

**GUJARAT TECHNOLOGICAL UNIVERSITY**

**BE - SEMESTER-VI (NEW) - EXAMINATION – SUMMER 2018**

**Subject Code:2162103**

**Date:28/04/2018**

**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.

- Q.1** (a) List the basic steps in the P/M technique. **03**  
 (b) How many ways one can produces metal powder production? **04**  
 (c) What are the advantages and limitations of Powder Metallurgy? **07**
- Q.2** (a) Micro-hardness of sinter compact dependences on porosity—Justify the statement. **03**  
 (b) The main factor for altering the apparent density is not the particle size but particle size distribution.—Justify statement. **04**  
 (c) What do you mean by characterization of metal powders? Discuss the tool(s) & techniques used for the characterization of metal powders with respect to their purity, shape, size and green strength. **07**
- OR**
- Q.3** (c) Define flow rate of powders. How it is to be measured? **07**  
 (a) Explain the term: (i) Tap Density (ii) Flowability (iii) Apparent Density **03**  
 (b) Why apparent density so important in P/M? **04**  
 (c) How do you determine particle size distribution by Sieve Analysis? Give the ASTM standard for such measurement. **07**
- OR**
- Q.3** (a) What is the atomization process for manufacturing of metal powder? Draw neat sketch to show this process. **03**  
 (b) Illustrate with figure the mechanism of atomization. **04**  
 (c) How do you distinguish between gas and water atomization? Briefly Explain. **07**
- Q.4** (a) What do you mean by compatibility and green density? **03**  
 (b) What are the steps involved in powder rolling to manufacture the sheet? **04**  
 (c) By which technique the difficulty in conventional die compaction can be overcome? Explain it Briefly. **07**
- OR**
- Q.4** (a) What do you mean by blending and mixing of powder? **03**  
 (b) Classify powder compaction methods with and without pressure. **04**  
 (c) Explain pyrophoricity and toxicity of powders. **07**
- Q.5** (a) What is slip in slip casting method? **03**  
 (b) Explain with figure double die compaction method. **04**  
 (c) What is the effect of type of compaction on green density distribution? Explain with figure. **07**
- OR**
- Q.5** (a) What is the purpose of Sintering in P/M? **03**  
 (b) Explain solid state sintering briefly. **04**  
 (c) With schematic diagram of progress of sintering. Explain in detail liquid phase sintering. **07**

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