



QP CODE: 22101785



22101785

Reg No :

Name :

B.Sc DEGREE (CBCS) SPECIAL SUPPLEMENTARY EXAMINATIONS, MAY 2022

Fifth Semester

CORE COURSE - PH5CRT05 - ELECTRICITY AND ELECTRODYNAMICS

Common for B.Sc Physics Model I, B.Sc Physics Model II Applied Electronics, B.Sc Physics Model II Computer Applications & B.Sc Physics Model III Electronic Equipment Maintenance

2019 Admission Only

90803564

Time: 3 Hours

Max. Marks : 60

Part A

*Answer any **ten** questions.*

*Each question carries **1** mark.*

1. Develop the phase relationship between voltage and current in an AC circuit containing resistance only.
2. Explain briefly the theory of transformer on no load.
3. Define thermo couple.
4. Explain Gradient of a scalar field?
5. State and explain Stokes theorem?
6. Why electric field inside a charged conductor is zero?
7. Difference between flux and flux density of an electric field?
8. Electric field inside a charged spherical conductor is zero. Why?
9. Prove that the tangential component of the electric field is continuous across a boundary.
10. What is the significance of Magnetic vector potential?
11. State and explain Fleming's right hand rule.
12. State Maxwell's equation in terms of free charges and currents.

(10×1=10)

Part B

*Answer any **six** questions.*

*Each question carries **5** marks.*





13. An electric lamp which runs at 40V and consumes 10A current is connected to AC mains at 100V, 50Hz. Calculate the inductance of the coil
14. In a series LCR circuit the voltage and the current are given by $V = 353.5\cos(3000t - 10^\circ)V$, $I = 12.5\cos(3000t - 55^\circ)A$. The inductance is 0.01H. find R and C
15. Show the efficiency of a power system supplying maximum power to the load is 50%.
16. A circuit consists of a capacitance of 0.01 μF , an inductance of 0.1 mH, and a resistance of 200 Ω . Find the frequency at which the circuit will oscillate.
17. Charges $+10^{-7}C$, $-2 \times 10^{-7}C$, $+3 \times 10^{-7}C$ and $+5 \times 10^{-7}C$ are placed at the four corners of a square of side 1m. Find the potential at the point of intersection of the diagonals?
18. Find the magnetic field at the centre of an infinitely long solenoid of radius 3cm with 1200 turns if a current of 6A is flowing through it?
19. In Hydrogen atom the electron revolves around the nucleus in a path of radius $5 \times 10^{-11}m$ at a frequency of 6.8×10^{15} Hz. What is the value of magnetic field produced at the centre of the orbit?
20. A current of 65A flows through a circular coil of 1 turn with radius 2cm. Find the flux density at the centre?
21. Obtain an expression for the electric and magnetic waves in monochromatic plane wave?
(6×5=30)

Part C

Answer any **two** questions.

Each question carries **10** marks.

22. Define capacitive reactance, Inductive reactance and impedance of a circuit
23. Discuss growth and decay current in an L - R circuit.
24. Explain cyclotron motion. Arrive at the cyclotron formula. Obtain the radius of the path of the particle if the uniform magnetic field is applied at an angle with the direction of motion of the particle.
25. State and explain Poynting's theorem? Explain its significance in electrodynamics.
(2×10=20)

