BSc DEGREE (CBCS) EXAMINATION, FEBRUARY 2020

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

E1FA5F2A

Time: 3 Hours   Maximum Marks :60

Part A

*Answer any **ten** questions.*

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

1. Explain the LCR rejecter circuit.

2. How will you Nortonize a given circuit?

3. Seebeck effect is reversible effect. Comment on this.

4. Explain divergence of a vector field.

5. Discuss about the divergence and curl of electric and magnetic fields.

6. What is capacitance of a capacitor?

7. What is the relation between electric field and potential?

8. Show that work done by magnetic field is zero.

9. Distinguish between scalar and vector potentials.

10. Derive the Faraday's law in differential form.

11. Distinguish between lenz's law and Fleming's right hand rule.

12. What is Continuity equation and what is its significance?

(10×1=10)

Part B

*Answer any **six** questions.*

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

13. Calculate the average value and rms value of an alternating voltage for its half cycle

14. A 50 cycle AC is applied to an LR circuit in series with L= $(1/\pi)$ H and R=2100 Ω. Calculate the reactance and impedence offered by the circuit and the angle of lag.

15. 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 is required would be required to achieve the same result?

16. When a capacitor is charged to a p.d of 400V is connected to a voltmeter having a resistance of 25 mega ohm, the voltage is observed to have fallen to 50V at the end of an interval of 2 minutes. Find the value of the capacitor

17. Verify stokes theorem for the vector $\bar{A} = (2x-y)\hat{\imath} - yz^2\hat{\jmath} - y^2z\check{k}$ over the upper half surface of the sphere $x^2 + y^2 + z^2 = 1$.

18. Obtain an expression for electrostatic force. Explain the principal of superposition of force in electrostatics?

19. Derive Poisson's and Laplace's equations.

20. Compare the terms electrostatics and magnetostatics.

21. Prove by using Maxwell's equation that the velocity of propagation of electromagnetic waves through empty space is 3 x 10^8 m/s, same as velocity of light.

<div align="right">(6×5=30)</div>

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. Discuss charging and discharging of a capacitor through a resistor and inductor.

24. State and explain Ampere's Circuital law. Derive using this law an expression for magnetic field

due to a long cylindrical wire and long solenoid.

25. Derive the expression for energy density of an electromagnetic wave in free space.

$(2\times10=20)$