Reg. No ..... Name **23U342**

B. Sc. DEGREE END SEMESTER EXAMINATION : NOVEMBER 2023

SEMESTER 3 : COMPLEMENTARY PHYSICS FOR CHEMISTRY

COURSE : **19U3CPPHY6 : MODERN PHYSICS AND MAGNETISM**

(For Regular - 2022 Admission and Improvement/Supplementary - 2021/2020/2019 Admissions)

Time : Three Hours Max. Marks: 60

PART A

Answer any 8 (2 marks each)

1. What is meant by fluorescence?
2. Why is it that earth has an associated magnetic field?
3. Explain spin of the electron. What is its significance in vector atom model?
4. What are magnetic maps?
5. Explain the physical significance of the wave function.
6. Hydrogen has only one electron; still, it emits a series of spectral lines. How is this possible?
7. How is a zener diode usually biased?
8. Activity of a radioactive substance becomes 8000Bq to 1000Bq in 12 days. What is the half life of the radioactive substance?
9. State and explain the uncertainty principle.
10. Write down the expression for de Broglie wavelength. Mention the symbols.

(2 x 8 = 16)

PART B

Answer any 6 (4 marks each)

11. The half life of radium is 3.82 days. In what time will the activity decay to (1/16) of its original value.
12. The work function of barium and tungsten are 2.5eV and 5eV respectively. Check whether these materials are useful in a photocell, which is to detect visible light.
13. An electron in the n = 2 state of hydrogen remains there on the average of about 10^{-6} s, before making a transition to n=1 state. Estimate the uncertainty in the energy of n=2 state.
14. An AC supply of 230 V is supplied to a halfwave rectifier circuit through a transformer of turn ratio 10:1 Find the DC output voltage and the peak inverse voltage. Assume the diode to have a static resistance of 10 ohms.
15. In a CB configuation, current amplification is 0.9. Find base current for an emitter current of 1 milli ampere.
16. An electron has a speed of 600m/s with an accuracy of 0.004%. Calculate the certainty with which we can locate the position of the electron.
17. Explain the information given by binding energy curve.
18. Give two theories on the magnetism of earth.

(4 x 6 = 24)

PART C

Answer any 2 (10 marks each)

19. Discuss an experiment to plot B-H curve of a sample.
20. Give an account of the Bohr model of the atom. Explain the origin of spectral lines of hydrogen on the basis of this theory.
21. Obtain expressions for efficiency and ripple factor of a halfwave rectifier.
22. A particle is in a cubical box. Obtain its energy value and function.

(10 x 2 = 20)