U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

July 2023 Semester End Main Examinations

Programme: B.E. **Semester: VI**
Branch: Institutional Elective **Duration: 3 hrs.**
Course Code: 19EC6OE1EM **Max Marks: 100**
Course: Electronic Engineering Materials **Date: 07.07.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	CO	PO	Marks
1	a)	A second-order reaction was observed. The reaction rate constant at three degrees Celsius was found to be 8.9×10^{-3} L/mol and 7.1×10^{-2} L/mol at 35 degrees Celsius. What is the activation energy of this reaction? Give description of all the parameters encountered in the equation used.	*CO1*	*PO1*	**10**
	b)	Classify the engineering materials based on nature and applications. List materials under each category and the uses of the same.	*CO 1*	*PO1*	**10**
		UNIT - II			
2	a)	Describe the conduction process of Metals, Semiconductors and Insulators with relevant band diagrams	*CO 1*	*PO1*	**10**
	b)	An n-type semiconductor is known to have an electron concentration of 5×10^{17} $(m)^{-3}$. Upon application of electric field 1000 V/m, the drift velocity measured is found to be 350 m/s. Determine the conductivity of the material. Give description of all the parameters encountered in the equation used.	*CO 1*	*PO1*	**10**
		OR			
3	a)	Define polarization. Explain different types of polarization with relevant diagrams. Highlight the frequency dependence of polarization.	*CO 1*	*PO1*	**10**
	b)	At room temperature the electron conduction of PbS is 25 $(ohmm)^{-1}$. The electron and hole mobilities are 0.06 and 0.02 m^{2}/Vs respectively. Compute the intrinsic carrier concentration of PbS at room temperature. Explain the importance of each parameter in the equation used.	*CO 1*	*PO1*	**10**
		UNIT - III			
4	a)	Differentiate between phosphorescence, fluorescence and luminance. List the materials that exhibit these phenomenon and the practical uses of the same.	*CO1*	*PO1*	**10**

		b)	Highlight the absorption process involved in direct and indirect type of semiconductor with relevant diagrams and equations.	*CO 1*	*PO1*	**10**
			UNIT - IV			
	5	a)	Describe the working principle of thermal evaporation deposition process with a neat schematic diagram. List any three advantages and disadvantages of the deposition method.	*CO 2*	*PO2*	**10**
		b)	With relevant schematic, explain the process flow of CVD process. List any two applications of CVD process.	*CO 2*	*PO2*	**10**
			UNIT - V			
	6	a)	Explain the working principle of Bragg's Law and Highlight the significance of X-rays used in determining the crystal structure.	*CO 2*	*PO2*	**10**
		b)	Discuss the uses and working principle of SEM with a schematic diagram and also write the different type of signals generated when the electron beam hits the surface of the sample	*CO 2*	*PO2*	**10**
			OR			
	7	a)	Analyze how AFM can be used to measure thickness of a thin film.	*CO 2*	*PO2*	**10**
		b)	Analyze the advantage and disadvantage of using TEM.	*CO 2*	*PO2*	**10**

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