Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– III (New) EXAMINATION – WINTER 2019

Subject Code: 2132004 Date: 3/12/2019

Subject Name: Principles Of Materials Science And Physical Metallurgy

Time: 02:30 PM TO 05:30 PM Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1	**(a)**	Explain the need of material science in Engineering applications.	**03**
	(b)	Mention various polycrystalline and non-crystalline materials.	**04**
	(c)	Discuss the factors that are taken into consideration in selecting materials for engineering application.	**07**
Q.2	**(a)**	Derive Bragg's Law.	**03**
	(b)	Draw a unit cells and show the following planes (1) 100 (2)111 (3) 112 (4) 001	**04**
	(c)	Draw and Explain iron – iron carbide diagram.	**07**
		OR	
	(c)	Explain Eutectic, Eutectoid, Peritectic and Peritectoid Systems.	**07**
Q.3	**(a)**	Ductile materials are tougher than brittle ones. Why?	**03**
	(b)	Differentiate between Micro Examination and Macro Examination of Engineering Metallic Materials.	**04**
	(c)	What is the use of Jominy hardenability test? Explain in Detail.	**07**
		OR	
Q.3	**(a)**	What is creep? Explain the factors affecting it.	**03**
	(b)	Differentiate crystalline and non-crystalline structure.	**04**
	(c)	Define heat treatment? Explain various stages of heat treatment.	**07**
Q.4	**(a)**	Differentiate between carburizing and nitriding.	**03**
	(b)	Define the following properties of engineering materials. (1) Stress (2) Strength (3) Ductility (4) Fatigue	**04**
	(c)	Explain TTT diagram with fully labeling.	**07**
		OR	
Q.4	**(a)**	What is difference between Pre sintering and sintering?	**03**
	(b)	Give the overview of Hardening, tempering and normalizing processes.	**04**
	(c)	Explain Gibb's phase Rule.	**07**
Q.5	**(a)**	Enlist the various techniques for powder production. Explain any one with neat sketch.	**03**
	(b)	Write down comparison of destructive and non destructive test.	**04**
	(c)	Explain magnetic particle test with diagram. State its application.	**07**
		OR	
Q.5	**(a)**	Define and explain annealing process.	**03**
	(b)	Explain the Principal of Ultrasonic Testing with neat sketch.	**04**
	(c)	What is powder metallurgy? Discuss advantages and disadvantages of powder metallurgy techniques.	**07**

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