

III B.Tech I Semester Supplementary Examinations, November 2006**POWDER METALLURGY****(Metallurgy & Material Technology)****Time: 3 hours****Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Define 'Powder Metallurgy'. Explain how powder metallurgy is different and advantageous to other manufacturing processes? [8]
(b) Explain with the help of neat flow chart, the basic steps involved in powder metallurgy. [8]
2. Explain the following powder production methods. Give the characteristics of the powders thus produced.
 - (a) Production of iron powder by reduction of mill scale
 - (b) Production of Ni powders by thermal decomposition
 - (c) Production of atomized iron powders
 - (d) Production of Cu powders by rotating electrode process (REP) [4*4=16]
3. (a) Classify and describe powder particle shapes. [4]
(b) Explain the following particle size measurement techniques.
 - i. Sedimentation and
 - ii. Elutriation [6]
(c) How particle shape and size are measured by microscopic techniques. [6]
4. (a) Explain the following Powder Characteristics
 - i. Chemical Composition and Structure.
 - ii. Surface topography.
 - iii. Flow rate and
 - iv. Apparent density and tap density. [4*3=12]
(b) Explain how metal powders are stored to prevent them from pyrophoric and toxic behaviour. [2]
(c) Explain why metal powders are subjected to annealing treatment and when? [2]
5. (a) Classify compaction methods and explain various process variables to distinguish various compaction techniques. [4]
(b) List out various types of die compaction techniques and mention their merits and demerits. [8]
(c) Explain Isostatic compaction and give its advantages. [4]

6. (a) Describe the behaviour of metal powder during compaction. [6]
(b) Define Sintering and how is it different from hot pressing. [4]
(c) Explain Sintering process with the help of various stages. [6]
7. (a) Explain the various zones of sintering furnace with respect to their role and operation. [6]
(b) Explain various methods of conveying compacts to the sintering furnace? [4]
(c) What are the functions of sintering atmospheres and explain the characteristics of various sintering atmospheres. [6]
8. Write short notes on the following:
 - (a) Manufacture of cermets and their applications. [4]
 - (b) Manufacture of Self - Lubricating bearings. [4]
 - (c) Production of bronze filters [4]
 - (d) Powder Metallurgy processing of materials for aerospace applications. [4]

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