This question paper contains **3** printed pages]

Roll No. | | | | | | | | | | | |

S. No. of Question Paper : **1622**

Unique Paper Code : **222453** **C**

Name of the Paper : **(PHCT-402) Physics—II**

Name of the Course : **B.Sc. (Hons.)Chemistry/Geology**

Semester : **IV**

Duration : **3 Hours** Maximum Marks : **75**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Question No. **1** is compulsory.

Attempt *Five* questions in all taking at least *two* questions from each Section.

1. Attempt *five* questions out of the following :

(*a*) Prove that :

$$\vec{E} = -\vec{\nabla} V .$$

(*b*) What is Lorentz force ? Write an expression for the Lorentz force.

(*c*) Write down Maxwell's equation for free space.

(*d*) Give the truth table of XNOR gate.

(*e*) Write 2's complement of $(01001101)_2$.

P.T.O.

(*f*) Draw the circuit of half wave rectifier.

(*g*) When the emitter current of a transistor changes by 1 mA its collector current changes by 0.955 mA. Calculate α and β.

(*h*) Write a short note on continuity equation. 3×5=15

Section A

2. (*a*) Calculate the electric field of a uniformly charged hollow cylinder using Gauss law. 10

(*b*) Derive an expression for electric field due to a dipole at a distance '*r*' along its perpendicular bisector. 5

3. (*a*) Use Maxwell's equation to obtain the wave equation. How did this equation help in the development of the idea that light is also a form of electromagnetic radiation ? 10

(*b*) Show that electromagnetic waves are transverse in nature. 5

4. (*a*) Distinguish between diamagnetic, paramagnetic and ferromagnetic material. 6

(*b*) State the laws of electromagnetic induction and describe experiments you would perform to illustrate the factors which determine the magnitude of induced currents set up in closed circuit. 9

Section B

5. (*a*) Define stability factor "S". Find the stability factor in CE configuration using base resistor method. 8

(*b*) How voltage divider bias method works in CE configuration for good stabilization. 7

6. What is rectification ? Draw and explain the working of full wave rectifier and obtain the expression for efficiency and ripple factor. 15

7. (*a*) Write the truth table for a half subtractor and draw its circuit diagram using NAND gates. 7

(*b*) Prove that : 4

$$(A + B)(A + \bar{B})(\bar{A} + C) = AC.$$

(*c*) Convert $(3827)_{10}$ into binary and octal numbers. 4