Reg. No .... Name **24U345**

B.Sc. DEGREE END SEMESTER EXAMINATION - OCTOBER 2024
SEMESTER 3 : COMPLEMENTARY PHYSICS FOR CHEMISTRY
COURSE : **19U3CPPHY6 : MODERN PHYSICS AND MAGNETISM**
(For Regular 2023 Admission and Improvement/Supplementary 2022/2021/2020/2019 Admissions)

Time : Three Hours

Max. Marks: 60

PART A
Answer any 8 (2 marks each)

1. What is meant by a normalised wave function?
2. What is meant by biasing of a diode?
3. Mention the factors that led to the development of wave mechanics.
4. What are magnetographs?
5. Classical theory fails in the explanation of optical spectra. Summarise
6. Write any four properties of gamma rays?
7. What is packing fraction? How is it related to stability of the atom?
8. Briefly explain radioactive dating?
9. What are hard and soft magnetic materials? Give an application each.
10. State, with reasoning, if the following statement is is true. At absolute zero semiconductors can still conduct.

(2 x 8 = 16)

PART B
Answer any 6 (4 marks each)

11. Determine the frequency of an X-ray photon whose momentum is 1.1×10^{-23} kgm/s.
12. The half life of radium is 3.82 days. In what time will the activity decay to (1/16) of its original value.
13. Find the wave number of Hα line in the hydrogen spectrum. Rydberg constant R = 1.097×10^7 m^{-1}.
14. Describe breifly classification of the nucleus
15. The applied a.c. power to a halfwave rectifier is 110 W, where as the DC output is 45 W. Determine the rectification efficiency. Comment about the remaining power and power efficiency.
16. Explain dia, para and ferromagnetic materials. Distinguish between them in terms of susceptibility and relative permeabiility.

17. An electrons is enclosed in a box of length 1 Å. Determine the energy eigen values.
18. Explain dia, para and ferromagnetic materials. Distinguish between them in terms of susceptibility and relative permeabiility.

(4 x 6 = 24)

PART C
Answer any 2 (10 marks each)

19. Discuss the three transistor configurations as well as obtain expressions and relations between the associated amplification factors.

20. Discuss an experiment to plot B-H curve of a sample.

21. Write an essay on natural radioactivity, explaining the properties of the emitted radiations.

22. Discuss the dual nature of matter. Describe Davisson and Germer experiment and show that electrons behave like waves.

(10 x 2 = 20)