I B. Tech II Semester Supplementary Examinations, April/May - 2019 ENGINEERING PHYSICS-II

(Com. to All Branches)

Time: 3 hours Max.			Marks: 75	
Answer any FIVE Questions All Questions carry Equal Marks				
1.	a)	Obtain Schrödinger time dependent equation. What is the condition for the wave function ψ to be well behaved?	(10M)	
	b)	Discuss advantages of quantum computing over classical computing.	(5M)	
2.	a)	Explain basic assumptions of quantum free electron theory. Obtain an expression for conductivity of a conductor based on this theory.	(10M)	
	b)	Elaborate the concept of Fermi energy.	(5M)	
3.	a)	Discuss in detail the Kronig-Penney model of band theory of solids.	(10M)	
	b)	Write a note on effective mass of an electron.	(5M)	
4.	a)	Explain B-H curve of ferromagnetic material on the basis of domain theory.	(10M)	
	b)	Differentiate Hard magnetic material from Soft magnetic materials.	(5M)	
5.	a)	Describe the effects of current and magnetic field on a superconductor.	(10M)	
	b)	Prove that a superconductor behaves as a perfect diamagnetic.	(5M)	
6.	a)	Write a note on : (i) Ferroelectric materials (ii) Piezoelectric materials	(10M)	
	b)	Deduce the Claussius-Mossotti relation for dielectrics.	(5M)	
7.	a)	Explain Hall effect and derive an expression for Hall coefficient in semiconductors.	(10M)	
	b)	Find the Hall voltage in silicon doped with 10^{23} phosphorous atoms/m ³ . The Si sample is $100\mu m$ thick with a current flow of $1mA$ for a magnetic field of $10^{-5}Wb/cm^2$.	(5M)	
8.	a)	What are nanoparticles? Explain at least two techniques for producing nanoparticles.	(10M)	
	b)	Discuss any five applications of nanomaterials.	(5M)	