QP CODE: 23104219

Reg No : .....

Name : .....

B.Sc DEGREE (CBCS) REGULAR / IMPROVEMENT / REAPPEARANCE EXAMINATIONS, JANUARY 2023

Third Semester

COMPLEMENTARY COURSE - PH3CMT01 - PHYSICS-MODERN PHYSICS AND ELECTRONICS

Common to B.Sc Mathematics Model I & B.Sc Statistics Model I

2017 Admission Onwards

1D0518FA

Time: 3 Hours Max. Marks : 60

Part A

*Answer any **ten** questions.*

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

1. Show that orbital magnetic moment is directly propotional to orbital angular momentum.
2. Explain the term Bohr magneton.
3. What is transient equilibrium?
4. For a material particle , show that the phase velocity is always greater than c.
5. How many lines are present in H_α line? Name them.
6. Mention the condition for the occurance of pure rotational spectrum of diatomic molecule.
7. What is a rectifier?
8. What is the efficiency of a full wave rectifier?
9. Draw the circuit diagrams of a full wave bridge rectifier. Compare its inputs and outputs wave forms.
10. Why is the binary number systems used in computers?
11. Convert the decimal number 1397 into the hexadecimal number.
12. Write four basic rules for adding binary digits. Give the truth table for binary addition.

(10×1=10)

Part B

*Answer any **six** questions.*

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

13. The atomic mass of $_8O^{16}$ is 16.000u.Calculate its binding energy per nucleon. Mass of proton = 1.007825u.Mass of neutron = 1.008665u.

14. If the disintegration constant of a radio active substance is 9.435×10^{-8}, calculate its half-life period.

15. Determine the time in which a gram of Radium will disintegrate to 0.2 gm if the half-life is 1620 years.

16. An electron is confined to move in a cubical box of side 1 Å. Calculate the minimum uncertainty in its velocity. Given mass of electron = 9×10^{-31} kg.[h = 6.62×10^{-34} Js]

17. The lowest energy for a particle trapped in one-dimensinal box is 3.2×10^{-18}J. Calculate the next three possible higher states of energies the particle can have in eV.

18. In a p-n junction, the depletion region is 400 nm wide and an electric field of 5.0×10^5 Vm^{-1} exists in it. (a) Find the height of the potential barrier. (b) What should be the minimum kinetic energy of a conduction electron which can diffuse from the n-side to the p-side?

19. Explain the formation of potential barrier in p-n junction diode.

20. Draw the logic circuits for the realization of basic logic operations using NOR gates only.

21. Draw the logic diagrams of a half adder and write its truth table.

(6×5=30)

Part C

*Answer any **two** questions.*

*Each question carries **10** marks.*

22. Explain the hydrogen atom spectrum using Bohr atom model.

23. Briefly explain with a diagram the experimental set to study Raman effect. Discuss the quantum theory of Raman effect.

24. Explain the working of a Zener diode. Describe its V-I characteristics.

25. State the De Morgan's theorems. Prove them by the method of pure induction illustrating the logical operations in a table.

(2×10=20)