Reg. No.															

Question Paper Code	13698

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2025

Second Semester

Computer Science and Engineering

(Common to Artificial Intelligence and Data Science, Information Technology, Computer Science and Engineering (AIML), Computer Science and Engineering (IoT), Computer Science and Engineering (Cyber security) & M.Tech. - Computer Science and Engineering (5 Years Integrated))

20BSPH203 – PHYSICS FOR INFORMATION SCIENCE

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	*K – Level*	*CO*
1.	Example of low resistivity material is _____ (a) Silver (b) Manganese (c) Magnesium (d) Tungsten	*1*	*K1*	*CO1*
2.	At 0 K below Fermi energy, the probability of finding an electron is ____. (a) 0 (b) 0.5 (c) 1 (d) infinity	*1*	*K1*	*CO1*
3.	How does a semiconductor behave at absolute zero? (a) Conductor (b) Insulator (c) Semiconductor (d) Protection device	*1*	*K1*	*CO2*
4.	Acceptors are _____ impurity atoms (a) Trivalent (b) Pentavalent (c) Hexavalent (d) Heptavalent	*1*	*K1*	*CO2*
5.	The magnetization is defined by the ratio of _____ (a)Magnetic moment to area (b) Magnetic moment to volume (c) Magnetic flux density to area (d) Magnetic flux density to volume	*1*	*K1*	*CO3*
6.	_____ is used for writing/reading of data to/from a (a) Magnetic disk (b) Magnetic tape (c) Magnetic frames (d) Magnetic Ribbon	*1*	*K1*	*CO3*
7.	In Type-II superconductor the critical field is _____ than type-I (a) Lesser (b) Greater (c) Equal (d) Infinite	*1*	*K1*	*CO4*
8.	Materials that transmit light with minimum absorption and reflection are known as (a) Transparent (b) Translucent (c) Opaque (d) All the above	*1*	*K1*	*CO4*
9.	What is the field that integrates nanotechnology with biology called? (a) Nano electronics (b) Nanomedicine (c) Nanoengineering (d) Nanomaterials science	*1*	*K1*	*CO5*
10.	In which approach low volume structures-built atom by atom? (a) Bottom up (b) Left-right (c) Side by side (d) Right-left	*1*	*K1*	*CO6*

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

11.	Evaluate the Fermi function for an energy K_BT above the Fermi energy.	*2*	*K2*	*CO1*
12.	Recall Forbidden energy levels.	*2*	*K1*	*CO1*
13.	List any five differences in Elemental and Compound semiconductor.	*2*	*K2*	*CO2*
14.	Define diffusion transport.	*2*	*K1*	*CO2*
15.	What happens to the magnetic flux when a diamagnetic material is kept in a magnetic field?	*2*	*K2*	*CO3*
16.	Distinguish between soft and hard magnetic materials.	*2*	*K2*	*CO3*
17.	Discuss the absorption of light by semiconductors.	*2*	*K2*	*CO4*

18.	What are the applications and drawbacks of OLED?		*2*	*K2*	*CO4*
19.	The wavelength of light emission in an LED is 1.55 μm. Calculate the band gap in eV?		*2*	*K2*	*CO5*
20.	Tell about Fermi energy level of nano material.		*2*	*K2*	*CO5*
21.	Infer about the term quantum confinement.		*2*	*K1*	*CO6*
22.	What is Quantum dot Laser?		*2*	*K1*	*CO6*

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Derive the mathematical expression for Thermal conductivity of a conducting material.	*11*	*K2*	*CO1*
		OR			
	b)	Derive the mathematical expression for Electrical conductivity of a conducting material.	*11*	*K2*	*CO1*
24.	a)	Obtain an expression for the carrier concentration of holes in the valence band of a p-type semiconductor.	*11*	*K2*	*CO2*
		OR			
	b)	Obtain an expression for the carrier concentration of electrons in the conduction band of an n-type semiconductor.	*11*	*K2*	*CO2*
25.	a)	Derive an expression for hall coefficient. Hall coefficient for n-type and p-type semiconductor.	*11*	*K2*	*CO3*
		OR			
	b)	Classify the magnetic materials into dia, para, ferro, antiferro and ferromagnetism.	*11*	*K2*	*CO3*
26.	a)	Describe the working of magnetic hard disc based on GMR sensor.	*11*	*K2*	*CO4*
		OR			
	b)	Define the optical materials and categorize the optical materials based on carrier generation and recombination process.	*11*	*K2*	*CO4*
27.	a)	Compare Type –I and Type –II superconductors properties and application.	*11*	*K2*	*CO5*
		OR			
	b)	Construct the solar cell structure and discuss the working.	*11*	*K2*	*CO5*
28.	a)	Briefly discuss about the Carbon nanotubes and its properties and applications.	*11*	*K2*	*CO6*
		OR			
	b)	Examine the density of states in quantum well, quantum wire and quantum dot structure in detail.	*11*	*K2*	*CO6*