B-Tech-sem-II, (2014 course), E&TC winter-2018

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.

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 5×10^{-1} wb/m^2. The electron deflection is perpendicular to the magnetic field. If the radius of path of electron is 2×10^{-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 μV appears along it's 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 $\sigma = 5.5 \times 10^7 (\Omega\, m)^{-1}$. **(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. Write the conditions for constructive and distractive interference. **(06)**

b) Calculate the wavelength of monochromatic light incident normally on a plane grating having 5000 lines per/cm, **i)** if 2^{nd} order spectral line is deviated by an angle of 30^0 and **ii)** if 1^{st} order spectral line is deviated through 20^0. **(04)**

OR

Q.4 **a)** What is resolving power of Telescope? Show that it of 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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