QP CODE: 23127025

Reg No : .....

Name : .....

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

94BEA55E

Time: 3 Hours Max. Marks : 60

Part A

*Answer any **ten** questions.*

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

1. State the postulates of Bohr atom model.
2. List the quantum numbers required to specify completely the state of an atom.
3. State Pauli's exclusion principle.
4. What are the consequence of uncertainty principle?
5. Write down the different transitions that occur in molecular spectra.
6. Write down two distinctive features of IR and Raman Spectra.
7. Define space charge width.
8. Explain the zener breakdown mechanism.
9. Draw the circuit symbol and label the leads of an n-p-n transistor.
10. Convert the decimal number 1397 into the hexadecimal number.
11. Write four basic rules for adding binary digits. Give the truth table for binary addition.
12. What is a truth table?

(10×1=10)

Part B

*Answer any **six** questions.*

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

13. The binding energy per nucleon for two isotopes of carbon ^{12}C and ^{13}C are 7.68Mev and 7.47Mev respectively. What is the energy required to remove a neutron from the carbon nucleus.

14. The half-life of radon is 3.8 days. After how many days only one twentieth of the radon sample will left over?

15. Describe the determination of age of a fossil sample using radiocarbon dating.

16. Find the energy of the neutron in units of electron Volt whose de Broglie wavelength is 10^{-10} m .

17. If the wave function $\psi(x)= A \sin kt$ satisfies the time – independent Schrodinger equation . Find the form of the potential V(x).

18. 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 and the load resistance is 167 ohm. Calculate the maximum and the mean load current.

19. What are the advantage of a forward bridge rectifier over that of a centre tap full wave rectifier.

20. Distinguish between decimal number systems and binary number systems using an example.

21. State and prove De Morgan's theorm.

(6×5=30)

Part C

*Answer any **two** questions.*

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

22. Derive the equation for radioactive decay. What do you mean by half-life and mean life of radioactive substance? Obtain the relation connecting disintegration constant, mean life and half-life of a radioactive substance.

23. Discuss NMR spectroscopy.

24. Draw the circuit diagram and explain the working of a half wave diode rectifier. Explain ripple voltage and ripple factor.

25. What are adder circuits? Explain the following: Half adder and full adder, truth tables and circuit diagram.

(2×10=20)