21101585

QP CODE: 21101585

Reg No : .....

Name : .....

B.Sc DEGREE (CBCS) SPECIAL SUPPLEMENTARY EXAMINATION, JULY 2021

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

2018 Admission Only

95D625D0

Time: 3 Hours Max. Marks : 60

Part A

*Answer any **ten** questions.*

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

1. Define the capacitive reactance, inductive reactance and impedance.
2. How will you convert a voltage source with series resistance into an equivalent current source with a parallel resistance?
3. What is seebeck coefficient?
4. Explain curl of a vector field.
5. State and explain Divergence theorem.
6. Distinguish between Scalar and vector fields.
7. What is Lorentz Force?
8. State Biot- Savart Law.
9. Distinguish between scalar and vector potentials.
10. State Faraday's Law of Electromagnetic Induction.
11. State and explain Flemming's right hand rule.
12. What are the essential properties of electromagnetic waves?

(10×1=10)

Part B

*Answer any **six** questions.*

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

13. An alternating voltage of 230V and frequency 50 Hz is applied to a 5H choke of resistance 100Ω. Find the power factor and power absorbed.

14. A series LCR circuit with R= 25Ω and L= 0.6H results in a leading phase angle of 60^0 at a frequency of 40 Hz. At what frequency will the circuit be resonant?

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

17. 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?

18. Derive an expression for electric field due to a solid sphere carrying a charge Q at a point a) outside the sphere, b) on the surface of sphere, c) inside the sphere.

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

20. A solenoid consisting of 250 turns is wound on a former of radius 0.05m and length 40cm. What is the value of magnetic flux density, if a current of 3A is flowing through it, at a) The midpoint of solenoid, b) The end

21. Obtain an expression for speed of Transverse wave on a string?

(6×5=30)

Part C

*Answer any **two** questions.*

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

22. Explain how an AC generator is producing an alternating voltage. Give the wave form of an alternating voltage

23. Derive an expression for decay of current through inductance L and resistance R in a circuit?

24. What is electric potential energy? Obtain an expression for the potential energy of a group of point charge distribution.

25. Discuss Maxwell's equations in vacuum, charge free region and matter.

(2×10=20)