Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III(New) EXAMINATION – SUMMER 2016

Subject Code:2132004 Date:04/06/2016

Subject Name:Principles Of Materials Science And Physical Metallurgy

Time:10:30 AM to 01:30 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		Short Questions	14
	1	For large value of Permeability (μ) magnetization factor (H) should be (A) Larger (B) Smaller (C) Equal (D) None	
	2	Total number of Atoms in HCP structure is (A) 6 (B) 4 (C) 2 (D) 1	
	3	Pulse Echo system is a type of (A) Liquid penetrate method (B) Fluroscopy (C)Ultra sonic inspection (D) Radiography	
	4	Which variable affects the Fatigue life? (A) Temperature (B) Force (C) Weight (D) Friction	
	5	A cast iron with 3% of carbon is called as (A) Hypoeutectoid (B) Hypereutectoid (C)Hypoeutectic (D) Hypereutectic	
	6	Degree of Freedom at triple point in unary system is (A) 0 (B) 1 (C) 2 (D) -1	
	7	Above the following line, liquid phase exists for all composition in phase diagram (A) Tie line (B) solves (C) sodius (D) liquidus	
	8	Eutectoid product in Fe-C system is called (A) Pearlite (B) Bainite (C) Ledebarite (D) Spherodite	
	9	An Atomic Packing factor is (A) Distance between two adjacent atoms (B) Projected area fraction of atoms on a plane (C) Volume fraction of atoms in cell (D) None	
	10	Gibbs phase Rule for general system is (A) P+F = C-1 (B) P+F= C+1 (C) P+F = C-2 (D) P+F = C+2	
	11	Melting point of pure Bismuth is (A) 271°C (B) 275°C (C) 260°C (D) 265°C	
	12	Write down any Three names of Quenching Media.	
	13	Define the term “Phase”.	
	14	Define Allotropy.	
Q.2	(a)	Compare the macrostructure and microstructure examination.	03
	(b)	Write down the name of basic type of Crystal structure and	04

		explain B.C.C structure.	
	(c)	Differentiate metal and non metal and enlist the Engineering requirement of material.	07
		OR	
	(c)	Define the line defect in crystal imperfection and explain Edge dislocation.	07
Q.3	(a)	Write down working principle of spark test.	03
	(b)	Explain Gibb's Phase Rule.	04
	(c)	Draw Iron-Carbon diagram with all necessary details.	07
		OR	
Q.3	(a)	Calculate the Atomic Packing factor for F.C.C structure.	03
	(b)	Explain the cooling curve for Pure metal.	04
	(c)	Describe Jominy Hardenability test with neat sketch.	07
Q.4	(a)	Explain Full Annealing process.	03
	(b)	Define: (1) Fatigue (2) Fracture (3) Creep	04
	(c)	Differentiate Flame hardening and Induction hardening process on the basis of parametric control, process features, safety & productivity.	07
		OR	
Q.4	(a)	Write down the factors affecting the Hardenability.	03
	(b)	Write down the types of Fracture and explain Ductile fracture.	04
	(c)	Define heat treatment process and explain Nitriding process	07
Q.5	(a)	Write down the advantages of Ultrasonic non destructive testing.	03
	(b)	Define NDT and Write down its objectives.	04
	(c)	What is Powder Metallurgy? Explain its Applications in Brief.	07
		OR	
Q.5	(a)	Write down the principle of Magneto Particle testing.	03
	(b)	Explain X-Ray Fluoroscopy.	04
	(c)	Explain Sintering Process in Brief.	07

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