Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI • EXAMINATION – SUMMER 2013

Subject Code: 162103 **Date: 28-05-2013**

Subject Name: Powder Metallurgy

Time: 10.30 am - 01.00 pm **Total Marks: 70**

Instructions:

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

Q.1	**(a)**	What is Powder Metallurgy? With a flow sheet explain briefly basic powder metallurgy process steps.	**07**
	(b)	List advantages (process, metallurgical, commercial) and limitations of powder metallurgy. List examples of powder metallurgy products.	**07**
Q.2	**(a)**	What is atomization? List atomization techniques. With neat sketch explain water atomization technique.	**07**
	(b)	Describe briefly: Apparent density, Tap density, Flaw rate.	**07**
		OR	
	(b)	List the methods for determination of particle size and particle size distribution of metallic powder. Explain sieve analysis method.	**07**
Q.3	**(a)**	What do you understand by metal powder characteristics? Explain briefly their effects during compacting and sintering operations.	**07**
	(b)	List the techniques of powder manufacture by mechanical processes. Discuss ball milling and explain the importance of critical speed.	**07**
		OR	
Q.3	**(a)**	List various pre-treatments to which powders are subjected to before compaction. Explain why they are necessary.	**07**
	(b)	What are the basic principles of compacting? Discuss briefly different types of die compaction techniques.	**07**
Q.4	**(a)**	Explain the necessity of use of lubricants in the die compaction of powders. Discuss commonly used lubricants.	**07**
	(b)	Discuss isostatic pressing. What are its advantages over die compaction?	**07**
		OR	
Q.4	**(a)**	Write a short note on powder rolling.	**07**
	(b)	What is sintering? Discuss the mechanism of sintering.	**07**
Q.5	**(a)**	What is liquid phase sintering? What are its advantages?	**07**
	(b)	Discuss manufacturing of porous bearings by powder metallurgy technique.	**07**
		OR	
Q.5	**(a)**	Why cemented carbide tools are produced by powder metallurgy technique? Explain its manufacturing process.	**07**
	(b)	Write a short note on sintering furnaces.	**07**

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