

**B.Tech. SEM -II Computer/ Info. Tech./ Electronics / Bio Medical /  
E & TC) 2014 Course (CBCS) : WINTER - 2018**

**SUBJECT: ENGINEERING PHYSICS**

**W-2018-2273**

Day: Friday  
Date: 16/11/2018

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.

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- Q.1** a) Explain the motion of electron in parallel electric field. (06)  
b) What are thermonuclear reactions? Explain Proton - Proton Cycle. (04)

**OR**

- Q.1** a) Explain construction and working of cyclotron. Show energy of particle emerging out of cyclotron is  $E_{\max} = \frac{1}{2} \frac{q^2 B^2 R^2}{m}$ . (06)  
b) An electron accelerated through a certain potential difference enters a uniform magnetic field of  $5 \times 10^{-1}$  wb/m<sup>2</sup>. The electron deflection is perpendicular to the magnetic field. If the radius of path of electron is  $2 \times 10^{-2}$  m, calculate the potential difference through which the electron is accelerated. (04)

- Q.2** a) What is Hall effect? Obtain an expression for Hall voltage. (06)  
b) Explain Meissner effect in detail. What are the features of superconductivity? (04)

**OR**

- Q.2** a) Explain superconductivity based on BCS theory. (06)  
b) A specimen when applied with a magnetic field of 2 Tesla along its thickness, experiences Hall effect and Hall voltage of 0.09  $\mu$ V appears along its width. Calculate Hall coefficient and mobility of the electrons in the specimen if length, width and thickness of specimen is 1m, 1cm and 1mm respectively. Given: Conductivity of specimen is  $\sigma = 5.5 \times 10^7$  ( $\Omega$  m)<sup>-1</sup>. (04)

- Q.3** a) What is Entropy? How it is represented? Discuss the change in entropy in reversible and irreversible processes. (06)  
b) What are colloids? Discuss the synthesis of colloidal nanoparticles. (04)

**OR**

- Q.3** a) What are nanoparticles? Explain the synthesis of nanoparticles by top down approach. (06)  
b) State and explain first and third law of thermodynamics. (04)

**P.T.O.**

- Q.4 a)** Discuss the formation of Newton's Rings with neat and labeled diagram. (06)  
Write the conditions for constructive and destructive interference.
- b)** Calculate the wavelength of monochromatic light incident normally on a plane grating having 5000 lines per/cm, **i)** if 2<sup>nd</sup> order spectral line is deviated by an angle of 30° and **ii)** if 1<sup>st</sup> order spectral line is deviated through 20°.

**OR**

- Q.4 a)** What is resolving power of Telescope? Show that it depends upon wavelength of light and diameter of circular aperture. (06)
- b)** Discuss any two applications of Interference. (04)

- Q.5 a)** How polarimeter can be used to determine optical activity of solution. (06)
- b)** Discuss **i)** Spontaneous emission **ii)** Stimulated emission (04)

**OR**

- Q.5 a)** With energy level diagram discuss construction and working of Ruby laser. (06)
- b)** Discuss **i)** Dichroism **ii)** Retardation plates (04)

- Q.6 a)** What is Reverberation time ( $T$ )? Discuss factors affecting  $T$ . Write Sabine formula and explain the terms involved in it. (06)
- b)** Discuss the properties of matter waves. (04)

**OR**

- Q.6 a)** Discuss the experiment that demonstrates wave nature of electron on the basis of diffraction effects from Ni crystal. (06)
- b)** Explain the terms, **i)** Echo, **ii)** Reverberation (04)

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