



19102031

QP CODE: 19102031

Reg No : .....

Name : .....

**B.Sc. DEGREE (CBCS) EXAMINATION, OCTOBER 2019**

**Third Semester**

B.Sc Chemistry Model I

**COMPLEMENTARY COURSE - PH3CMT02 - PHYSICS - MODERN PHYSICS AND  
MAGNETISM**

(Common to B.Sc Chemistry Model I, B.Sc Geology Model I)

2017 Admission Onwards

B78D3CB2

Maximum Marks: 60

Time: 3 Hours

**Part A**

*Answer any ten questions*

*Each question carries 1 mark*

1. List the quantum numbers required to specify completely the state of an atom.
2. Briefly explain J-J coupling.
3. What is artificial radioactivity? Briefly explain the theory behind radioactive dating.
4. Write down the Schrodinger equation for a time independent particle moving in a three dimensional potential.
5. What do you understand by box normalization?
6. How does the sodium D line occur?
7. What is Rayleigh scattering?
8. What is Zener voltage?
9. Bridge rectifiers are becoming more and more popular. Why?
10. In a transistor the emitter and collector are of the same type of semiconducting material. Yet they cannot be interchanged in a circuit connection. Explain
11. How can identify a paramagnetic rod from a diamagnetic rod?
12. What are magnetographs?

(10×1=10)





## Part B

*Answer any six questions.*

*Each question carries 5 marks.*

13. Estimate the B.E of  ${}_{15}\text{P}^{31}$ . Given mass of  ${}_{15}\text{P}^{31} = 30.97376$  u. Mass of proton = 1.007825u, mass of neutron = 1.008665 u
14. Determine the activity of 1mg of a radioactive substance having atomic mass 222amu. Given the half-life is 3.8 days.
15. Find the energy of the neutron in units of electron Volt whose de Broglie wavelength is  $10^{-10}$  m .
16. If the wave function  $\psi(x) = A \sin kx$  satisfies the time – independent Schrodinger equation . Find the form of the potential  $V(x)$ .
17. The bond length of HCl molecule is  $136 \times 10^{-12}$  m. Calculate the rotational constant of HCl.
18. A silicon diode of forward resistance  $13 \Omega$  is connected in series with an ac voltage of peak value 24 V and a load resistance of  $220 \Omega$ . Calculate the peak current and peak voltage across the load.
19. How does junction breakdown occur in p-n junction diodes.
20. Draw and compare the output waveform of full wave and half wave rectifier.
21. With the help of a diagram, explain the elements of Earth's magnetic field

(6×5=30)

## Part C

*Answer any two questions.*

*Each question carries 10 marks.*

22. Discuss the properties of atomic nucleus.
23. What is the physical interpretation of a wave function in quantum mechanics? Write down the conditions on the wave function.
24. Draw the circuit diagram and explain the working of a half wave diode rectifier. Explain ripple voltage and ripple factor.
25. What is ferromagnetism? Discuss the magnetic hysteresis curve in ferromagnets? Mention some uses of these curve?

(2×10=20)

