## B.E/B.TECH, M.E/M.TECH, MBA, MCA, POLYTECHNIC & SCHOOL

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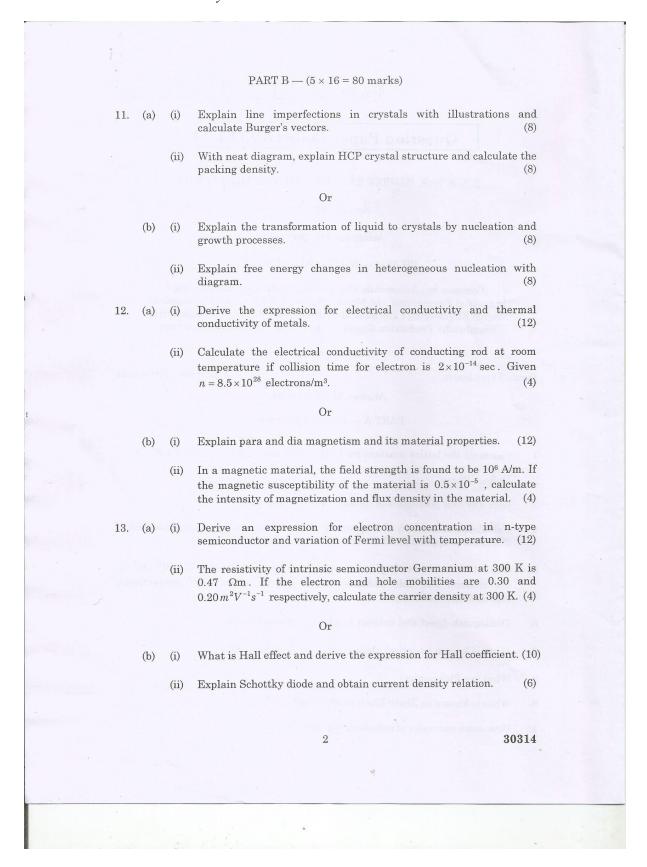
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Programme in a straight to make the part and place in the contract of			
Question Paper Code: 30314			
B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023.			
Second Semester			
Aerospace Engineering			
PH 3251 — MATERIALS SCIENCE			
(Common to : Automobile Engineering / Industrial Engineering / Industrial Engineering and Management / Manufacturing Engineering/ Marine Engineering / Mechanical Engineering / Mechanical Engineering (Sandwich)/ Production Engineering / Safety and Fire Engineering)			
(Regulations 2021)			
Time: Three hours Maximum: 100 marks			
Answer ALL questions.			
PART A — $(10 \times 2 = 20 \text{ marks})$			
1. Calculate the lattice constant for FCC crystal having atomic radius 1.476 Å.			
2. Define "Phase".			
3. Give any four postulates of classical free electron theory.			
<ol> <li>Calculate the intensity of magnetization of a material when a magnetic field of 2000 A/m is applied and has susceptibility of 1000.</li> </ol>			
5. The intrinsic carrier density at room temperature in Ge is $2.37 \times 10^{19} / m^3$ . If			
the electron and hole mobilities are 0.38 and $0.18m^2V^{-1}s^{-1}$ respectively, calculate the resistivity.			
6. Distinguish direct and indirect band gap semiconductors.			
7. What is known as optical absorption in semiconductors?			
8. What are Plasmonics?			
9. What is known as Zener-Bloch oscillations?			

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	14.	(a)	Explain carrier injection and various reconsemiconductor with proper illustration.	mbination processes in (16)
			Or	
		(b)	With neat diagram explain the construction and light emitting diode devices.	working of solar cell and (16)
	15.	(a)	Explain the Quantum structures such as Quanwith suitable illustrations.	ntum well, wire and dot (16)
			Or	
		(b)	Explain in detail the carbon nanotubes and	its properties. Give its
			applications in various fields.	(16)
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