



QP CODE: 21101946



21101946

Reg No :

Name :

B.Sc DEGREE (CBCS) EXAMINATION, AUGUST 2021

Third Semester

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

Common to B.Sc Chemistry Model I & B.Sc Geology Model I

2017 Admission Onwards

10C1967D

Time: 3 Hours

Max. Marks : 60

Part A

*Answer any **ten** questions.*

*Each question carries **1** mark.*

1. Write down the formula for electron energy levels in Bohr model and explain the terms.
2. What is Gyromagnetic ratio?
3. State and explain radioactive decay law.
4. Write the Planck's distribution law.
5. Does the concept of Bohr orbit violate the uncertainty principle
6. What is Rayleigh scattering?
7. Write down the different modes of vibration for a molecule having no centre of symmetry.
8. Explain the zener breakdown mechanism.
9. What is Zener effect?
10. Why an ordinary junction transistor is called bipolar?
11. What is meant by magnetostriction?
12. Define the term Horizontal component of earth's field? Give the relation connecting B and B_h .

(10×1=10)

Part B

*Answer any **six** questions.*

*Each question carries **5** marks.*





13. The atomic mass of ${}^8\text{O}^{16}$ is 16.000u. Calculate its binding energy per nucleon. Mass of proton = 1.007825u. Mass of neutron = 1.008665u.
14. An archaeological sample contains 1/8 as much C-14 as an equal amount of carbon in living matter. What is the age of the sample if the half-life of C-14 is 5568 years?
15. The lowest energy that is possible for a particle trapped in a box is 40 eV. What are the possible three higher energies for the particle.
16. The electron in the hydrogen atom makes transitions from a -1.51 eV to -3.4 eV state. Calculate the wavelength of the spectral line emitted, $1\text{eV} = 1.6 \times 10^{-19} \text{ J}$, $h = 6.62 \times 10^{-34} \text{ Js}$.
17. Obtain the moment of inertia of the molecule about an axis passing through the centre of mass if the first line in the rotational spectra of CO molecule is 2 cm^{-1} .
18. A potential barrier of 0.50 V exists across a p-n junction. (a) If the depletion region is $5.0 \times 10^{-7} \text{ m}$ wide, what is the intensity of the electric field in this region? (b) An electron with speed $5.0 \times 10^5 \text{ ms}^{-1}$ approaches the p-n junction from the n-side, with what speed will it enter the p-side?
19. A full wave rectifier using four diodes of constant forward resistance of 1.5Ω is used to rectify an ac voltage of rms value 12 V. If the load resistance is 167Ω , calculate the maximum and mean load current.
20. A full wave rectifier using four diodes of constant forward resistance of 11.5 ohm is used to rectify an ac voltage of rms 12V. If the load resistance is 167 ohm calculate the maximum and the mean load current.
21. Discuss the properties of ferromagnetic substances.

(6×5=30)

Part C

Answer any **two** questions.

Each question carries **10** marks.

22. Explain vector atom model. Discuss the quantum numbers associated with vector atom model.
23. Give a comparative study on
a). Fluorescence and Phosphorescence b).. Infra Red and Raman spectroscopy
24. Explain the working of a bridge rectifier and derive expressions for efficiency and ripple factor.
25. Explain the origin and compare the properties of dia, para and ferromagnetic materials?

(2×10=20)

