
18. (a) (i) Write a note on the construction of a Ballistic Galvanometer
(ii) Obtain the equation for Deadbeat Condition.
(OR)
- (b) (i) State and explain Amphere's Law.
(ii) Discuss anyone application of it.
19. (a) (i) Calculate the Self Inductance for a Solenoid.
(ii) Obtain an expression for Energy stored in a Magnetic Field.
(OR)
- (b) (i) Draw the Series LCR circuit.
(ii) Obtain expressions for net Voltage, Current and Phase in this.
20. (a) Derive Maxwell's Equations in Free Space.
(OR)
- (b) Describe the EM waves in an Isotropic non-conducting Media.