QP CODE: 21100036

21100036

Reg No : .....

Name : .....

B.Sc DEGREE (CBCS) EXAMINATION, FEBRUARY 2021

Fifth Semester

Core Course - PH5CRT05 - ELECTRICITY AND ELECTRODYNAMICS

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

2017 Admission Onwards

43537958

Time: 3 Hours Max. Marks : 60

Part A

*Answer any **ten** questions.*

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

1. What is meant by wattles current?
2. What is resonance curve?
3. State law of intermediate metals in thermo electric circuits.
4. State and explain Stokes theorem?
5. Distinguish between Scalar and vector fields?
6. State Gauss's law?
7. What is electric potential energy?
8. Prove that the tangential component of the electric field is continous across a boundary.
9. Explain why magnetic monopoles doesn't exist?
10. Explain the significance of Faraday's Law of Electromagnetic Induction.
11. State and explain Lenz's law.
12. Define Poynting's Vector and explain its significance? Represent it mathematically.

(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. A 60V, 10W lamp is to be run on 100V, 60 cycles main. Calculate the inductance of the choke coil required in the circuit. How much pure resistance would be required to achieve the same result?

15. A generator develops 200V and has an internal resistance of 100Ω. Find the power delivered to the load of (i) 100Ω (ii) 300Ω. Find their efficiencies also.

16. Discuss decay current in an L - R circuit.

17. What is meant by divergence and curl of a vector field? Explain its significance. If $V = 2x^3y^2z^2\hat{i}$, find the divergence and curl of V?

18. The distance between the electron and proton in the hydrogen atom is 5.35×10^{-9} cm. Compare the magnitude of the Electrical and Gravitational Forces between these particles?

19. If a charge is allowed to move in the direction in the vicinity of a current carrying rod such that current flows in same direction as the outside charge is moving. Find the work done by the magnetic field?

20. A solenoid of 1200 turns is wound uniformly in a single layer on a glass tube 2m long and 0.03m in diameter. Find the magnetic flux density at
a)the centre of solenoid b) the ends, when a current of 2 amp flows through it.

21. Obtain differential form of wane equation?

(6×5=30)

Part C

*Answer any **two** questions.*

*Each question carries **10** marks.*

22. Develop the phase relation between voltage and current in a circuit which contain inductor only, capacitor only and resistor only.

23. A charged capacitor having a charge q_0 is discharged through a resistance. Find an expression for instantaneous charge q in terms of time t and charge q_0. Explain the significance of time constant?

24. Explain magnetic vector potential and its physical significance. If $\vec{A} = (x^2+y^2+z^2)^{-1}\hat{i}$. Find B.

25. Show how Maxwell modified Ampere's Law in magnetostatics?

(2×10=20)