22100544

QP CODE: 22100544

Reg No : .....

Name : .....

B.Sc DEGREE (CBCS) REGULAR / REAPPEARANCE EXAMINATIONS, APRIL 2022

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

7E29E577

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 J-J coupling.
3. Define artificial radioactivity.
4. What do you understand by matter waves?
5. Write down the Schrodinger equation for a time independent particle moving in a three dimensional potential.
6. Differentiate between fluorescence and phosphorescence.
7. What is Peak Inverse Voltage of a diode in a rectifier circuit?
8. What is the efficiency of a half wave rectifier?
9. What is the significance of the arrow-head in the transistor symbol?
10. What is the minimum number of bits required to encode the decimal digits 0 through 9? justify.
11. Convert the binary fraction 0.110 into the decimal form.
12. What is a truth table?

(10×1=10)

Part B

*Answer any **six** questions.*

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

13. Assuming 1u=931 Mev,calculate the mass of the C-12 isotope of carbon.
14. Obtain the relation between half-life and decay constant.
15. Describe the determination of age of a fossil sample using radiocarbon dating.
16. An electron has a speed of 1.05×10^4 m/s within an accuracy of 0.02%. Calculate the uncertainty in the position of the electron.
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. An ac voltage of peak value 20 V is connected in series with a silicon diode and load resistance of 500 Ω. If the forward resistance of diode is 10 Ω, find: (i) peak current through diode (ii) peak output voltage. What will be these values if the diode is assumed to be ideal?
19. Draw and compare the output waveform of full wave and half wave rectifier.
20. By converting the following decimal numbers into binary, perform the subtraction between them using 1's complement method. (a) 10 - 28 (b) 26 -13
21. Using De morgan's theorems Show that $(A+B)(\bar{A}+\bar{B})=A$

(6×5=30)

Part C

*Answer any **two** questions.*

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

22. Discuss the properties of atomic nucleus.
23. Describe schematically the fine structure of H_α line.
24. Explain the working of a bridge rectifier and derive expressions for efficiency and ripple factor.
25. What are adder circuits? Explain the following: Half adder and full adder, truth tables and circuit diagram.

(2×10=20)