Reg. No.												

Question Paper Code	12463

BE / B. Tech / M.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2023

Second Semester

Computer Science and Engineering

(Common to Information Technology, Computer Science and Engineering (AIML), Computer Science and Engineering (IoT), Computer Science and Engineering (Cyber Security), Artificial Intelligence and Data Science & M.Tech. - Computer Science and Engineering)

20BSPH203 - PHYSICS FOR INFORMATION SCIENCE

(Regulations 2020)

Duration: 3 Hours Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

		Marks, K-Level, CO
1.	State any four postulates of the classical free electron theory of solids.	*2,K1,CO1*
2.	What is periodic potential?	*2,K1,CO1*
3.	Bring out the differences between intrinsic and extrinsic semiconductors.	*2,K2,CO2*
4.	How do you increase the conductivity of semiconductors?	*2,K2,CO2*
5.	Write down the applications of the Hall effect.	*2,K1,CO3*
6.	What is magnetic susceptibility?	*2,K1,CO3*
7.	What is superconductivity?	*2,K1,CO4*
8.	The wavelength of light emission in an LED is 1.55 μm. Calculate the band gap in eV?	*2,K2,CO4*
9.	Relate the size of the material with its optical absorption wavelength and band gap energy.	*2,K2,CO5*
10.	What is a quantum dot?	*2,K2,CO5*

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11.	a)	Deduce mathematical expression for electrical conductivity and thermal conductivity of a conducting material and hence obtain Wiedemann-Franz law.	*13,K2,CO1*
		OR	
	b)	Derive an expression for the effective mass of an electron moving energy bands of a solid. Show how it varies with the wave vector.	*13,K2,CO1*
12.	a)	Derive an expression for the carrier concentration of an intrinsic semiconductor.	*13,K2,CO2*

OR

b) Obtain an expression for the carrier concentration of electrons in the conduction band of an n-type semiconductor. *13,K2,CO2*

13. a) Explain the construction and working of the Schottky diode and ohmic contact. *13,K2,CO3*

OR

b) Discuss briefly about the classification of magnetic materials based on magnetic moment/spin alignment. *13,K2,CO3*

14. a) Explain in detail carrier generation and recombination in semiconductors. *13,K2,CO4*

OR

b) Explain briefly about the following phenomenon in superconductors.

(i) Meissner effect *4,K2,CO4*

(ii) Effect of magnetic field *3,K2,CO4*

(iii) Effect of current *3,K2,CO4*

(iv) Josephson effect and its types *3,K2,CO4*

15. a) Describe the principle, construction and working of solar cells. *13,K3,CO5*

OR

b) Discuss principle, construction, working, advantages, drawbacks and applications of OLED. *13,K3,CO5*

PART - C (1 × 15 = 15 Marks)

16. a) Describe carbon nanotubes with types of structures, properties and applications. *15,K2,CO6*

OR

b) Discuss in detail about the principle, construction and working of a Single Electron Transistor (SET). *15,K2,CO6*