PAPER ID-421056

Subject Code: RAS201

Roll No: | | | | | | | | | | | | | |

BTECH
(SEM II) THEORY EXAMINATION 2021-22
ENGINEERING PHYSICS-II

BTECH
SEM-II THEORY EXAMINATION 2021-22
SUBJECT NAME : ENGINEERING PHYSICS -II

Time: 3 Hours ***Total Marks: 70***

Notes:

- *Attempt all Sections and Assume any missing data.*
- *Appropriate marks are allotted to each question, answer accordingly.*

SECTION-A	Attempt **All** of the following Questions in brief	Marks **(7X2=14)**
Q1(a)	What are Bravias lattices? Illustrate them.	
Q1(b)	Distinguish between paramagnetic and diamagnetic substances.	
Q1(c)	What is pointing vector and state its unit	
Q1(d)	Write and explain Fermi dirac probability distribution function.	
Q1(e)	Explain Meissner's effect?	
Q1(f)	Define Skin Depth.	
Q1(g)	What are carbon nanotubes and state application of nanotubes?	

SECTION-B	Attempt **ANY THREE** of the following Questions	Marks **(3X7=21)**
Q2(a)	What is Compton Effect? Derive and expression for Compton Shift	
Q2(b)	What is local field? Obtain an expression for Lorentz equation for local field and hence deduce Clausius-Mossotti relation	
Q2(c)	Derive the electromagnetic wave equations in vacuum and show that the waves travels at a speed of light.	
Q2(d)	Deduce formula for the effective mass of an electron. What is the physical meaning of negative effective mass?	
Q2(e)	What are Buckyballs? Discuss their properties and application.	

SECTION-C	Attempt **ANY ONE** following Question	Marks **(1X7=7)**
Q3(a)	Describe the crystal structure of diamond and calculate its atomic radius, number of atoms per unit cell and atomic packing factor.	
Q3(b)	Derive Bragg's Law for the diffraction of X-rays by crystals. Describe Bragg's X-ray spectrometer. CO1	

SECTION-C	Attempt **ANY ONE** following Question	Marks **(1X7=7)**
Q4(a)	The following data refers to a dielectric material; ε_r= 4.94 and n^2 = 2.69, where n is the index of refraction, calculate the ration between electronic and ionic polarizability for this material.	
Q4(b)	Describe the Langevin's theory of diamagnetism. Show that the magnetic susceptibility is negative and independent of temperature.	

SECTION-C	Attempt **ANY ONE** following Question	Marks **(1X7=7)**
Q5(a)	State and deduce Poynting theorem for the flow of energy in an electromagnetic field.	
Q5(b)	If the earth receives 2 cal min^{-1} cm^{-2} solar energy, what are the amplitudes of electric and magnetic fields of radiation?	

SECTION-C	Attempt **ANY ONE** following Question	Marks **(1X7=7)**

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Q6(a)	What do you mean by fermi level? Show that the Fermi level of an intrinsic semiconductor lies half way between conduction and valence bands.
Q6(b)	In a P type semiconductor, the Fermi level is 0.3 eV above the valence band at temperature 300 K. Determine the new position of Fermi Level for temperature 400 K.

SECTION-C	Attempt **ANY ONE** following Question	Marks **(1X7=7)**
Q7(a)	What are superconductors? Explain their classification as type I and type II superconductors.	
Q7(b)	For a specimen of a superconductor, the critical fields are 1.4×10^5 and 4.2×10^5 A/m for temperature 14*K* and 13 *K* respectively. Calculate the transition temperature and critical fields at 0 *K* and 4.2*K*.	