

B. Sc DEGREE END SEMESTER EXAMINATION - OCT. 2020: JANUARY 2021**SEMESTER 3 : COMPLEMENTARY PHYSICS (FOR B Sc CHEMISTRY)****COURSE : 19U3CPPHY6 : MODERN PHYSICS AND MAGNETISM***(For Regular - 2019 Admission)*

Time : Three Hours

Max. Marks: 60

PART A**Answer any 8 (2 marks each)**

1. What are Stokes' and Antistoke's lines?
2. Summarise the fundamental concepts of Planck's quantum theory.
3. Mention the factors that led to the development of wave mechanics.
4. What is radioactive equilibrium?
5. Write down the expression for the energy of an electron in the nth orbit. Explain the symbols.
6. What do you mean by radioactive equilibrium?
7. Comment about the width of a p-n junction, with biasing.
8. What are diamagnetic materials?
9. What is Bohr magneton?
10. What are magnetic maps?

(2 x 8 = 16)**PART B****Answer any 6 (4 marks each)**

11. Estimate the de Broglie wave length associated with an electron accelerated by a potential difference of 200 volts.
12. Estimate the de Broglie wavelength associated with an electron having kinetic energy 15 ev.
13. The work function of barium and tungsten are 2.5eV and 4.2eV respectively. Check whether these materials are useful in a photocell, which is to detect visible light.
14. The wavelength of H α line is 6563 Å. Find the value of the Rydberg constant.
15. The electron in the hydrogen atom jumps from the fourth orbit to the second. Find the wavelength of the spectral line emitted.
16. Calculate the time required for 10% of a sample of Thorium to disintegrate. Assume the half-life of Thorium to be 1.4×10^{10} years.
17. In a CE configuration current amplification is 45. The voltage drop across a 1 kilo ohm resistor connected across collector is 1V. Find base current.
18. 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.

(4 x 6 = 24)**PART C****Answer any 2 (10 marks each)**

19. What is Raman effect? Discuss the quantum theory explanation of this effect
20. Write an essay on natural radioactivity, explaining the properties of the emitted radiations.
21. Obtain expressions for efficiency and ripple factor of a fullwave rectifier, without a center-tap transformer. Discuss an experiment to determine these parameters.
22. Classify materials, based on their magnetic response.

(10 x 2 = 20)