(FOR THE CANDIDATES ADMITTED DURING THE ACADEMIC YEAR 2021-22 ONLY) **SUBJECT CODE 21 UPS 405** **REG.NO.**

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

END-OF-SEMESTER EXAMINATIONS : MAY – 2023

B.Sc. – PHYSICS **MAXIMUM MARKS: 70**

IV SEMESTER **TIME : 3 HOURS**

PART – III
ELECTRICITY AND MAGNETISM
SECTION – A (10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS.
MULTIPLE CHOICE QUESTIONS. (K1)

1. Electric field potential is due to a point charge _____.
   (a) falls inversely proportional to the distance
   (b) falls inversely proportional to the square root of the distance
   (c) falls inversely proportional to the square of the distance
   (d) it does not change with distance
2. To increase the capacitance of capacitor, the plates must be placed _____.
   (a) further apart (b) closer together (c) in series (d) made smaller
3. The unit of magnetic flux is _____.
   (a) weber-m^2 (b) weber/m^2 (c) Weber (d) Henry
4. A coil does not consume any power. It should be _____.
   (a) resistive (b) inductive (c) capacitive (d) none of the above
5. The idea of displacement current is due to **_____.**
   (a) Ampere (b) Faraday (c) Gauss (d) Maxwell

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES. (K2)

6. Define electric potential.
7. Define capacitance and capacitor.
8. State Ampere's law.
9. What is self inductance?
10. Write the equation of Gauss law for magnetic field.

(CONTD …. 2)

SECTION – B (5 X 4 = 20 MARKS)

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

(K3)

11. a) Derive Poisson and Laplace equations. What is the importance of these equations?

(OR)

b) Obtain an expression for the electric potential due to an electric dipole.

12. a) Derive an expression for the energy stored in a capacitor.

(OR)

b) Explain the physical meaning of polarization.

13. a) Explain the force on a current carrying wire.

(OR)

b) Discuss the interaction between two long parallel currents.

14. a) State and explain Faraday's laws of electromagnetic induction.

(OR)

b) Calculate the self inductance of a solenoid.

15. a) Explain the types of currents.

(OR)

b) Write Maxwell equations. Solve them in free space.

SECTION – C (4 X 10 = 40 MARKS)

ANSWER ANY FOUR OUT OF SIX QUESTIONS

(16th QUESTION IS COMPULSORY AND ANSWER ANY THREE QUESTIONS (FROM Qn. No : 17 to 21) (K4 (Or) K5)

16. Obtain an expression for the electric potential due to a linear quadrapole.

17. Obtain an expression for the electric potential and field due to uniformly charged disc.

18. Derive the Claussius – Mossotti's equation.

19. What is Biot Savart law? Apply it to determine the magnetic field due to long straight wire carrying current.

20. Give the theory of oscillatory discharge of condenser through a circuit containing an inductance and resistance.

21. Deduce Poynting theorem for the flow of energy in an electromagnetic field.

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ETHICAL PAPER