

**B.Tech. SEM -II Computer/ Info. Tech./ Electronics / Bio Medical /  
E & TC) 2014 Course (CBCS) : SUMMER - 2019  
SUBJECT : ENGINEERING PHYSICS**

Day : Wednesday  
Date : 29/05/2019

**S-2019-2538**

Time : 10.00 AM TO 01.00 PM  
Max. Marks : 60

**N.B.:**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Use of non programmable **CALCULATOR** is allowed.
- 4) Draw neat and labeled diagrams **WHEREVER** necessary.
- 5) Assume suitable data wherever necessary.

**Constants:**

$$e = 1.6 \times 10^{-19} C$$

$$m_e = 9.1 \times 10^{-31} kg$$

$$h = 6.63 \times 10^{-34} J. s$$

$$m_p = 1.66 \times 10^{-27} kg$$

$$N_a = 6.025 \times 10^{23} \text{ atoms/gm-mole}$$

- Q.1** Explain with a neat diagram the principle and working of a Bainbridge mass spectrograph. If the magnetic field in the velocity selector is  $1 \text{ Wb/m}^2$  and ions having a velocity of  $0.4 \times 10^7 \text{ m/s}$  pass undeflected find the electric field in the velocity selector. **[10]**

**OR**

Describe principle, construction and working of cyclotron and derive resonance frequency.

- Q.2** Derive an expression for conductivity in a metal. Calculate the conductivity of extrinsic silicon at room temperature if the donor impurity added is 1 in  $10^8$  silicon atoms. **[10]**  
Given :  $n_i = 1.5 \times 10^{10} \text{ per cm}^3$   
 $\mu_e = 1300 \text{ cm}^2/\text{volt. Sec.}$   
No. of atoms per unit volume =  $5 \times 10^{22}$ .

**OR**

What is superconductivity? Explain BCS theory of superconductors.

- Q.3** What is entropy? Explain reversible and irreversible process. **[10]**

**OR**

Explain briefly how colloids are synthesized by a chemical route.

- Q.4** Explain the theory and the experimental arrangement of Newton's rings **[10]**  
experiment.

**OR**

Derive an expression for the intensity at a point in the Fraunhofer's type of diffraction produced by single slit.

- Q.5** Explain the phenomenon of double refraction on the basis of Huygen's wave theory. Calculate the thickness of quarter wave plate and a half wave plate. **[10]**  
Given :  $\mu_e = 1.553$ ,  $\mu_o = 1.544$  and  $\lambda = 5000 \text{ \AA}$ .

**OR**

State and explain the properties of LASER. Write any two applications of LASER in detail.

- Q.6** What are the factors which affect the architectural acoustics? Discuss the remedies for the same. **[10]**

**OR**

Derive Schrodinger's time independent wave equation. Lowest energy level of an electron trapped in a potential well is 38 eV. Find the width of the well.

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