Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2162103 **Date: 27/04/2017**

Subject Name: Powder Metallurgy

Time: 10:30 AM to 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.**

			MARKS
Q.1		**Short Questions**	**14**
	1	Define Powder metallurgy	
	2	Cemented Refractory materials were developed only after year _____ A.1908 B.1910 C 1947 D.1975	
	3	Write the applications of powder metallurgical parts possessing controlled porosity	
	4	What is the purpose of powder testing?	
	5	List out the basic characteristics of metal powders	
	6	What is the detrimental effect of insoluble oxides in metal powder?	
	7	Draw different particle shapes.	
	8	List the factors affecting Apparent density.	
	9	Define Flow rate of powder.	
	10	What do you mean by Green strength?	
	11	What is the main driving force for sintering? A. Increase in free energy due to decrease in surface area B. Decrease in free energy due to decrease in surface area C. Decrease in free energy due to increase in surface area D. Increase in free energy due to increase in surface area	
	12	List various powder production methods.	
	13	What is cermet?	
	14	Define Friction index.	
Q.2	**(a)**	What are the advantages of manufacturing gears by powder metallurgy route compare to casting method?	**03**
	(b)	Explain Green spring effect.	**04**
	(c)	Write the Advantages and limitations of powder metallurgy.	**07**
		OR	
	(c)	Draw the flow diagram for polycrystalline ferrite preparation. Write applications of ferrite material.	**07**
Q.3	**(a)**	What are the advantages of particle size analysis by sieving method?	**03**
	(b)	What are the basic requirement should be fulfill by powder mixing plant?	**04**

	(c)	Explain water atomization process with schematic diagram	**07**
		OR	
Q.3	**(a)**	The main factor is not the particle size but particle size distribution for altering the apparent density-Justify the statement.	**03**
	(b)	Describe the role of lubrication during compacting.	**04**
	(c)	Explain die compaction technique in brief with mandatory features.	**07**
Q.4	**(a)**	Differentiate the Blending and Mixing.	**03**
	(b)	Explain high energy rate forming method.	**04**
	(c)	Write short note on Isostatic pressing.	**07**
		OR	
Q.4	**(a)**	Tap density measurement reduce the cost of the powder? How?	**03**
	(b)	Describe the advantages and limitation of Hot pressing.	**04**
	(c)	What is powder rolling? Explain in detail.	**07**
Q.5	**(a)**	Draw schematic diagram of powder extrusion pressing.	**03**
	(b)	Write properties of sintered friction materials	**04**
	(c)	What do you understand by Dispersion strengthened materials? List various manufacturing methods for it. Describe application and limitation of dispersion strengthened materials	**07**
		OR	
Q.5	**(a)**	Explain in brief Powder forging	**03**
	(b)	Describe the stages of sintering.	**04**
	(c)	Write short note on liquid phase sintering.	**07**

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