B.Sc DEGREE (CBCS) REGULAR / IMPROVEMENT / REAPPEARANCE EXAMINATIONS, JANUARY 2023

Third Semester

COMPLEMENTARY COURSE - PH3CMT02 - PHYSICS - MODERN PHYSICS AND MAGNETISM

Common to B.Sc Chemistry Model I & B.Sc Geology Model I

2017 Admission Onwards

ABA21C5A

Time: 3 Hours

Max. Marks : 60

Part A

*Answer any **ten** questions.*

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

1. Explain the term Bohr magneton.

2. Write the relation between half-life and mean-life of an element.

3. Explain the uses of carbon dating.

4. Consider two identical bodies, one at 1000K and the other at 1500 K. Which body emits more radiation in the shorted wavelength region?

5. What do you understand by Eigen function? Write down the normalized eigen function for a particle in a box.

6. In which regions of the electromagnetic spectra do the rotational transitions fall into?

7. Differentiate between fluorescence and phosphorescence.

8. Define Peak Inverse Voltage.

9. Is the frequency content of the output of a half wave rectifier and a full wave rectifier the same? Explain

10. Why emitter is always forward biased?

11. Explain the temperature dependency of ferromagnetic susceptibility.

12. What are magnetographs?

Part B

Answer any six questions.
Each question carries 5 marks.

13. Calculate the diameter of a nucleus of mass number 108. GivenR_0=1.2fm.

14. A radioactive sample contain 4mg of $_{32}U^{238}$ Determine (a)how much of the sample will remain unchanged after 62000 years (b)what will be the activity of the sample at that time. Given the half life is 2.48×10^5 years and decay constant is 8.88×10^{-14}/s.

15. The spectral density of the sun peaks at a wavelength of 900 nm. If the sun behaves as a black body, what is the temperature of the sun?

16. The lowest energy for a particle trapped in 1-dimensinal box is 3.2×10^{-18}J. Calculate the next three possible higher states of energies the particle can have in eV.

17. The electron in the hydrogen atom makes transitions from a -1.51 eV to -3.4 eV state. Calculate the wavelength of the spectral line emitted, 1eV = 1.6×10^{-19} J, h = 6.62×10^{-34} Js.

18. How does junction breakdown occur in p-n junction diodes?

19. How does a zener diode work as a voltage regulator ?

20. Obtain the ripple factor of (a) Half wave rectifier (b) Full wave rectifier.

21. Magnetic susceptibility of copper is 7.8×10^{-4} . Calculate the flux density when it is subjected to a magnetic field of 8×10^5 A/m.

(6×5=30)

Part C

Answer any two questions.
Each question carries 10 marks.

22. Discuss the properties of atomic nucleus.

23. Obtain the time dependent Schrodinger equation for a free particle.

24. Explain the working of a bridge rectifier and derive expressions for efficiency and ripple factor.

25. Discuss about earth's magnetism and with help of diagram, explain the components of earth's magnetic fields.

(2×10=20)