QP CODE: 22103395

Reg No : ....

Name : ....

B.Sc DEGREE (CBCS) REGULAR / REAPPEARANCE EXAMINATIONS, NOVEMBER 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

2017 Admission Onwards

811250A0

Time: 3 Hours

Max. Marks : 60

Part A

*Answer any **ten** questions.*

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

1. Why does a capacitor blocks DC?

2. What is the condition for resonance in a parallel LCR circuit?

3. State any two differences between Peltier effect and Joules effect.

4. Explain curl of a vector field.

5. Why electric field inside a charged conductor is zero?

6. Distinguish between Scalar and vector fields?

7. Prove that the tangential component of the electric field is continous across a boundary.

8. State Ampere's Circuital Law?

9. Explain the concept of magnetic vector potential. Obtain its relation with magnetic field.

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

11. State and Explain Lenz's law.

12. What are monochromatic plain waves?

(10×1=10)

Part B

*Answer any **six** questions.*
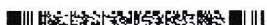
Each question carries 5 marks.

13. A resistor R= 50Ω and an unknown capacitor are in series. The voltage across the resistor is V_R= 25sin(2000t+30^0). If the current leads the applied voltage by 60^0, what is the capacitance?

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 is required would be required to achieve the same result?

15. Show the efficiency of a power system supplying maximum power to the load is 50%.

16. Find whether the discharge of a capacitor through the circuit consisting of the following elements connected in series is oscillatory, or not. C = 0.1 μF; L = 10 milli henry; R = 200 Ω. If the circuit is oscillatory determine the frequency.

17. State and explain Gauss's law in electrostatics.

18. Charges $+10^{-7}$C, -2×10^{-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?

19. A wire bent in the form of a semicircle of radius R meters carries a current of 1 ampere. It is placed in a magnetic field B web/m2 acting perpendicular to the plane of the semicircle. Calculate the force acting on the wire?

20. Obtain an expression for the magnetic field due to a current in a straight wire.

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

(6×5=30)

Part C

*Answer any **two** questions.*
*Each question carries **10** marks.*

22. Define capacitive reactance,Inductive reactance and impedence of a circuit.

23. Explain the charging and discharging of a capacitor through a resistor.

24. State and explain the fundamental theorems of divergence and curl. Give also the geometrical interpretation of them.

25. Assuming the expression for the work to assemble static charge distribution, arrive at Poynting's theorem.

(2×10=20)