

This question paper contains 3 printed pages.]

Your Roll No.

1256

B.Sc. (Hons.) / II
CHEMISTRY – Paper XI
(Physics II)

A

Time : 3 Hours

Maximum Marks : 38

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

Question No. 1 is compulsory. Attempt any two questions from each Section.

1. Attempt any five of the following :

(a) What is atomic polarizability. Show that

$$\vec{p} = \alpha \vec{E}_0.$$

(b) In space electric field $\vec{E} = 8\hat{i} + 4\hat{j} + 2\hat{k}$. Calculate the electric flux through the

surface $\vec{S} = 5\hat{i}$.

(c) Explain the term 'coercivity' and 'retentivity' in hysteresis curve.

(d) Write down the Maxwell's equations for electromagnetic waves.

- (e) Explain the working of a tank circuit in an oscillator.
- (f) Using 2's complement method subtract 28 from 49.
- (g) Convert decimal number $(175.015)_{10}$ to octal number.
- (h) Define d.c. load line in a transistor. Give the significance of Q-point. $(5 \times 2 = 10)$

SECTION - A

- 2. (a) State Gauss's theorem. Express it in differential form $\vec{\nabla} \cdot \vec{E} = \frac{\rho}{\epsilon_0}$. (1, 3)
- (b) Using Gauss theorem, calculate electric field due to infinitely long charge wire. 3
- 3. (a) State and prove Ampere's circuital law. 2
- (b) Using Biot-Savart's law find the magnetic field due to an infinite straight current carrying wire. 5
- 4. (a) State and prove Poynting theorem. 4
- (b) Obtain Maxwell's modification of Ampere's circuital law. 3

SECTION - B

5. (a) Draw hybrid model equivalent circuit for a transistor (CE), and explain various h-parameters. 3
- (b) Calculate current gain and voltage gain using h-parameters for a CE amplifier. 4
6. (a) Define stability factor 's'. Find the stability factor in CE using base resistor method. 4
- (b) Explain the working of a zener diode. 3
7. (a) Prove the following identity by Boolean algebra : 3
- $$(A + B)(A + \bar{B})(\bar{A}C) = AC$$
- (b) Draw a circuit for a half adder using NAND gates and write its truth table. 4
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