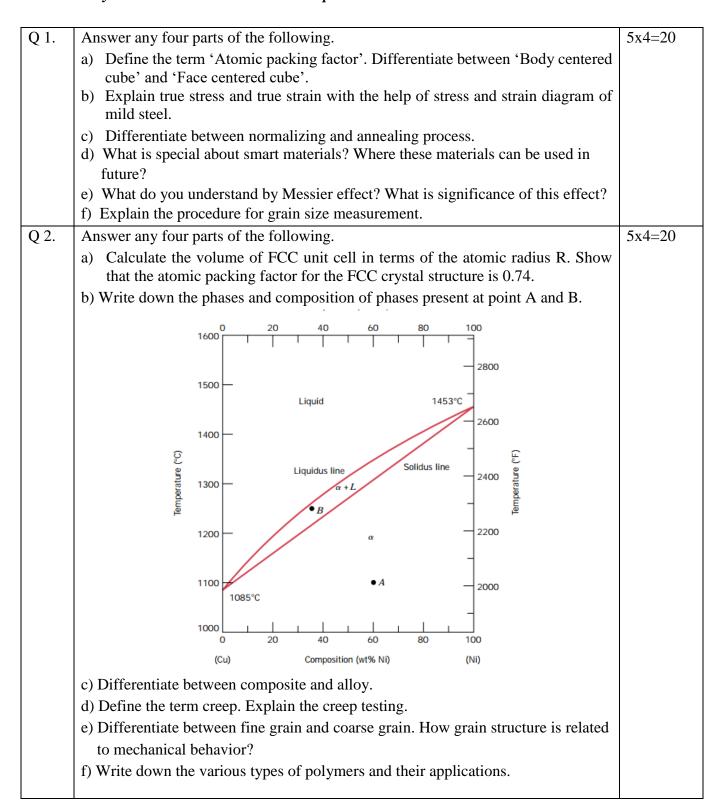
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## ODD SEMESTER EXAMINATION, 2022 – 23 (II<sup>nd</sup> year B.Tech. – Mechanical Engineering) Materials Science & Technology

Duration: 3:00 hrs Max Marks: 100

Note: - Attempt all questions. All Questions carry equal marks. In case of any ambiguity or missing data, the same may be assumed and state the assumption made in the answer.



Q 3.	Answer any two parts of the following.	10x2 = 20
	a) Draw Iron-Carbon Phase diagram. For a 99.65 wt% Fe-0.35 wt% C alloy at a	
	temperature just below the eutectoid, determine the following:	
	(i) The fractions of total ferrite and cementite phase	
	(ii) The fractions of the pro-eutectoid ferrite and pearlite	
	(iii) The fraction of eutectoid ferrite.	
	b) Explain TTT diagram for eutectoid steel. Also explain different microstructures obtained by different modes of cooling (i.e. furnace/air/water). Explain martensite and its crystal structure.	
	c) Explain flow diagram for production of Cast Iron and Steel.	
Q 4.	Answer any two parts of the following.	10x2 = 20
	a) Define Fatigue and mention two fatigue resistant materials. What is its effect on properties of material? What is the procedure of conducting 'Fatigue test'?	
	b) Explain Type I and Type II superconductors. Also explain high Tc	
	superconductor.	
	c) Explain the following	
	(i) Screw dislocation	
	(ii) Write name of seven crystal systems.	
	(iii) Tempering	
	(iv) Differentiate between brass and bronze	
	(v) Differentiate between Dia, para and ferro-magnetic materials.	
Q 5.	Answer any two parts of the following.	10x2 = 20
	a) Explain ultrasonic non-destructive test and magnetic particle inspection method.	
	b) Why is heat treatment imparted to steel? Name different heat treatment processes	
	and explain their objectives.	
	c) Discuss salient features and uses of the following;	
	(i) Nickel super alloys	
	(ii) Nano materials	
	(iii) Ceramics	
	(iv) Adhesive	
	(v) Corrosion resistance materials	

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