QP CODE: 21101959

21101959

Reg No : .....

Name : .....

B.Sc DEGREE (CBCS)EXAMINATION, AUGUST 2021

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

56921053

Time: 3 Hours

Max. Marks : 60

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 L-S coupling.
3. What is transient equilibrium?
4. Write the Planck's distribution law.
5. What are the admissibility condition of wave function?
6. Illustrate the energy level diagram of sodium D line.
7. What type of carriers is present in the depletion region?
8. What is Zener voltage?
9. Why the width of the base region of a transistor is kept very small compared to other regions?
10. Convert the hexadecimal number 3A .2F into the decimal number.
11. Write down the steps to find the 1's complement and 2's complement of a binary number.
12. What are single variable theorems of Boolean algebra? Give two examples.

(10×1=10)

Part B

*Answer any **six** questions.*

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

13. If the Rydberg constant is 1.097 X $10^7 m^{-1}$, what are the wavelengths of the first three lines of Paschen series?

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

15. The half life of $^{92}U_{238}$ against alpha decay is 4.5×10^9 years. Calculate the number of disintegrations taking place in 5 gm of the substance in unit time.

16. 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.

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. Explain the biasing of a p-n junction diode.

19. A half wave rectifier is used to supply 50 V dc to a resistive load of 800 Ω, find: (i) Im (ii) Idc (iii) Irms (iv) dc power output (v) dc output voltage

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

21. Draw and explain the logic circuit of a full adder. Derive the expressions for both the sum and carry outputs.

(6×5=30)

Part C

*Answer any **two** questions.*
*Each question carries **10** marks.*

22. Write a note on the salient features of nuclear forces.

23. Obtain the Schrödinger equation for a particle moving in a time dependent potential. What do you understand by a stationary state?

24. With a neat diagram describe the action of a full wave bridge rectifier. Compare the merits over that of a center tap full wave rectifier.

25. What are logic gates? Discuss the logic operations of the basic gates using equivalent electronic circuits.

(2×10=20)