Reg. No.															

Question Paper Code	12807

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2024

Second Semester

Electrical and Electronics Engineering

(Common to Electronics and Communication Engineering and Computer and Communication Engineering)

20BSPH201 – PHYSICS OF ELECTRONIC DEVICES

Regulations - 2020

Duration: 3 Hours Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	Use the Fermi distribution function to obtain the value of F(E) for $E-E_F$=0.01eV at 200K.	2	K3	CO1
2.	Define effective mass of an electron.	2	K1	CO1
3.	Distinguish between intrinsic and extrinsic semiconductor.	2	K2	CO2
4.	List out the properties of semiconductor.	2	K2	CO2
5.	A magnetic field of 1800 A/m produces a magnetic flux of 3 $x10^{-5}$Wb in an iron bar of cross-section area 0.2 cm^2. Calculate the permeability.	2	K2	CO3
6.	Define dielectric loss.	2	K1	CO3
7.	A BJT has a base current of 200μA. Determine the collector current and β.	2	K2	CO4
8.	Define early effect.	2	K2	CO4
9.	Give a reason for which N-Channel FET's are Preferred over P-Channel FET's.	2	K2	CO5
10.	Differentiate the features of CCD and Solar cell.	2	K2	CO5

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

			Marks	K – Level	CO
11.	a)	Deduce mathematical expressions for thermal and electrical Conductivities of metals using classical free electron theory.	13	K2	CO1
		OR			
	b)	A particle of mass 'm' is bounded in deep three dimensional potential well of infinite height. Derive the relevant relations to determine the energies and wave functions of the electron.	13	K2	CO1
12.	a)	Derive an expression for the density of holes in an Intrinsic semiconductor with Neat Energy band diagram.	13	K2	CO2
		OR			
	b)	Explain the principle, construction, characteristics and application of	13	K2	CO2

the Zener diode with a suitable diagram.

13.	a) i)	Give the classification of magnetic materials with their properties.	*5*	*K2*	*CO3*
	ii)	Explain the hysteresis curve of a ferromagnetic material using Domain concept.	*8*	*K2*	*CO3*
		OR			
	b)	Explain Domain theory .Draw B-H Curve based on the Domain theory of ferromagnetism.	*13*	*K2*	*CO3*
14.	a)	Discuss the different types of polarization mechanism and the polarizability involved in dielectric materials.	*13*	*K2*	*CO4*
	b)	Derive a mathematical expression for the internal field in solid dielectrics and hence deduce Clausius-Mosotti equation.	*13*	*K2*	*CO4*
15.	a)	Describe the input and output characteristics of a transistor in CB configuration.	*13*	*K3*	*CO5*
		OR			
	b)	Explain Gummel Poon-model with neat circuit diagram.	*13*	*K2*	*CO5*

PART - C (1 × 15 = 15 Marks)

16.	a)	Explain the drain and transfer characteristics of an p-channel JFET.	*15*	*K2*	*CO6*
		OR			
	b)	Illustrate the working principle of SCR with V-I characteristics.	*15*	*K3*	*CO6*