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 $_{15}P^{31}$. Given massof$_{15}P^{31}$ =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 kT satisfies the time – independent Schrodinger equation . Find the form of the potential V(x).

17. The bond length of HCl molecule is 136 x 10^{-12} m. Calculate the rotational constant of HCl.

18. A silicon diode of forward resistance 13 Ω is connected in series with an ac voltage of peak value 24 V and a load resistance of 220 Ω. 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)