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(FOR THE CANDIDATES ADMITTED **20UPS405**

DURING THE ACADEMIC YEAR 2020-21 ONLY) **REG.NO.:**

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

END-OF-SEMESTER EXAMINATIONS: JULY-2022

B.Sc. PHYSICS **MAXIMUM MARKS: 70**

SEMESTER: IV **TIME: 3 HOURS**

PART - III

CORE-V : ELECTRICITY AND MAGNETISM

SECTION - A (10 X 1 = 10 MARKS)

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

1. The potential at a point near the isolated positive charge is _____.
   a. positive b. negative c. zero d. infinite
2. Select the cylindrical capacitor _____.
   a. insulated wire b. submarine cable
   c. ceramic capacitor d. isolated conducting sphere
3. The SI unit of magnetic flux is _____.
   a. Gauss b. Oersted c. weber d. Farad
4. In the LR circuit the quantity L/R is referred to as _____.
   a. time constant of the circuit b. time constant of the inductor
   c. Inductive reactance d. current ratio
5. $\nabla X \mathbf{E} =$ **_____.**
   a. $\partial\mathbf{B}/\partial t$ b. $-\partial\mathbf{B}/\partial t$ c. Zero d. $\partial\mathbf{D}/\partial t$

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

6. Write the Poisson and Laplace equations.
7. Define the term capacitance.
8. Write Biot – Savort law.
9. What is known as mutual induction?
10. What is known as pointing theorem?

SECTION – B (5 X 4 = 20 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K3)

11. a) Deduce the relation between the E and V (E-Electric field , B – Potential Difference).

(or)

b) Define electric dipole. Obtain the expression for the potential energy of a dipole in a uniform electric field.

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

(OR)

b) What are polar and non polar molecules? Discuss with examples.

(CONTD….2)

13. a) A square coil of side d carries a current i. Calculate the magnetic induction at the center of the coil.

(OR)

b) Compare the emf of two cells using B.G.

14. a) Deduce the Faraday's laws from Lorentz force expression.

(OR)

b) With a neat sketch, describe the experimental determination of mutual inductance

15. a) Derive Maxwell's field equation in terms of electromagnetic potentials.

(OR)

b) State and explain the poynting theorem.

SECTION - C (4 X 10 = 40 MARKS)

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

16. Describe the phenomenon of self-inductance and derive an expression for it. Apply it to find the self-induction of a long solenoid.

17. Obtain the expression for the electric potential due to two concentric shells.

18. Deduce the expressions for the capacity of capacitors are filled partially and completely with dielectric.

19. Give the theory of the Ballistic Galvanometer with construction details.

20. Obtain an expression for the growth and decay of charge in a capacitor through a resistance

21. Setup Max well's equations for isotropic nonconducting medium and discuss the nature of electromagnetic waves when it passes through the medium.

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