Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI • EXAMINATION – WINTER • 2014

Subject Code: 162103 **Date: 01-12-2014**

Subject Name: Powder Metallurgy

Time: 02:30 pm - 05:00 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 do you understand by powder metallurgy? Using flow chart show steps of powder metallurgy. List applications of powder metallurgy.	**07**
	(b)	List methods of powder production. Discuss in detail water atomization process.	**07**
Q.2	**(a)**	Name mechanical methods of powder production. Explain objective and mechanism of milling.	**07**
	(b)	Define: (i) Aspect ratio (ii) Shape factor (iii) Apparent density (iv) Tap density (v) Flow rate (vi) Angle of repose (vii) Porosity.	**07**
		OR	
	(b)	List the powder characteristics that affect the properties of final product and explain their effects.	**07**
Q.3	**(a)**	Explain in detail Electrodeposition method of powder production.	**07**
	(b)	What are various steps of powder conditioning prior to compaction? Explain blending and mixing of powder.	**07**
		OR	
Q.3	**(a)**	Explain with suitable diagrams variation of density during compaction. What is the reason for green density variation across sample length in single die compaction? How it can be improved?	**07**
	(b)	Explain single and double action presses. What is the effect of lubricants? List commonly used lubricants.	**07**
Q.4	**(a)**	Write a short note on powder rolling.	**07**
	(b)	Why sintering is necessary after compaction? Explain sintering stages with suitable diagrams.	**07**
		OR	
Q.4	**(a)**	Explain production of carbide tools by powder metallurgy.	**07**
	(b)	Discuss effect of sintering variables on properties of sintered products.	**07**
Q.5	**(a)**	Explain Isostatic pressing process.	**07**
	(b)	Write short note on powder extrusion process.	**07**
		OR	
Q.5	**(a)**	Discuss advantages and limitations of powder metallurgy.	**07**
	(b)	Explain the importance of die design for compaction. Discuss the die materials generally used for compaction.	**07**

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